7050.0219 HUMAN HEALTH-BASED CRITERIA AND STANDARDS.

Subpart 1. **Objective.** Human health-based criteria and standards protect humans from potential adverse effects of eating fish and edible aquatic organisms and incidental ingestion of water while recreating in Class 2 waters and from the consumption of drinking water from Class 1 surface waters (includes Class 2A and 2Bd waters). Human health-based criteria and standards must be determined using the methods in this part.

Subp. 2. **Applicability of methods.** Human health-based chronic criteria (CC) or chronic standards (CS) must be evaluated based on the pollutant's toxicological profile: noncarcinogen or nonlinear carcinogen (NLC), developmental susceptibility, and linear carcinogen (C).

A. Algorithms for these toxicological profiles by Class 2 subclasses are described in subparts 13 to 15. Other scientifically defensible algorithms may be applied by the commissioner on a chemical-specific basis for evaluating developmental susceptibility to toxic pollutants in fish tissue based on the consideration listed in subparts 3 to 5.

B. The most stringent CC or CS by medium (water or fish tissue), Class 2 subclass, and toxicological profile, or taste and odor criteria as described in part 7050.0218, subpart 8, are the final applicable human health-based CC or CS.

Subp. 3. **Available and reliable scientific data.** The data and information used to develop a site-specific CC or CS must be approved by the commissioner. The commissioner must consider measures of availability and reliability of the data and information.

Subp. 4. **Toxicological values.** The RfD used to calculate criteria for noncarcinogenic and nonlinear carcinogenic chemicals (NLC) and the CSF and $AF_{lifetime}$ or CSF and ADAF used to calculate CC or CS for linear carcinogenic (C) chemicals are obtained from the MDH or developed according to parts 4717.7820, subparts 5 and 21, and 7050.0218, subpart 3.

Subp. 5. **Exposure values.** Drinking water intake rates are obtained from the MDH. RSC uses a default value of 0.2 for most pollutants, unless:

A. there are no significant known or potential sources other than those addressed for the designated use, then 0.5 must be used; or

B. sufficient exposure data are available to support an alternative pollutant-specific value between 0.2 and 0.8.

Subp. 6. **Bioaccumulation factors.** This subpart describes the process and data for deriving bioaccumulation factors (BAF) used in the calculation of the human health-based chronic criteria (CC) or chronic standards (CS).

A. Information used for defining BAF must be consistent with the pollutant form used to derive the RfD or CSF. BAF development must also consider other forms that bioaccumulate in fish tissue. The preferred bioaccumulation data are available and reliable field and laboratory studies.

B. A general description of the steps and data used to determine final state or site BAF are listed in subitems (1) to (6) and described in detail in subparts 7 to 12.

(1) Categorize the pollutant based on certain properties into one of three broadly defined chemical categories: nonionic organic, ionic organic, or inorganic and organometallic chemicals as described in subpart 7.

(2) Define the methods for developing baseline BAF as described in subpart 8. A baseline BAF is the expression of the BAF based on the bioavailable or freely dissolved fraction of a pollutant in the ambient water and normalized concentration of the pollutant within the organism.

(3) Determine the relevant procedure (1 to 6) for identifying the acceptable baseline BAF methods (maximum of four) and their hierarchy for developing individual or aquatic species-specific baseline BAF as described in subpart 9.

(4) Calculate species mean baseline BAF from acceptable individual baseline BAF as described in subpart 10.

(5) Determine final baseline BAF for TL_3 and TL_4 as described in subpart 11.

(6) Develop final state or site BAF for TL_3 and TL_4 based on default parameters by Class 2 subclass or site-specific data as described in subpart 12.

Subp. 7. **Chemical categorization.** For BAF purposes, organic chemicals that have no or negligible ionization at the pH range of ambient surface waters are categorized as nonionic organic chemicals; organic chemicals that undergo ionization at the pH range of ambient surface waters are categorized as ionic organic chemicals and further delineated for BAF development based on subpart 9, item C; organometallic chemicals and other chemicals or elements are categorized as organometallic and inorganic chemicals.

Subp. 8. **Methods for baseline BAF.** The four methods for developing baseline BAF in items A to D are listed in a hierarchy from most preferred to least preferred, except as noted in subpart 9: use of field-measured BAF studies (field BAF); use of field-measured BSAF studies (field BSAF); use of laboratory-measured BCF studies with food chain multipliers (lab BCF*FCM); and use of octanol-water partition coefficients with food chain multipliers (K_{ow}*FCM). Where relevant, differences in the baseline BAF methods are described by chemical categorization.

A. Method 1: Field BAF. The field-measured BAF for a nonionic organic chemical is calculated based on the total concentration of the chemical in the appropriate tissue of the aquatic organism (on a wet tissue basis) and the total concentration of chemical in ambient surface water at the site of sampling (BAF^{t}_{T}).

measured $BAF^{t}_{T} = C_t/C_w$

where: BAF^{t}_{T} = field-measured BAF based on total concentration in tissue and water (L/kg)

C_t = total concentration of the chemical in the specified wet tissue (µg/kg)

C_w = total concentration of the chemical in water (µg/L)

The measured BAF^{t}_{T} is converted to a baseline BAF or BAF_{l}^{fd} by the following equation:

$$\text{baseline } BAF_{l}^{fd} = \left[\frac{\text{measured } BAF_{T}^{t}}{f_{fd}}\right]\left(\frac{1}{f_{l}}\right)$$

where: baseline BAF_{l}^{fd} = BAF expressed on a freely dissolved and lipid-normalized basis (L/kg)

f_l = fraction of the tissue that is lipid

f_{fd} = fraction of the total chemical that is freely dissolved in ambient surface water

The freely dissolved fraction or f_{fd} is the portion of the nonionic organic chemical that is not bound to particulate organic carbon or dissolved organic carbon and is calculated:

$$f_{fd} = \frac{1}{[1 + (POC \times K_{OW}) + (DOC \times 0.08 \times K_{OW})]}$$

where: POC = concentration of particulate organic carbon (kg/L)

DOC = concentration of dissolved organic carbon (kg/L)

K_{OW} = n-octanol water partition coefficient for the chemical

POC and DOC concentrations are obtained from the original study from which the field-measured BAF is determined. If POC and DOC concentrations are not reported in the BAF study, reliable estimates of POC and DOC are obtained from other studies at closely related sites within the same water body. If no study data are available, the USEPA national default DOC and POC values are used, as they are representative of average ambient surface water conditions. The USEPA national default values are DOC of 2.9 mg/L and POC of 0.5 mg/L, converted to kg/L by dividing by 1,000,000.

For the field-measured BAF for a chemical classified as inorganic and organometallic, the field BAF is equal to the baseline BAF and is not expressed on a lipid or freely dissolved fraction basis. Normalization on other characteristics must be supported by chemical-specific data.

B. Method 2: Field BSAF. For nonionic organic chemicals, the field-measured BSAF is determined by relating lipid-normalized concentration of the chemical in the appropriate tissue of the aquatic organism to organic carbon-normalized concentrations of the chemical in surface sediment.

$$BSAF = \frac{C_l}{C_{soc}}$$

where: BSAF = biota-sediment accumulation factor for the chemical (kg of sediment organic carbon/kg of lipid)

C_l = lipid-normalized concentration of the chemical in the specified wet tissue (µg/g lipid), calculated as:

$$C_l = \frac{C_t}{f_l}$$

where: f_l = fraction lipid content in the tissue

Other variables as defined under item A

C_{soc} = organic-carbon normalized concentration of a chemical in surface sediment samples (µg/g sediment organic carbon), calculated as:

$$C_{soc} = \frac{C_s}{f_{oc}}$$

where: C_s = concentration of chemical in dry sediment (µg/g sediment)

f_{oc} = fraction organic carbon in dry sediment

The measured BSAF is converted to a baseline BAF or BAF_l^{fd} by the following equation:

$$(\text{baseline BAF}_l^{fd})_i = (\text{BSAF})_i \frac{(\Pi_{socw})_r\ (D_{i/r})\ (K_{OW})_i}{(K_{ow})_r}$$

where: $(\text{baseline BAF}_l^{fd})_i$ = BAF expressed on a freely dissolved and lipid-normalized basis for chemical of interest "i" or the chemical that is the basis of the criteria (L/kg)

BSAF_i = measured BSAF for the chemical "i" (kg organic carbon/kg of lipid)

$(\Pi_{socw})_r$ = sediment to water partition coefficient or sediment organic carbon to freely dissolved concentration ratio of the reference chemical "r." Reference chemicals with $(\Pi_{socw})_r/(K_{ow})$ similar to that of the chemical of interest are preferred for this method (L/kg sediment organic carbon)

$$\left(\prod_{socw}\right)_r = \frac{\left(C_{soc}\right)_r}{\left(C_w^{fd}\right)_r}$$

where: $(C_{soc})_r$ = concentration of the reference chemical "r" in dry sediment normalized to sediment organic carbon (μg/kg sediment organic carbon)

$(C^{fd}_w)_r$ = concentration of the reference chemical "r" freely dissolved in water (μg/L)

$(D_{i/r})$ = ratio between $\Pi_{socw/}K_{ow}$ for chemicals "i" and reference chemical "r"; a ratio equal to or close to one is preferred

$(K_{ow})_i$ = octanol-water partition coefficient for the chemical "i"

$(K_{ow})_r$ = octanol-water partition coefficient for the reference chemical "r"

Other variables as defined under item A

C. Method 3: Lab BCF*FCM. The laboratory-measured BCF for nonionic organic chemicals is calculated based on the total concentration of the chemical in the appropriate tissue of the aquatic organism (on a wet tissue basis) and the total concentration of chemical in the study water (BCF^t_T).

$$\text{measured BCF}^t_T = \frac{C_t}{C_w}$$

where: C_w = total concentration of chemical in the laboratory test water (µg/L)

Other variables as defined under item A

Baseline BAF_1^{fd} equation:

$$\text{baseline } BAF_1^{fd} = (FCM)\left[\frac{\text{measured } BCF_T^t}{f_{fd}} - 1\right] x \left(\frac{1}{f_1}\right)$$

where: f_{fd} = fraction of the total chemical in the test water that is freely dissolved, where POC and DOC or reasonable estimates based on total organic carbon (TOC) values measured in the test water are used, unless not available, then the following defaults are used based on typical lab water characteristics: DOC of 2.5 mg/L and POC at 0 mg/L, converted to kg/L by dividing by 1,000,000

FCM = food chain multiplier

Other variables as defined under item A

For ionic organic, inorganic, and organometallic chemicals, based on available data, the laboratory BCF is equal to the baseline BAF and is not expressed on a lipid or freely dissolved fraction basis. Normalization on other characteristics must be supported by chemical-specific data. FCM must come from field BAF studies.

D. Method 4: K_{ow}*FCM. In this method, K_{ow} is assumed to be equal to the baseline BAF_1^{fd} for certain nonionic organic chemicals described in the procedures.

$$\text{baseline } BAF_1^{fd} = (FCM) \text{ x } (K_{ow})$$

where: Variables as defined under items A and C

Subp. 9. **Hierarchy of acceptable baseline BAF methods.** Determine the hierarchy of acceptable baseline BAF methods available under subpart 8 for appropriate use based on the chemical categorization of the pollutant and other relevant properties as described under Procedures 1 to 6.

A. Procedures 1 to 6 are used for defining the hierarchy and use of the four baseline BAF methods based on chemical categorization and a chemical's ionization state in ambient surface waters, hydrophobicity, biomagnification, and metabolism in aquatic organisms, primarily freshwater fish species. Table 1 provides the basic information for identifying the acceptable procedures and hierarchy for baseline BAF methods as described under items B to D:

<table>
<tr><td colspan="6">Table 1.</td></tr>
<tr><td colspan="6">Chemical Categorization</td></tr>
<tr><td colspan="4">Nonionic Organic and Ionic (negligible ionization)
Organic Chemicals</td><td colspan="2">Inorganic, Organometallic, and Ionic Chemicals</td></tr>
<tr><td colspan="4">Hydrophobicity</td><td colspan="2">Biomagnification Factor (BMF)</td></tr>
<tr><td colspan="2">log $K_{ow} \geq 4$</td><td colspan="2">log $K_{ow} < 4$</td><td rowspan="3">BMF ≤ 1,000</td><td rowspan="3">BMF > 1,000</td></tr>
<tr><td colspan="4">Metabolism in Aquatic Organisms (Fish)</td></tr>
<tr><td>Low or Unknown</td><td>High</td><td>Low or Unknown</td><td>High</td></tr>
<tr><td colspan="6">Procedures:</td></tr>
<tr><td>Procedure 1</td><td>Procedure 2</td><td>Procedure 3</td><td>Procedure 4</td><td>Procedure 5</td><td>Procedure 6</td></tr>
<tr><td>1) Field BAF
2) Field BSAF
3) Lab BCF*FCM
4) K_{ow}*FCM</td><td>1) Field BAF
2) Field BSAF
3) Lab BCF</td><td>1) Field BAF or Lab BCF
2) K_{ow}</td><td>Field BAF or Lab BCF</td><td>Field BAF or Lab BCF</td><td>1) Field BAF
2) Lab BCF*FCM</td></tr>
</table>

B. For nonionic (neutral) organic chemicals, defined as chemicals that have no or negligible ionization in ambient surface water, Procedures 1 to 4 describe the hierarchy of acceptable baseline BAF methods to use.

(1) Procedure 1 applies to nonionic organic chemicals with moderate to high hydrophobicity defined as log K_{ow} greater than or equal to (≥) 4 and either a low level of documented metabolism in aquatic organisms or lack of sufficient data to characterize metabolism. All four baseline BAF methods are available for use based on the stated hierarchy in Table 1 and availability of acceptable data.

(2) Procedure 2 applies to nonionic organic chemicals with moderate to high hydrophobicity defined as log $K_{ow} \geq 4$ and a high level of documented metabolism in aquatic organisms. The acceptable methods are field BAF, BSAF, and lab BCF*FCM, where FCM is equal to one.

(3) Procedure 3 applies to nonionic organic chemicals with low hydrophobicity defined as log K_{ow} less than (<) 4 and either a low level of documented metabolism in aquatic organisms or lack of sufficient data to characterize metabolism. The acceptable methods are field BAF or lab BCF*FCM, with equal preference given, and K_{ow}*FCM, where FCM is equal to one in both methods.

(4) Procedure 4 applies to nonionic organic chemicals with low hydrophobicity defined as log $K_{ow} < 4$ and high levels of documented metabolism in aquatic organisms. Equal preference is given to both acceptable methods: field BAF or lab BCF*FCM, where FCM is equal to one.

C. For ionic organic chemicals (defined as chemicals that can readily accept or donate protons) the procedures that define the available hierarchy and appropriate baseline

BAF methods depend on further characteristics of the chemical. The main characteristics relate to exhibiting primarily nonionic (neutral) characteristics (ionization is negligible) or ionic characteristic in average surface water pH ranges based on its acid dissociation constant (K_a) expressed as the negative base 10 log (pK_a) and functional group or groups:

(1) When ionization is negligible, the chemical is categorized as a nonionic organic chemical and baseline BAF procedures are applied based on hydrophobicity and metabolism characteristics described for Procedures 1 to 4 under item B, subitems (1) to (4).

(2) In all other cases, the chemical is categorized with inorganic and organometallic chemicals and addressed with Procedure 5 or 6 under item D, subitem (1) or (2).

Available chemical-specific data that supports more defensible baseline BAF methods must be used in place of these default assignments.

D. Inorganic and organometallic chemicals are defined as inorganic minerals, other inorganic chemicals, and elements: metals and metalloids and organometallic chemicals, and Procedures 5 and 6 define the use of acceptable baseline BAF methods. Procedures 5 and 6 are distinguished by the determination of whether the chemical demonstrates biomagnifications through field BAF or laboratory BCF studies, with BAF or BMF greater than 1,000 being the cut-off for this purpose. BMF is calculated using chemical concentrations in the tissue of aquatic organisms at two successive trophic levels as:

$$BMF_{(TL,\ n)} = C_{t\ (TL,\ n)} / C_{t\ (TL,\ n-1)}$$

where: $C_{t\ (TL,\ n)}$ = total concentration of relevant chemical form or forms in appropriate tissue of predator organism at trophic level "n" (may be either wet weight or dry weight concentration so long as both the predator and prey concentrations are expressed in the same manner) (μg/kg)

$C_{t\ (TL,\ n-1)}$ = total concentration of relevant chemical form or forms in appropriate tissue of prey organism at the next lower trophic level from the predator (may be either wet weight or dry weight concentration so long as both the predator and prey concentrations are expressed in the same manner) (μg/kg)

(1) Procedure 5 applies when geometric mean BAF or BMF is less than or equal to 1,000 when comparing successive trophic level ratios up through trophic level 4. Equal preference is given to field BAF or lab BCF*FCM, where FCM is equal to one. For this procedure, field BAF or lab BCF is applied as the baseline BAF.

measured $BAF^{t}_{T} = C_t/C_w$ or $BCF^{t}_{T} = C_t/C_w$ are applied as the baseline BAF.

where: Variables as defined under subpart 8

(2) Procedure 6 applies when geometric mean BAF or BMF is greater than 1,000 when comparing successive trophic level ratios up through trophic level 4. The acceptable methods are field BAF or lab BCF*FCM, with preference for field BAF. For this procedure, field BAF or lab BCF is applied as the baseline BAF.

measured $BAF^{t}_{T} = C_t/C_w$ or $BCF^{t}_{T} = C_t/C_w$ are applied as the baseline BAF.

where: Variables as defined under subpart 8

Subp. 10. **Species mean baseline BAF.** Calculate species and mean baseline BAF from acceptable individual baseline BAF.

A. For each appropriate baseline BAF method, calculate species-mean baseline BAF using the geometric mean.

B. Any baseline BAF with large differences between species (greater than ten percent) needs additional justification for use in a species-mean baseline BAF.

C. Evaluate data uncertainties for consideration in method hierarchy application for calculating trophic level baseline BAF.

Subp. 11. **Final baseline BAF by trophic level.** Determine the final baseline BAF by trophic level (TL):

A. Calculate geometric mean baseline BAF for TL_3 and TL_4 using available species-means for each baseline BAF method. For Class 2A water, preference is given for *Salmonidae* data and developed as a single representative TL_4 baseline BAF for cold-water aquatic communities.

B. Combine species-means for methods that have equal preference in procedural hierarchies and have similarly reliable baseline BAF based on evaluation of data uncertainties for a final baseline BAF for TL_3 where applicable, and final baseline BAF for TL_4.

C. For some pollutants, TL_3 and TL_4 baseline BAF may be identical when not dependent on trophic level factors, such as lipid partitioning.

Subp. 12. **Final state or site BAF by trophic level.** Calculate final state or site BAF for TL_3 where applicable and TL_4 for use in developing human health-based chronic criteria or standards.

A. For nonionic organic chemicals and ionic organic chemicals with no or negligible ionization as defined under subpart 7, for each TL_3 and TL_4, calculate a state or site BAF using the following equation:

$$\text{state or site BAF}_{(\text{TL n})} = \left[\left(\text{final baseline BAF}_{l}^{fd}\right)_{\text{TL n}} \times (f_l)_{\text{TL n}} + 1\right] \times (f_{fd})$$

where: $(\text{final baseline BAF}_{l}^{fd})_{\text{TL n}}$ = final trophic-level-mean baseline BAF expressed on a freely dissolved and lipid-normalized basis for trophic level "n" (L/kg)

$(f_l)_{\text{TL n}}$ = lipid fraction of aquatic species consumed at trophic level "n" by Class 2 subclass: Class 2A = 0.06; Class 2Bd/2B/2C/2D = 0.02 for TL_3 and 0.015 for TL_4

f_{fd} = fraction of the total chemical in water that is freely dissolved in ambient waters

The default DOC and POC values for the state ambient Class 2 surface waters are 7.5 x 10^{-6} kg/L (7.5 mg/L) and 5 x 10^{-7} kg/L (0.5 mg/L), respectively. For a site BAF for use in site-specific criteria development, the DOC and POC values are from the site monitoring data, if available; in all other cases, the state defaults are used.

B. For inorganic and organometallic chemicals and ionic organic chemicals with ionization in natural waters, the baseline BAF^{t}_{T} using total chemical concentrations or bioavailable forms are directly applied as the state or site BAF:

$$\text{state BAF}_{(\text{TL n})} \text{ or site BAF} = \text{final baseline BAF}_{(\text{TL n})}$$

Subp. 13. **Algorithms for Class 2A or 2Bd surface waters.** This subpart describes human health-based criteria or standards for classes of surface waters designated for drinking water, fish consumption, and recreational use. To develop a final chronic criteria (CC_{dfr}) or standard (CS_{dfr}) applicable to surface waters designated Class 2A or 2Bd, items A to D must be evaluated for use based on the pollutant's toxicological profile: noncarcinogen or nonlinear carcinogen (NLC); developmental susceptibility; or linear carcinogen (C).

A. Algorithm for noncarcinogenic or NLC chemicals applicable to surface waters designated Class 2A or 2Bd to calculate: CC_{dfr} or CS_{dfr}=

$$\frac{RfD_{chronic}\ (\text{mg/kg-d}) \times RSC\ (\text{no units}) \times 1{,}000\ \mu g/mg}{\{DWIR_{chronic}\ (\text{L/kg-d}) + FCR_{adult}\ (\text{kg/kg-d})[(0.24 \times BAF_{TL3}\ (\text{L/kg})) + (0.76 \times BAF_{TL4}\ (\text{L/kg})]\}}$$

where: CC_{dfr} or CS_{dfr} = drinking water plus fish consumption and recreation chronic criterion or standard in μg/L

$RfD_{chronic}$ = reference dose for chronic duration in mg/kg-day

RSC = relative source contribution factor

1,000 μg/mg = a factor used to convert milligram (mg) to microgram (μg); there are 1,000 micrograms per milligram

$DWIR_{chronic}$ = drinking water intake rate for the chronic duration based on a 95th percentile time-weighted average from MDH; rate may be chemical-specific with sufficient data or use the default rate of 0.043 L/kg-d

FCR_{adult} = fish consumption intake rate of 0.00043 kg/kg-d based on 0.030 kg/day of amount of fish assumed to be consumed per day and 70 kg adult body weight or rate may be chemical-specific with sufficient data

BAF_{TL3} = final BAF for TL_3 fish in L/kg; accounts for 24 percent of fish consumed

BAF_{TL4} = final BAF for TL_4 fish in L/kg; accounts for 76 percent of fish consumed; for Class 2A, the BAF_{TL4} is applied to 100 percent of the FCR

B. Supplemental algorithm for developmental susceptibility for noncarcinogenic or NLC chemicals applicable to surface waters designated Class 2A or 2Bd to calculate: CC_{dev} or CS_{dev} =

$$\frac{RfD_{duration\_(acute,\ short\text{-}term,\ or\ subchronic)}\ (mg/kg\text{-}d) \times RSC\ (no\ units) \times 1{,}000\ \mu g/mg}{DWIR_{duration\_(acute,\ short\text{-}term,\ or\ subchronic)}\ (L/kg\text{-}d)}$$

where: CC_{dev} or CS_{dev} = developmental-based drinking water chronic criterion or standard in μg/L applied when shorter duration adverse effects and exposure parameters result in a more stringent chronic criterion or standard than calculated from item A

$RfD_{duration}$ = reference dose for acute, short-term, or subchronic duration in mg/kg-day

$DWIR_{duration}$ = drinking water intake rate for acute, short-term, or subchronic duration in L/kg-d; drinking water intake rate for the acute, short-term, and subchronic durations based on a 95th percentile time-weighted average from MDH; rate may be chemical-specific with sufficient data or use default rates of 0.289, 0.289, and 0.077 L/kg-d, respectively

Other variables as defined under item A

C. Algorithm for linear carcinogenic chemicals with lifetime adjustment factors ($AF_{lifetime}$) applicable to surface waters designated Class 2A or 2Bd to calculate: CC_{dfr} or CS_{dfr} =

$$\frac{CR\ (1 \times 10^{-5})}{CSF(\text{mg/kg-d})^{-1} \times AF_{Lifetime}} \times \frac{1000\ \mu g/mg}{\{DWIR_{Lifetime}(\text{L/kg-d}) + FCR_{Adult}\ (\text{kg/kg-d})\ [(0.24 \times BAF_{TL3}\ (\text{L/kg})) + (0.76 \times BAF_{TL4}(\text{L/kg}))]\}}$$

where: CC_{dfr} or CS_{dfr} = drinking water plus fish consumption and recreation chronic criterion or standard in µg/L

CR = cancer risk level or an additional excess cancer risk equal to 1 x 10^{-5} (1 in 100,000)

CSF = cancer potency slope factor in $(mg/kg\text{-}d)^{-1}$

$AF_{lifetime}$ = adjustment factor, lifetime (no units)

$DWIR_{lifetime}$ = drinking water intake rate for lifetime duration; drinking water intake rate for the lifetime duration based on a 95^{th} percentile time-weighted average from MDH; rate may be chemical-specific with sufficient data or use default rate of 0.043 L/kg-d

Other variables as defined under item A

D. Algorithm for linear carcinogenic chemicals with age-dependent adjustment factors (ADAF) applicable to surface waters designated Class 2A or 2Bd to calculate: CC_{dfr} or CS_{dfr} =

$$\frac{CR\ (1 \times 10^{-5}) \times 1000}{\left(\begin{array}{l}\{CSF \times ADAF_{<2} \times D_{<2} \times [DWIR_{<2} + FCR_{<2} \times (0.24BAF_{TL3} + 0.76BAF_{TL4})]\} + \\ \{CSF \times ADAF_{2\ to\ <16} \times D_{2to<16} \times [DWIR_{2\ to<16} + FCR_{2\ to<16} \times (0.24BAF_{TL3} + 0.76BAF_{TL4})]\} + \\ \{CSF \times ADAF_{16to70} \times D_{16to70} \times [DWIR_{16to70} + FCR_{Adult} \times (0.24BAF_{TL3} + 0.76BAF_{TL4})]\}\end{array}\right) / 70yrs}$$

where: CC_{dfr} or CS_{dfr} = drinking water plus fish consumption and recreation chronic criterion or standard in µg/L

ADAF = age-dependent adjustment factor by age groups

D = duration corresponding to the three age groups: birth up to two years of age (two-year duration), two years of age up to 16 years of age (14-year duration), and 16 years of age up to 70 years of age (54-year duration)

DWIR = drinking water intake rate for age groups; drinking water intake rate for the lifetime duration based on a 95^{th} percentile time-weighted average from MDH; rate may be chemical-specific with sufficient data or use default rates for:

$DWIR_{0<2}$ = 0.137 L/kg-d, birth up to two years of age

$DWIR_{2\ to\ <16}$ = 0.047 L/kg-d, two up to 16 years of age

$DWIR_{16\text{ to }70}$ = 0.039 L/kg-d, 16 up to 70 years of age

FCR = fish consumption intake rate by age groups:

$FCR_{0<2}$ = 0.00086 kg/kg-d

$FCR_{2\text{ to }<16}$ = 0.00055 kg/kg-d

$FCR_{16\text{ to }70}$ = 0.00043 kg/kg-d

Subp. 14. **Algorithm for Class 2B, 2C, or 2D surface waters.** This subpart describes human health-based criteria or standards for classes of surface waters designated for fish consumption and recreational use (nondrinking water use). To develop a final chronic criteria (CC_{fr}) or standard (CS_{fr}) applicable to surface waters designated Class 2B, 2C, or 2D, items A to C must be evaluated for use based on the pollutant's toxicological profile: noncarcinogen or nonlinear carcinogen (NLC) or linear carcinogen (C).

A. Algorithm for noncarcinogenic or NLC chemicals applicable to Class 2B, 2C, or 2D surface waters to calculate: CC_{fr} or CS_{fr} =

$$\frac{RfD_{chronic}\text{ (mg/kg-d) x RSC (no units) x 1,000 µg/mg}}{\{IWR_{chronic}\text{ (L/kg-d)} + FCR_{adult}\text{ (kg/kg-d)}[(0.24 \text{ x } BAF_{TL3}\text{ (L/kg))} + (0.76 \text{ x } BAF_{TL4}\text{ (L/kg)}]\}}$$

where: CC_{fr} or CS_{fr} = fish consumption and recreation chronic criterion or standard in µg/L

$IWR_{chronic}$ = 0.0013 L/kg-d; assumed incidental water intake rate based on minimum chronic duration

Other variables as defined under subpart 13

B. Algorithm for linear carcinogenic chemicals with lifetime adjustment factors ($AF_{lifetime}$) applicable to surface waters designated Class 2B, 2C, or 2D to calculate: CC_{fr} or CS_{fr} =

$$\frac{CR\ (1 \text{ x } 10^{-5})}{CSF(\text{mg/kg-d})^{-1} \text{ x } AF_{Lifetime}} \text{ x } \frac{1000\ \mu g/mg}{\{IWR_{chronic}\text{ (L/kg-d)} + FCR_{Adult}\text{ (kg/kg-d)}\left[(0.24 \text{ x } BAF_{TL3}\text{ (L/kg)}) + (0.76 \text{ x } BAF_{TL4}\text{(L/kg)})\right]\}}$$

where: CC_{fr} or CS_{fr} = fish consumption and recreation chronic criterion or standard in µg/L

Other variables as defined under item A and subpart 13

C. Algorithm for linear carcinogenic chemicals with age-dependent adjustment factors (ADAF) applicable to surface waters designated Class 2B, 2C, or 2D to calculate: CC_{fr} or CS_{fr} =

$$\frac{CR\,(1\times10^{-5})\times1000}{\left(\begin{array}{l}\left\{CSF\times ADAF_{<2}\times D_{<2}\times[IWR+FCR_{<2}\times(0.24BAF_{TL3}+0.76BAF_{TL4})]\right\}+\\ \left\{CSF\times ADAF_{2\,to<16}\times D_{2\,to<16}\times[IWR+FCR_{2\,to<16}\times(0.24BAF_{TL3}+0.76BAF_{TL4})]\right\}+\\ \left\{CSF\times ADAF_{16\,to\,70}\times D_{16\,to\,70}\times[IWR+FCR_{Adult}\times(0.24BAF_{TL3}+0.76BAF_{TL4})]\right\}\end{array}\right)/70yrs}$$

where: CC_{fr} or CS_{fr} = fish consumption and recreation chronic criterion or standard in µg/L

Other variables as defined under item A and subpart 13

Subp. 15. **Algorithms for Class 2 fish tissue.** This subpart describes algorithms and fish tissue criteria (CC_{ft}) and standards (CS_{ft}) for chemical with BAF greater than 1,000 (BCC threshold) applicable to Class 2 surface waters. Items A to C must be evaluated for use based on the pollutant's toxicological profile: noncarcinogen or nonlinear carcinogen (NLC) or linear carcinogen (C).

A. Algorithm for noncarcinogenic or NLC chemicals applicable to Class 2 surface waters to calculate: CC_{ft} or CS_{ft} =

$$\frac{RfD_{chronic}\ (mg/kg\text{-}d)\times RSC\ (no\ units)\ or\ -\ RSC\ (mg/kg\text{-}d)}{FCR_{adult}\ (kg/kg\text{-}d)}$$

where: CC_{ft} or CS_{ft} = fish tissue-based chronic criterion or standard in mg/kg

Other variables as defined under subpart 13

B. Algorithm for linear carcinogenic chemicals with lifetime adjustment factors ($AF_{lifetime}$) applicable to Class 2 surface waters to calculate: CC_{ft} or CS_{ft} =

$$\frac{CR\ (1\times10^{-5})}{CSF\ (mg/kg\text{-}d)^{-1}\times AF_{lifetime}\ (no\ units)}\times\frac{1}{FCR_{Adult}\ (kg/kg\text{-}d)}$$

where: CC_{ft} or CS_{ft} = fish tissue-based chronic criterion or standard in mg/kg

Other variables as defined under subpart 13

C. Algorithm for linear carcinogenic chemicals with age-dependent adjustment factors (ADAFs) applicable to Class 2 surface waters to calculate: CC_{ft} or CS_{ft} =

$$\frac{CR\ (1 \times 10^{-5})}{\left[\frac{(CSF \times ADAF_{<2} \times D_{0\text{-}2} \times FCR_{<2})+(CSF \times ADAF_{2\text{-}16} \times D_{2\text{-}16} \times FCR_{2\text{-}16})+(CSF \times ADAF_{16\text{-}70} \times D_{16\text{-}70} \times FCR_{16\text{-}70})}{70\ \text{years}}\right]}$$

where: CC_{ft} or CS_{ft} = fish tissue-based chronic criterion or standard in mg/kg
Other variables as defined under subpart 13

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7050.0220 SPECIFIC WATER QUALITY STANDARDS BY ASSOCIATED USE CLASSES.

Subpart 1. **Purpose and scope.** The numeric and narrative water quality standards in this chapter prescribe the qualities or properties of the waters of the state that are necessary for the designated public uses and benefits. If the standards in this chapter are exceeded, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to designated uses or established classes of the waters of the state.

All surface waters are protected for multiple beneficial uses. Numeric water quality standards are tabulated in this part for all uses applicable to four common categories of surface waters, so that all applicable standards for each category are listed together in subparts 3a to 6a. The four categories are:

A. cold water sport fish (trout waters), also protected for drinking water: Classes 1B, 2A, 3A or 3B, 4A and 4B, and 5 (subpart 3a);

B. cool and warm water sport fish, also protected for drinking water: Classes 1B or 1C, 2Bd, 3A or 3B, 4A and 4B, and 5 (subpart 4a);

C. cool and warm water sport fish, indigenous aquatic life, and wetlands: Classes 2B, 2C, or 2D; 3A, 3B, 3C, or 3D; 4A and 4B or 4C; and 5 (subpart 5a); and

D. limited resource value waters: Classes 3C, 4A and 4B, 5, and 7 (subpart 6a).

Subp. 2. **Explanation of tables.**

A. Class 1 domestic consumption (DC) standards are the United States Environmental Protection Agency primary (maximum contaminant levels) and secondary drinking water standards, as contained in Code of Federal Regulations, title 40, parts 141 and 143, as amended through July 1, 2006. The DC standards are listed in subparts 3a and 4a, except that individual pollutants, substances, or organisms in the treatment technological, disinfectants, microbiological, and radiological categories are not listed unless they are listed because a secondary drinking water standard or a standard for another use class exists.

B. Certain drinking water standards are not applicable to Class 1 waters. The following are not applicable to Class 1 surface waters: the primary drinking water standards for acrylamide, epichlorohydrin, copper, lead, and turbidity (treatment technique standards) and the standards in the disinfectants and microbiological organisms categories. The drinking water standards not applicable to Class 1 ground waters are listed in part 7050.0221.

C. Class 2 standards for metals are expressed as total metal in subparts 3a to 5a, but must be converted to dissolved metal standards for application to surface waters.

Conversion factors for converting total metal standards to dissolved metal standards are listed in part 7050.0222, subpart 9. The conversion factor for metals not listed in part 7050.0222, subpart 9, is one. The dissolved metal standard equals the total metal standard times the conversion factor. Water quality-based effluent limits for metals are expressed as total metal.

D. The tables of standards in subparts 3a to 6a include the following abbreviations and acronyms:

AN	means aesthetic enjoyment and navigation, Class 5 waters
*	an asterisk following the FAV and MS values or double dashes (–) means part 7050.0222, subpart 7, item G, applies
(c)	means the chemical is assumed to be a human carcinoge
CS	means chronic standard, defined in part 7050.0218, subpart 3
DC	means domestic consumption (drinking water), Class 1 waters
–	double dashes means there is no standard
exp. ()	means the natural antilogarithm (base e) of the expression in parenthesis
FAV	means final acute value, defined in part 7050.0218, subpart 3
IC	means industrial consumption, Class 3 waters
IR	means agriculture irrigation use, Class 4A waters
LS	means agriculture livestock and wildlife use, Class 4B waters
MS	means maximum standard, defined in part 7050.0218, subpart 3
NA	means not applicable
(S)	means the associated value is a secondary drinking water standard
su	means standard unit. It is the reporting unit for pH
TH	means total hardness in mg/L, which is the sum of the calcium and magnesium concentrations expressed as $CaCO_3$
TON	means threshold odor number

E. Important synonyms or acronyms for some chemicals are listed in parentheses below the primary name.

F. When two or more use classes have standards for the same pollutant, the most stringent standard applies pursuant to part 7050.0450. All surface waters are protected for Class 6, but this class has no numeric standards so it is not included in the tables.

Subp. 3. [Repealed, 24 SR 1105]

Subp. 3a. **Cold water sport fish, drinking water, and associated use classes.** Water quality standards applicable to use Classes 1B, 2A, 3A or 3B, 4A and 4B, and 5 surface waters.

A. MISCELLANEOUS SUBSTANCE, CHARACTERISTIC, OR POLLUTANT

	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B IR	5 AN
(1) Ammonia, un-ionized as N, µg/L	16	–	–	–	–	–	–	–
(2) Asbestos, >10 µm (c), fibers/L	–	–	–	7.0e+06	–	–	–	–
(3) Bicarbonates (HCO_3), meq/L	–	–	–	–	–	5	–	–
(4) Bromate, µg/L	–	–	–	10	–	–	–	–
(5) Chloride, mg/L	230	860	1,720	250(S)	50/100	–	–	–

	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B IR	5 AN
(6) Chlorine, total residual, µg/L	11	19	38	–	–	–	–	–
(7) Chlorite, µg/L	–	–	–	1,000	–	–	–	–
(8) Color, Pt-Co	30	–	–	15(S)	–	–	–	–

(9) Cyanide, free, µg/L

5.2	22	45	200	–	–	–	–

(10) *Escherichia (E.) coli* bacteria, organisms/100 mL

See item D	–	–	–	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B IR**	**5 AN**

(11) Eutrophication standards for lakes and reservoirs (phosphorus, total, µg/L; chlorophyll-a, µg/L; Secchi disk transparency, meters)

See part 7050.0222, subparts 2 and 2a	–	–	–	–	–	–	–

(12) Eutrophication standards for rivers, streams, and navigational pools (phosphorus, total µg/L; chlorophyll-a (seston), µg/L; five-day biochemical oxygen demand (BOD_5), mg/L; diel dissolved oxygen flux, mg/L; chlorophyll-a (periphyton), mg/m^2)

See part 7050.0222, subparts 2 and 2b	–	–	–	–	–	–	–

(13) Fluoride, mg/L

–	–	–	4	–	–	–	–

(14) Fluoride, mg/L

–	–	–	2(S)	–	–	–	–

(15) Foaming agents, µg/L

–	–	–	500(S)	–	–	–	–

(16) Hardness, Ca+Mg as $CaCO_3$, mg/L

–	–	–	–	50/250	–	–	–

	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B IR	5 AN
(17) Hydrogen sulfide, mg/L	–	–	–	–	–	–	–	0.02
(18) Nitrate as N, mg/L	–	–	–	10	–	–	–	–
(19) Nitrite as N, mg/L	–	–	–	1	–	–	–	–
(20) Nitrate + Nitrite as N, mg/L	–	–	–	10	–	–	–	–
(21) Odor, TON	–	–	–	3(S)	–	–	–	–

	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B IR	5 AN
(22) Oil, µg/L	500	5,000	10,000	–	–	–	–	–
(23) Oxygen, dissolved, mg/L	7, as a daily minimum	–	–	–	–	–	–	–
(24) pH minimum, su	6.5	–	–	6.5(S)	6.5/6.0	6.0	6.0	6.0
(25) pH maximum, su	8.5	–	–	8.5(S)	8.5/9.0	8.5	9.0	9.0

Parameter	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B IR	5 AN
(26) Radioactive materials	See item E	–	–	See item E	–	See item E	See item E	–

Parameter	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B IR	5 AN
(27) Salinity, total, mg/L	–	–	–	–	–	–	1,000	–
(28) Sodium, meq/L	–	–	–	–	–	60% of total cations	–	–
(29) Specific conductance at 25°C, µmhos/cm	–	–	–	–	–	1,000	–	–
(30) Sulfate, mg/L	–	–	–	250(S)	–	–	–	–
(31) Sulfates, wild rice present, mg/L	–	–	–	–	–	10	–	–

Parameter	2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B IR	5 AN
(32) Temperature, °F	No material increase	–	–	–	–	–	–	–
(33) Total dissolved salts, mg/L	–	–	–	–	–	700	–	–
(34) Total dissolved solids, mg/L								

–	–	–	500(S)	–	–	–	–

(35) Total suspended solids (TSS), mg/L

See part 7050.0222, subpart 2	–	–	–	–	–	–	–

B. METALS AND ELEMENTS

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(1) Aluminum, total, µg/L

87	748	1,496	50-200(S)	–	–	–	–

(2) Antimony, total, µg/L

5.5	90	180	6	–	–	–	–

(3) Arsenic, total, µg/L

2.0	360	720	10	–	–	–	–

(4) Barium, total, µg/L

–	–	–	2,000	–	–	–	–

(5) Beryllium, total, µg/L

–	–	–	4.0	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(6) Boron, total, µg/L

–	–	–	–	–	500	–	–

(7) Cadmium, total, µg/L

1.1	3.9	7.8	5	–	–	–	–

Class 2A cadmium standards are hardness dependent. Cadmium values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate cadmium standards for any hardness value not to exceed 400 mg/L.

(8) Chromium +3, total, µg/L

207	1,737	3,469	–	–	–	–	–

Class 2A trivalent chromium standards are hardness dependent. Chromium +3 values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate trivalent chromium standards for any hardness value not to exceed 400 mg/L.

(9) Chromium +6, total, µg/L

11	16	32	–	–	–	–	–

(10) Chromium, total, µg/L

–	–	–	100	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(11) Cobalt, total, µg/L

2.8	436	872	–	–	–	–	–

(12) Copper, total, µg/L

9.8	18	35	1,000 (S)	–	–	–	–

Class 2A copper standards are hardness dependent. Copper values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate copper standards for any hardness value not to exceed 400 mg/L.

(13) Iron, total, µg/L

–	–	–	300(S)	–	–	–	–

(14) Lead, total, µg/L

3.2	82	164	NA	–	–	–	–

Class 2A lead standards are hardness dependent. Lead values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate lead standards for any hardness value not to exceed 400 mg/L.

(15) Manganese, total, µg/L

–	–	–	50(S)	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(16) Mercury, total, in water, ng/L

6.9	2,400*	4,900*	2,000	–	–	–	–

(17) Mercury, total in edible fish tissue, mg/kg or parts per million

0.2	–	–	–	–	–	–	–

(18) Nickel, total, µg/L

158	1,418	2,836	–	–	–	–	–

Class 2A nickel standards are hardness dependent. Nickel values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate nickel standards for any hardness value not to exceed 400 mg/L.

(19) Selenium, total, µg/L

5.0	20	40	50	–	–	–	–

(20) Silver, total, µg/L

0.12	2.0	4.1	100(S)	–	–	–	–

Class 2A silver MS and FAV are hardness dependent. Silver values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate silver standards for any hardness value not to exceed 400 mg/L.

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
(21) Thallium, total, µg/L							
0.28	64	128	2	–	–	–	–
(22) Zinc, total, µg/L							
106	117	234	5,000 (S)	–	–	–	–

Class 2A zinc standards are hardness dependent. Zinc values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 2, for examples at other hardness values and equations to calculate zinc standards for any hardness value not to exceed 400 mg/L.

C. ORGANIC POLLUTANTS OR CHARACTERISTICS

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
(1) Acenaphthene, µg/L							
20	56	112	–	–	–	–	–
(2) Acetochlor, µg/L							
3.6	86	173	–	–	–	–	–
(3) Acrylonitrile (c), µg/L							
0.38	1,140*	2,281*	–	–	–	–	–
(4) Alachlor (c), µg/L							
3.8	800*	1,600*	2	–	–	–	–
(5) Aldicarb, µg/L							
–	–	–	3	–	–	–	–

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
(6) Aldicarb sulfone, µg/L							
–	–	–	2	–	–	–	–
(7) Aldicarb sulfoxide, µg/L							
–	–	–	4	–	–	–	–
(8) Anthracene, µg/L							
0.035	0.32	0.63	–	–	–	–	–
(9) Atrazine (c), µg/L							
3.4	323	645	3	–	–	–	–
(10) Benzene (c), µg/L							
5.1	4,487*	8,974*	5	–	–	–	–

2A CS	2A MS	2A FAV	1B DC	3A/3B IC	4A IR	4B LS	5 AN
(11) Benzo(a)pyrene, µg/L							
–	–	–	0.2	–	–	–	–
(12) Bromoform, µg/L							
33	2,900	5,800	See sub-item (73)	–	–	–	–
(13) Carbofuran, µg/L							
–	–	–	40	–	–	–	–
(14) Carbon tetrachloride (c), µg/L							
1.9	1,750*	3,500*	5	–	–	–	–

(15) Chlordane (c), ng/L

0.073	1,200*	2,400*	2,000	–	–	–	–
2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(16) Chlorobenzene, µg/L (Monochlorobenzene)

20	423	846	100	–	–	–	–

(17) Chloroform (c), µg/L

53	1,392	2,784	See sub-item (73)	–	–	–	–

(18) Chlorpyrifos, µg/L

0.041	0.083	0.17	–	–	–	–	–

(19) Dalapon, µg/L

–	–	–	200	–	–	–	–

(20) DDT (c), ng/L

0.11	550*	1,100*	–	–	–	–	–
2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(21) 1,2-Dibromo-3-chloropropane (c), µg/L

–	–	–	0.2	–	–	–	–

(22) Dichlorobenzene (ortho), µg/L

–	–	–	600	–	–	–	–

(23) 1,4-Dichlorobenzene (para) (c), µg/L

–	–	–	75	–	–	–	–

(24) 1,2-Dichloroethane (c), µg/L

3.5	45,050*	90,100*	5	–	–	–	–

(25) 1,1-Dichloroethylene, µg/L

–	–	–	7	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(26) 1,2-Dichloroethylene (cis), µg/L

–	–	–	70	–	–	–	–

(27) 1,2-Dichloroethylene (trans), µg/L

–	–	–	100	–	–	–	–

(28) 2,4-Dichlorophenoxyacetic acid (2,4-D), µg/L

–	–	–	70	–	–	–	–

(29) 1,2-Dichloropropane (c), µg/L

–	–	–	5	–	–	–	–

(30) Dieldrin (c), ng/L

0.0065	1,300*	2,500*	–	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(31) Di-2-ethylhexyl adipate, µg/L

–	–	–	400	–	–	–	–

(32) Di-2-ethylhexyl phthalate (c), µg/L

1.9	–*	–*	6	–	–	–	–

(33) Di-n-Octyl phthalate, µg/L

30	825	1,650	–	–	–	–	–

(34) Dinoseb, µg/L

–	–	–	7	–	–	–	–

(35) Diquat, µg/L

–	–	–	20	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(36) Endosulfan, µg/L

0.0076	0.084	0.17	–	–	–	–	–

(37) Endothall, µg/L

–	–	–	100	–	–	–	–

(38) Endrin, µg/L

0.0039	0.090	0.18	2	–	–	–	–

(39) Ethylbenzene (c), µg/L

68	1,859	3,717	700	–	–	–	–

(40) Ethylene dibromide, µg/L

–	–	–	0.05	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(41) Fluoranthene, µg/L

1.9	3.5	6.9	–	–	–	–	–

(42) Glyphosate, µg/L

–	–	–	700	–	–	–	–

(43) Haloacetic acids (c), µg/L (Bromoacetic acid, Dibromoacetic acid, Dichloroacetic acid, Monochloroacetic acid, and Trichloroacetic acid)

–	–	–	60	–	–	–	–

(44) Heptachlor (c), ng/L

0.10	260*	520*	400	–	–	–	–

(45) Heptachlor epoxide (c), ng/L

0.12	270*	530*	200	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(46) Hexachlorobenzene (c), ng/L

0.061	–*	–*	1,000	–	–	–	–

(47) Hexachlorocyclopentadiene, µg/L

–	–	–	50	–	–	–	–

(48) Lindane (c), µg/L (Hexachlorocyclohexane, gamma-)

0.0087	1.0*	2.0*	0.2	–	–	–	–

(49) Methoxychlor, µg/L

–	–	–	40	–	–	–	–

(50) Methylene chloride (c), µg/L (Dichloromethane)

45	13,875*	27,749*	5	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(51) Metolachlor

23	271	543	–	–	–	–	–

(52) Naphthalene, µg/L

65	409	818	–	–	–	–	–

(53) Oxamyl, µg/L (Vydate)

–	–	–	200	–	–	–	–

(54) Parathion, µg/L

0.013	0.07	0.13	–	–	–	–	–

(55) Pentachlorophenol, µg/L

0.93	15	30	1	–	–	–	–

Class 2A MS and FAV are pH dependent. Pentachlorophenol values shown are for a pH of 7.5 only. See part 7050.0222, subpart 2, for examples at other pH values and equations to calculate pentachlorophenol standards for any pH value.

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(56) Phenanthrene, µg/L

3.6	32	64	–	–	–	–	–

(57) Phenol, µg/L

123	2,214	4,428	–	–	–	–	–

(58) Picloram, µg/L

–	–	–	500	–	–	–	–

(59) Polychlorinated biphenyls (c), ng/L (PCBs, total)

0.014	1,000*	2,000*	500	–	–	–	–

(60) Simazine, µg/L

–	–	–	4	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(61) Styrene (c), µg/L

–	–	–	100	–	–	–	–

(62) 2,3,7,8-Tetrachlorodibenzo-p-dioxin, ng/L (TCDD-dioxin)

–	–	–	0.03	–	–	–	–

(63) 1,1,2,2-Tetrachloroethane (c), µg/L

1.1	1,127*	2,253*	–	–	–	–	–

(64) Tetrachloroethylene (c), µg/L

3.8	428*	857*	5	–	–	–	–

(65) Toluene, µg/L

253	1,352	2,703	1,000	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(66) Toxaphene (c), ng/L

0.31	730*	1,500*	3,000	–	–	–	–

(67) 2,4,5-TP, µg/L (Silvex)

–	–	–	50	–	–	–	–

(68) 1,2,4-Trichlorobenzene, µg/L

–	–	–	70	–	–	–	–

(69) 1,1,1-Trichloroethane, µg/L

329	2,957	5,913	200	–	–	–	–

(70) 1,1,2-Trichloroethane, µg/L

–	–	–	5	–	–	–	–

2A CS	**2A MS**	**2A FAV**	**1B DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(71) 1,1,2-Trichloroethylene (c), µg/L

25	6,988	13,976*	5	–	–	–	–

(72) 2,4,6-Trichlorophenol, µg/L

2.0	102	203	–	–	–	–	–

(73) Trihalomethanes, total (c), µg/L (Bromodichloromethane, Bromoform, Chlorodibromomethane, and Chloroform)

–	–	–	80	–	–	–	–

(74) Vinyl chloride (c), µg/L

0.17	–*	–*	2	–	–	–	–

(75) Xylenes, total, µg/L

166	1,407	2,814	10,000	–	–	–	–

D. *Escherichia (E.) coli* bacteria shall not exceed 126 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between April 1 and October 31.

E. For radioactive materials, see parts 7050.0221, subpart 2; 7050.0222, subpart 2; and 7050.0224, subparts 2 and 3.

Subp. 4. [Repealed, 24 SR 1105]

Subp. 4a. **Cool and warm water sport fish, drinking water, and associated use classes.** Water quality standards applicable to use Classes 1B or 1C, 2Bd, 3A or 3B, 4A and 4B, and 5 surface waters.

A. MISCELLANEOUS SUBSTANCE, CHARACTERISTIC, OR POLLUTANT

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(1) Ammonia, un-ionized as N, µg/L

40	–	–	–	–	–	–	–

(2) Asbestos, >10 µm (c), fibers/L

–	–	–	7.0e+06	–	–	–	–
(3) Bicarbonates (HCO_3), meq/L							
–	–	–	–	–	5	–	–
(4) Bromate, µg/L							
–	–	–	10	–	–	–	–
(5) Chloride, mg/L							
230	860	1,720	250(S)	50/100	–	–	–
2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(6) Chlorine, total residual, µg/L							
11	19	38	–	–	–	–	–
(7) Chlorite, µg/L							
–	–	–	1,000	–	–	–	–
(8) Color, Pt-Co							
–	–	–	15(S)	–	–	–	–
(9) Cyanide, free, µg/L							
5.2	22	45	200	–	–	–	–
(10) *Escherichia (E.) coli* bacteria, organisms/100 mL							
See item D	–	–	–	–	–	–	–
2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(11) Eutrophication standards for lakes, shallow lakes, and reservoirs (phosphorus, total, µg/L; chlorophyll-a, µg/L; Secchi disk transparency, meters)

See part 7050.0222, subparts 3 and 3a	–	–	–	–	–	–	–

(12) Eutrophication standards for rivers, streams, and navigational pools (phosphorus, total µg/L; chlorophyll-a (seston), µg/L; five-day biochemical oxygen demand (BOD_5), mg/L; diel dissolved oxygen flux, mg/L; chlorophyll-a (periphyton), mg/m^2)

See part 7050.0222, subparts 3 and 3b	–	–	–	–	–	–	–

(13) Fluoride, mg/L

–	–	–	4	–	–	–	–

(14) Fluoride, mg/L

–	–	–	2(S)	–	–	–	–

(15) Foaming agents, µg/L

–	–	–	500(S)	–	–	–	–

(16) Hardness, Ca+Mg as $CaCO_3$, mg/L

–	–	–	–	50/250	–	–	–

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(17) Hydrogen sulfide, mg/L

–	–	–	–	–	–	–	0.02

(18) Nitrate as N, mg/L

–	–	–	10	–	–	–	–

(19) Nitrite as N, mg/L

–	–	–	1	–	–	–	–

(20) Nitrate + Nitrite as N, mg/L							
–	–	–	10	–	–	–	–
(21) Odor, TON							
–	–	–	3(S)	–	–	–	–

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B IC	4A IR	4B LS	5 AN
(22) Oil, µg/L							
500	5,000	10,000	–	–	–	–	–
(23) Oxygen, dissolved, mg/L							
See part 7050.0222, subpart 3	–	–	–	–	–	–	–
(24) pH minimum, su							
6.5	–	–	6.5(S)	6.5/6.0	6.0	6.0	6.0
(25) pH maximum, su							
9.0	–	–	8.5(S)	8.5/9.0	8.5	9.0	9.0
(26) Radioactive materials							
See item E	–	–	See item E	–	See item E	See item E	–

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B IC	4A IR	4B LS	5 AN
(27) Salinity, total, mg/L							
–	–	–	–	–	–	1,000	–
(28) Sodium, meq/L							

–	–	–	–	–	60% of total cations	–	–

(29) Specific conductance at 25°C, µmhos/cm

–	–	–	–	–	1,000	–	–

(30) Sulfate, mg/L

–	–	–	250(S)	–	–	–	–

(31) Sulfates, wild rice present, mg/L

–	–	–	–	–	10	–	–

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(32) Temperature, °F

See item F	–	–	–	–	–	–	–

(33) Total dissolved salts, mg/L

–	–	–	–	–	700	–	–

(34) Total dissolved solids, mg/L

–	–	–	500(S)	–	–	–	–

(35) Total suspended solids (TSS), mg/L

See part 7050.0222, subpart 3	–	–	–	–	–	–	–

B. METALS AND ELEMENTS

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(1) Aluminum, total, µg/L

125	1,072	2,145	50-200(S)	–	–	–	–

(2) Antimony, total, µg/L

5.5	90	180	6	–	–	–	–

(3) Arsenic, total, µg/L

2.0	360	720	10	–	–	–	–

(4) Barium, total, µg/L

–	–	–	2,000	–	–	–	–

(5) Beryllium, total, µg/L

–	–	–	4.0	–	–	–	–

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(6) Boron, total, µg/L

–	–	–	–	–	500	–	–

(7) Cadmium, total, µg/L

1.1	33	67	5	–	–	–	–

Class 2Bd cadmium standards are hardness dependent. Cadmium values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate cadmium standards for any hardness value not to exceed 400 mg/L.

(8) Chromium +3, total, µg/L

207	1,737	3,469	–	–	–	–	–

Class 2Bd trivalent chromium standards are hardness dependent. Chromium +3 values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate trivalent chromium standards for any hardness value not to exceed 400 mg/L.

(9) Chromium +6, total, µg/L

11	16	32	–	–	–	–	–

(10) Chromium, total, µg/L

–	–	–	100	–	–	–	–

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B IC	4A IR	4B LS	5 AN

(11) Cobalt, total, µg/L

2.8	436	872	–	–	–	–	–

(12) Copper, total, µg/L

9.8	18	35	1,000 (S)	–	–	–	–

Class 2Bd copper standards are hardness dependent. Copper values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate copper standards for any hardness value not to exceed 400 mg/L.

(13) Iron, total, µg/L

–	–	–	300(S)	–	–	–	–

(14) Lead, total, µg/L

3.2	82	164	NA	–	–	–	–

Class 2Bd lead standards are hardness dependent. Lead values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate lead standards for any hardness value not to exceed 400 mg/L.

(15) Manganese, total, µg/L

–	–	–	50(S)	–	–	–	–

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B IC	4A IR	4B LS	5 AN

(16) Mercury, total in water, ng/L

6.9	2,400*	4,900*	2,000	–	–	–	–

(17) Mercury, total in edible fish tissue, mg/kg or parts per million

0.2	–	–	–	–	–	–	–

(18) Nickel, total, µg/L

158	1,418	2,836	–	–	–	–	–

Class 2Bd nickel standards are hardness dependent. Nickel values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate nickel standards for any hardness value not to exceed 400 mg/L.

(19) Selenium, total, µg/L

5.0	20	40	50	–	–	–	–

(20) Silver, total, µg/L

1.0	2.0	4.1	100(S)	–	–	–	–

Class 2Bd silver MS and FAV are hardness dependent. Silver values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate silver standards for any hardness value not to exceed 400 mg/L.

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B IC**	**4A IR**	**4B LS**	**5 AN**

(21) Thallium, total, µg/L

0.28	64	128	2	–	–	–	–

(22) Zinc, total, µg/L

106	117	234	5,000 (S)	–	–	–	–

Class 2Bd zinc standards are hardness dependent. Zinc values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 3, for examples at other hardness values and equations to calculate zinc standards for any hardness value not to exceed 400 mg/L.

C. ORGANIC POLLUTANTS OR CHARACTERISTICS

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN
(1) Acenaphthene, µg/L							
20	56	112	–	–	–	–	–
(2) Acetochlor, µg/L							
3.6	86	173	–	–	–	–	–
(3) Acrylonitrile (c), µg/L							
0.38	1,140*	2,281*	–	–	–	–	–
(4) Alachlor (c), µg/L							
4.2	800*	1,600*	2	–	–	–	–
(5) Aldicarb, µg/L							
–	–	–	3	–	–	–	–

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN
(6) Aldicarb sulfone, µg/L							
–	–	–	2	–	–	–	–
(7) Aldicarb sulfoxide, µg/L							
–	–	–	4	–	–	–	–
(8) Anthracene, µg/L							
0.035	0.32	0.63	–	–	–	–	–
(9) Atrazine (c), µg/L							
3.4	323	645	3	–	–	–	–
(10) Benzene (c), µg/L							

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN
6.0	4,487*	8,974*	5	–	–	–	–

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN
(11) Benzo(a)pyrene, µg/L							
–	–	–	0.2	–	–	–	–
(12) Bromoform, µg/L							
41	2,900	5,800	See subitem (73)	–	–	–	–
(13) Carbofuran, µg/L							
–	–	–	40	–	–	–	–
(14) Carbon tetrachloride (c), µg/L							
1.9	1,750*	3,500*	5	–	–	–	–
(15) Chlordane (c), ng/L							
0.29	1,200*	2,400*	2,000	–	–	–	–

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN
(16) Chlorobenzene, µg/L (Monochlorobenzene)							
20	423	846	100	–	–	–	–
(17) Chloroform (c), µg/L							
53	1,392	2,784	See subitem (73)	–	–	–	–
(18) Chlorpyrifos, µg/L							
0.041	0.083	0.17	–	–	–	–	–

(19) Dalapon, µg/L

–	–	–	200	–	–	–	–

(20) DDT (c), ng/L

1.7	550*	1,100*	–	–	–	–	–

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(21) 1,2-Dibromo-3-chloropropane (c), µg/L

–	–	–	0.2	–	–	–	–

(22) Dichlorobenzene (ortho), µg/L

–	–	–	600	–	–	–	–

(23) 1,4-Dichlorobenzene (para) (c), µg/L

–	–	–	75	–	–	–	–

(24) 1,2-Dichloroethane (c), µg/L

3.8	45,050*	90,100*	5	–	–	–	–

(25) 1,1-Dichloroethylene, µg/L

–	–	–	7	–	–	–	–

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(26) 1,2-Dichloroethylene (cis), µg/L

–	–	–	70	–	–	–	–

(27) 1,2-Dichloroethylene (trans), µg/L

–	–	–	100	–	–	–	–

(28) 2,4-Dichlorophenoxyacetic acid (2,4-D), µg/L

–	–	–	70	–	–	–	–
(29) 1,2-Dichloropropane (c), µg/L							
–	–	–	5	–	–	–	–
(30) Dieldrin (c), ng/L							
0.026	1,300*	2,500*	–	–	–	–	–

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**
(31) Di-2-ethylhexyl adipate, µg/L							
–	–	–	400	–	–	–	–
(32) Di-2-ethylhexyl phthalate (c), µg/L							
1.9	–*	–*	6	–	–	–	–
(33) Di-n-Octyl phthalate, µg/L							
30	825	1,650	–	–	–	–	–
(34) Dinoseb, µg/L							
–	–	–	7	–	–	–	–
(35) Diquat, µg/L							
–	–	–	20	–	–	–	–

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**
(36) Endosulfan, µg/L							
0.029	0.28	0.56	–	–	–	–	–
(37) Endothall, µg/L							
–	–	–	100	–	–	–	–

(38) Endrin, µg/L

0.016	0.090	0.18	2	–	–	–	–

(39) Ethylbenzene (c), µg/L

68	1,859	3,717	700	–	–	–	–

(40) Ethylene dibromide, µg/L

–	–	–	0.05	–	–	–	–

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(41) Fluoranthene, µg/L

1.9	3.5	6.9	–	–	–	–	–

(42) Glyphosate, µg/L

–	–	–	700	–	–	–	–

(43) Haloacetic acids (c), µg/L (Bromoacetic acid, Dibromoacetic acid, Dichloroacetic acid, Monochloroacetic acid, and Trichloroacetic acid)

–	–	–	60	–	–	–	–

(44) Heptachlor (c), ng/L

0.39	260*	520*	400	–	–	–	–

(45) Heptachlor epoxide (c), ng/L

0.48	270*	530*	200	–	–	–	–

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(46) Hexachlorobenzene (c), ng/L

0.24	–*	–*	1,000	–	–	–	–

(47) Hexachlorocyclopentadiene, µg/L

–	–	–	50	–	–	–	–

(48) Lindane (c), µg/L (Hexachlorocyclohexane, gamma-)

0.032	4.4*	8.8*	0.2	–	–	–	–

(49) Methoxychlor, µg/L

–	–	–	40	–	–	–	–

(50) Methylene chloride (c), µg/L (Dichloromethane)

46	13,875*	27,749*	5	–	–	–	–

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(51) Metolachlor

23	271	543	–	–	–	–	–

(52) Naphthalene, µg/L

81	409	818	–	–	–	–	–

(53) Oxamyl, µg/L (Vydate)

–	–	–	200	–	–	–	–

(54) Parathion, µg/L

0.013	0.07	0.13	–	–	–	–	–

(55) Pentachlorophenol, µg/L

1.9	15	30	1	–	–	–	–

Class 2Bd MS and FAV are pH dependent. Pentachlorophenol values shown are for a pH of 7.5 only. See part 7050.0222, subpart 3, for examples at other pH values and equations to calculate pentachlorophenol standards for any pH value.

2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**

(56) Phenanthrene, µg/L							
3.6	32	64	–	–	–	–	–
(57) Phenol, µg/L							
123	2,214	4,428	–	–	–	–	–
(58) Picloram, µg/L							
–	–	–	500	–	–	–	–
(59) Polychlorinated biphenyls (c), ng/L (PCBs, total)							
0.029	1,000*	2,000*	500	–	–	–	–
(60) Simazine, µg/L							
–	–	–	4	–	–	–	–
2Bd CS	**2Bd MS**	**2Bd FAV**	**1B/1C DC**	**3A/3B ICIC**	**4A IR**	**4B LS**	**5 AN**
(61) Styrene (c), µg/L							
–	–	–	100	–	–	–	–
(62) 2,3,7,8-Tetrachlorodibenzo-p-dioxin, ng/L (TCDD-dioxin)							
–	–	–	0.03	–	–	–	–
(63) 1,1,2,2-Tetrachloroethane (c), µg/L							
1.5	1,127*	2,253*	–	–	–	–	–
(64) Tetrachloroethylene (c), µg/L							
3.8	428*	857*	5	–	–	–	–
(65) Toluene, µg/L							
253	1,352	2,703	1,000	–	–	–	–

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN

(66) Toxaphene (c), ng/L

1.3	730*	1,500*	3,000	–	–	–	–

(67) 2,4,5-TP, µg/L (Silvex)

–	–	–	50	–	–	–	–

(68) 1,2,4-Trichlorobenzene, µg/L

–	–	–	70	–	–	–	–

(69) 1,1,1-Trichloroethane, µg/L

329	2,957	5,913	200	–	–	–	–

(70) 1,1,2-Trichloroethane, µg/L

–	–	–	5	–	–	–	–

2Bd CS	2Bd MS	2Bd FAV	1B/1C DC	3A/3B ICIC	4A IR	4B LS	5 AN

(71) 1,1,2-Trichloroethylene (c), µg/L

25	6,988*	13,976*	5	–	–	–	–

(72) 2,4,6-Trichlorophenol, µg/L

2.0	102	203	–	–	–	–	–

(73) Trihalomethanes, total (c), µg/L (Bromodichloromethane, Bromoform, Chlorodibromomethane, and Chloroform)

–	–	–	80	–	–	–	–

(74) Vinyl chloride (c), µg/L

0.18	–*	–*	2	–	–	–	–

(75) Xylenes, total, µg/L

166	1,407	2,814	10,000	–	–	–	–

D. *Escherichia (E.) coli* bacteria shall not exceed 126 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between April 1 and October 31.

E. For radioactive materials, see parts 7050.0221, subpart 3; 7050.0222, subpart 3; and 7050.0224, subparts 2 and 3.

F. Temperature must not exceed five degrees Fahrenheit above natural in streams and three degrees Fahrenheit above natural in lakes, based on monthly average of maximum daily temperature, except in no case shall it exceed the daily average temperature of 86 degrees Fahrenheit.

Subp. 5. [Repealed, 24 SR 1105]

Subp. 5a. **Cool and warm water sport fish and associated use classes.** Water quality standards applicable to use Classes 2B, 2C, or 2D; 3A, 3B, or 3C; 4A and 4B; and 5 surface waters. See parts 7050.0223, subpart 5; 7050.0224, subpart 4; and 7050.0225, subpart 2, for Class 3D, 4C, and 5 standards applicable to wetlands, respectively.

A. MISCELLANEOUS SUBSTANCE, CHARACTERISTIC, OR POLLUTANT

2B,C&D CS	2B,C&D MS	2B,C&D FAV	3A/3B/3C IC	4A IR	4B LS	5 AN

(1) Ammonia, un-ionized as N, µg/L

40	–	–	–	–	–	–

(2) Bicarbonates (HCO_3), meq/L

–	–	–	–	5	–	–

(3) Chloride, mg/L

230	860	1,720	50/100/250	–	–	–

(4) Chlorine, total residual, µg/L

11	19	38	–	–	–	–

(5) Cyanide, free, µg/L

5.2	22	45	–	–	–	–

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(6) *Escherichia (E.) coli* bacteria, organisms/100 mL

See item D	–	–	–	–	–	–

(7) Eutrophication standards for lakes, shallow lakes, and reservoirs (phosphorus, total, µg/L; chlorophyll-a, µg/L; Secchi disk transparency, meters)

See part 7050.0222, subparts 4, 4a, and 5	–	–	–	–	–	–

(8) Eutrophication standards for rivers, streams, and navigational pools (phosphorus, total µg/L; chlorophyll-a (seston), µg/L; five-day biochemical oxygen demand (BOD_5), mg/L; diel dissolved oxygen flux, mg/L; chlorophyll-a (periphyton), mg/m^2)

See part 7050.0222, subparts 4 and 4b	–	–	–	–	–	–	–

(9) Hardness, Ca+Mg as $CaCO_3$, mg/L

–	–	–	50/250/500	–	–	–

(10) Hydrogen sulfide, mg/L

–	–	–	–	–	–	0.02

(11) Oil, µg/L

500	5,000	10,000	–	–	–	–

2B,C&D CS	2B,C&D MS	2B,C&D FAV	3A/3B/3C IC	4A IR	4B LS	5 AN
(12) Oxygen, dissolved, mg/L						
See part 7050.0222, subparts 4 to 6	–	–	–	–	–	–
(13) pH minimum, su						
6.5 See item E	–	–	6.5/6.0/6.0	6.0	6.0	6.0
(14) pH maximum, su						
9.0 See item E	–	–	8.5/9.0/9.0	8.5	9.0	9.0
(15) Radioactive materials						
See item F	–	–	–	See item F	See item F	–
(16) Salinity, total, mg/L						
–	–	–	–	–	1,000	–

2B,C&D CS	2B,C&D MS	2B,C&D FAV	3A/3B/3C IC	4A IR	4B LS	5 AN
(17) Sodium, meq/L						
–	–	–	–	60% of total cations	–	–
(18) Specific conductance at 25°C, µ mhos/cm						

–	–	–	–	1,000	–	–

(19) Sulfates, wild rice present, mg/L

–	–	–	–	10	–	–

(20) Temperature, °F

See item G	–	–	–	–	–	–

(21) Total dissolved salts, mg/L

–	–	–	–	700	–	–

(22) Total suspended solids (TSS), mg/L

See part 7050.0222, subpart 4	–	–	–	–	–	–

B. METALS AND ELEMENTS

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(1) Aluminum, total, µg/L

125	1,072	2,145	–	–	–	–

(2) Antimony, total, µg/L

31	90	180	–	–	–	–

(3) Arsenic, total, µg/L

53	360	720	–	–	–	–

(4) Boron, total, µg/L

–	–	–	–	500	–	–

(5) Cadmium, total, µg/L

1.1	33	67	–	–	–	–

Class 2B, 2C, and 2D cadmium standards are hardness dependent. Cadmium values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate cadmium standards for any hardness value not to exceed 400 mg/L.

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(6) Chromium +3, total, µg/L

207	1,737	3,469	–	–	–	–

Class 2B, 2C, and 2D trivalent chromium standards are hardness dependent. Chromium +3 values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate trivalent chromium standards for any hardness value not to exceed 400 mg/L.

(7) Chromium +6, total, µg/L

11	16	32	–	–	–	–

(8) Cobalt, total, µg/L

5.0	436	872	–	–	–	–

(9) Copper, total, µg/L

9.8	18	35	–	–	–	–

Class 2B, 2C, and 2D copper standards are hardness dependent. Copper values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate copper standards for any hardness value not to exceed 400 mg/L.

(10) Lead, total, µg/L

3.2	82	164	–	–	–	–

Class 2B, 2C, and 2D lead standards are hardness dependent. Lead values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate lead standards for any hardness value not to exceed 400 mg/L.

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(11) Mercury, total in water, ng/L

6.9	2,400*	4,900*	–	–	–	–

(12) Mercury, total in edible fish tissue, mg/kg or parts per million

0.2	–	–	–	–	–	–

(13) Nickel, total, µg/L

158	1,418	2,836	–	–	–	–

Class 2B, 2C, and 2D nickel standards are hardness dependent. Nickel values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate nickel standards for any hardness value not to exceed 400 mg/L.

(14) Selenium, total, µg/L

5.0	20	40	–	–	–	–

(15) Silver, total, µg/L

1.0	2.0	4.1	–	–	–	–

Class 2B, 2C, and 2D silver MS and FAV are hardness dependent. Silver values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate silver standards for any hardness value not to exceed 400 mg/L.

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(16) Thallium, total, µg/L

0.56	64	128	–	–	–	–

(17) Zinc, total, µg/L

106	117	234	–	–	–	–

Class 2B, 2C, and 2D zinc standards are hardness dependent. Zinc values shown are for a total hardness of 100 mg/L only. See part 7050.0222, subpart 4, for examples at other hardness values and equations to calculate zinc standards for any hardness value not to exceed 400 mg/L.

C. ORGANIC POLLUTANTS OR CHARACTERISTICS

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(1) Acenaphthene, µg/L

20	56	112	–	–	–	–

(2) Acetochlor, µg/L

3.6	86	173	–	–	–	–

(3) Acrylonitrile (c), µg/L

0.89	1,140*	2,281*	–	–	–	–

(4) Alachlor (c), µg/L

59	800	1,600	–	–	–	–

(5) Anthracene, µg/L

0.035	0.32	0.63	–	–	–	–

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(6) Atrazine (c), µg/L

10	323	645	–	–	–	–

(7) Benzene (c), µg/L

98	4,487	8,974	–	–	–	–

(8) Bromoform, µg/L

466	2,900	5,800	–	–	–	–

(9) Carbon tetrachloride (c), µg/L

5.9	1,750*	3,500*	–	–	–	–

(10) Chlordane (c), ng/L

0.29	1,200*	2,400*	–	–	–	–

2B,C&D CS	2B,C&D MS	2B,C&D FAV	3A/3B/3C IC	4A IR	4B LS	5 AN

(11) Chlorobenzene, µg/L (Monochlorobenzene)

20	423	846	–	–	–	–

(12) Chloroform (c), µg/L

155	1,392	2,78	–	–	–	–

(13) Chlorpyrifos, µg/L

0.041	0.083	0.17	–	–	–	–

(14) DDT (c), ng/L

1.7	550*	1,100*	–	–	–	–

(15) 1,2-Dichloroethane (c), µg/L

190	45,050*	90,100*	–	–	–	–

2B,C&D CS	2B,C&D MS	2B,C&D FAV	3A/3B/3C IC	4A IR	4B LS	5 AN

(16) Dieldrin (c), ng/L

0.026	1,300*	2,500*	–	–	–	–

(17) Di-2-ethylhexyl phthalate (c), µg/L

2.1	–*	–*	–	–	–	–

(18) Di-n-Octyl phthalate, µg/L

30	825	1,650	–	–	–	–

(19) Endosulfan, µg/L

0.031	0.28	0.56	–	–	–	–

(20) Endrin, µg/L

0.016	0.090	0.18	–	–	–	–

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(21) Ethylbenzene (c), µg/L

68	1,859	3,717	–	–	–	–

(22) Fluoranthene, µg/L

1.9	3.5	6.9	–	–	–	–

(23) Heptachlor (c), ng/L

0.39	260*	520*	–	–	–	–

(24) Heptachlor epoxide (c), ng/L

0.48	270*	530*	–	–	–	–

(25) Hexachlorobenzene (c), ng/L

0.24	–*	–*	–	–	–	–

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(26) Lindane (c), µg/L (Hexachlorocyclohexane, gamma-)

0.036	4.4*	8.8*	–	–	–	–

(27) Methylene chloride (c), µg/L (Dichloromethane)

1,940	13,875	27,749	–	–	–	–

(28) Metolachlor

23	271	543	–	–	–	–

(29) Naphthalene, µg/L

81	409	818	–	–	–	–

(30) Parathion, µg/L

0.013	0.07	0.13	–	–	–	–

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(31) Pentachlorophenol, µg/L

5.5	15	30	–	–	–	–

Class 2B, 2C, and 2D standards are pH dependent, except that the CS will not exceed 5.5 µg/L. Pentachlorophenol values shown are for a pH of 7.5 only. See part 7050.0222, subpart 4, for examples at other pH values and equations to calculate pentachlorophenol standards for any pH value.

(32) Phenanthrene, µg/L

3.6	32	64	–	–	–	–

(33) Phenol, µg/L

123	2,214	4,428	–	–	–	–

(34) Polychlorinated biphenyls (c), ng/L (PCBs, total)

0.029	1,000*	2,000*	–	–	–	–

(35) 1,1,2,2-Tetrachloroethane (c), µg/L

13	1,127	2,253	–	–	–	–

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(36) Tetrachloroethylene (c), µg/L

8.9	428	857	–	–	–	–

(37) Toluene, μg/L

253	1,352	2,703	–	–	–	–

(38) Toxaphene (c), ng/L

1.3	730*	1,500*	–	–	–	–

(39) 1,1,1-Trichloroethane, μg/L

329	2,957	5,913	–	–	–	–

(40) 1,1,2-Trichloroethylene (c), μg/L

120	6,988	13,976	–	–	–	–

2B,C&D CS	**2B,C&D MS**	**2B,C&D FAV**	**3A/3B/3C IC**	**4A IR**	**4B LS**	**5 AN**

(41) 2,4,6-Trichlorophenol, μg/L

2.0	102	203	–	–	–	–

(42) Vinyl chloride (c), μg/L

9.2	–*	–*	–	–	–	–

(43) Xylenes, total, μg/L

166	1,407	2,814	–	–	–	–

D. *Escherichia (E.) coli* bacteria shall not exceed 126 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between April 1 and October 31.

E. For pH, maintain background. See part 7050.0222, subpart 6.

F. For radioactive materials, see parts 7050.0222, subpart 4; and 7050.0224, subparts 2 and 3.

G. Temperature must not exceed:

(1) Class 2B standard: five degrees Fahrenheit above natural in streams and three degrees Fahrenheit above natural in lakes, based on monthly average of maximum daily temperature, except in no case shall it exceed the daily average temperature of 86 degrees Fahrenheit;

(2) Class 2C standard: five degrees Fahrenheit above natural in streams and three degrees Fahrenheit above natural in lakes, based on monthly average of maximum daily temperature, except in no case shall it exceed the daily average temperature of 90 degrees Fahrenheit; and

(3) Class 2D standard: maintain background as defined in part 7050.0222, subpart 6.

Subp. 6. [Repealed, 24 SR 1105]

Subp. 6a. **Limited resource value waters and associated use classes.**

A. WATER QUALITY STANDARDS APPLICABLE TO USE CLASSES 3C, 4A, 4B, 5, AND 7 SURFACE WATERS

7 LIMITED RESOURCE VALUE	**3C 1C**	**4A 1R**	**4B LS**	**5 AN**
(1) Bicarbonates (HCO_3), meq/L				
–	–	5	–	–
(2) Boron, µg/L				
–	–	500	–	–
(3) Chloride, mg/L				
–	250	–	–	–
(4) *Escherichia (E.) coli* bacteria, organisms/100 mL				
See item B	–	–	–	–
(5) Hardness, Ca+Mg as $CaCO_3$, mg/L				
–	500	–	–	–

7 LIMITED RESOURCE VALUE	3C 1C	4A 1R	4B LS	5 AN
(6) Hydrogen sulfide, mg/L				
–	–	–	–	0.02
(7) Oxygen, dissolved, mg/L				
See item C	–	–	–	–
(8) pH minimum, su				
6.0	6.0	6.0	6.0	6.0
(9) pH maximum, su				
9.0	9.0	8.5	9.0	9.0
(10) Radioactive materials				
–	–	See item D	See item D	–

7 LIMITED RESOURCE VALUE	3C 1C	4A 1R	4B LS	5 AN
(11) Salinity, total, mg/L				
–	–	–	1,000	–
(12) Sodium, meq/L				
–	–	60% of total cations	–	–
(13) Specific conductance at 25°C, µmhos/cm				

–	–	1,000	–	–

(14) Sulfates, wild rice present, mg/L

–	–	10	–	–

(15) Total dissolved salts, mg/L

–	–	700	–	–

(16) Toxic pollutants

See item E	–	–	–	–

B. *Escherichia (E.) coli* bacteria shall not exceed 630 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between May 1 and October 31.

C. The level of dissolved oxygen shall be maintained at concentrations that will avoid odors or putrid conditions in the receiving water or at concentrations at not less than one milligram per liter (daily average) provided that measurable concentrations are present at all times.

D. For radioactive materials, see part 7050.0224, subparts 2 and 3.

E. Toxic pollutants shall not be allowed in such quantities or concentrations that will impair the specified uses.

Subp. 7. **Site-specific modifications of standards.**

A. The standards in this part and in parts 7050.0221 to 7050.0227 are subject to review and modification as applied to a specific surface water body, reach, or segment. If site-specific information is available that shows that a site-specific modification is more appropriate than the statewide or ecoregion standard for a particular water body, reach, or segment, the site-specific information shall be applied.

B. The information supporting a site-specific modification can be provided by the commissioner or by any person outside the agency. The commissioner shall evaluate all relevant data in support of a modified standard and determine whether a change in the standard for a specific water body or reach is justified.

C. Any effluent limit determined to be necessary based on a modified standard shall only be required after the discharger has been given notice of the specific proposed effluent limits and an opportunity to request a hearing as provided in part 7000.1800.

D. Through the procedures established in items A to C, the following site-specific reservoir eutrophication standards apply to Lake Pepin (25-0001-00) in lieu of the water quality standards listed in this part and part 7050.0222:

(1) Phosphorus, total	µg/L	less than or equal to 100
(2) Chlorophyll-a (seston)	µg/L	less than or equal to 28

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 913; 12 SR 1810; 15 SR 1057; 18 SR 2195; 24 SR 1105; 24 SR 1133; 32 SR 1699; 39 SR 154*

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August 1994

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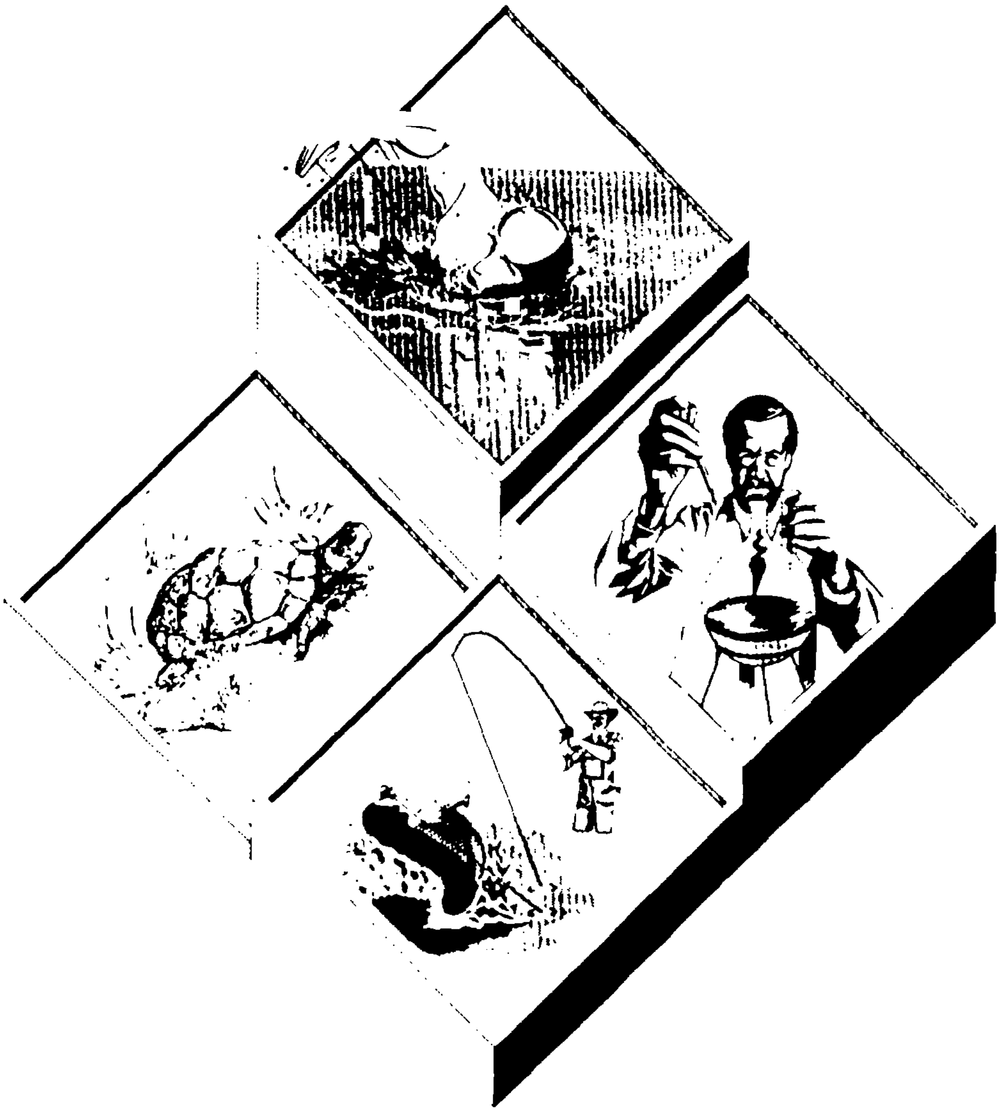
Water Quality Standards Handbook:

Second Edition



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WATER QUALITY STANDARDS

HANDBOOK

SECOND EDITION

Water Quality Standards Branch
Office of Science and Technology
U.S. Environmental Protection Agency
Washington, DC 20460

September 1993

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FOREWORD

Dear Colleague:

The following document entitled *Water Quality Standards Handbook - Second Edition* provides guidance issued in support of the Water Quality Standards Regulation (40 CFR 131, as amended). This Handbook includes the operative provisions of the first volume of the Handbook issued in 1983 and incorporates subsequent guidance issued since 1983. The 1993 Handbook contains only final guidance previously issued by EPA it contains no new guidance.

Since the 1983 Handbook has not been updated in ten years, we hope that this edition will prove valuable by pulling together current program guidance and providing a coherent document as a foundation for State and Tribal water quality standards programs. The Handbook also presents some of the evolving program concepts designed to reduce human and ecological risks, such as endangered species protection; criteria to protect wildlife, wetlands, and sediment quality; biological criteria to better define desired biological communities in aquatic ecosystems; and nutrient criteria.

This Handbook is intended to serve as a "living document," subject to future revisions as the water quality standards program moves forward, and to reflect the needs and experiences of EPA and the States. To this end, the Handbook is published in a loose leaf format designed to be placed in three ring binders. This copy of the Handbook includes updated material for 1994 (see Appendix X), and EPA anticipates publishing additional changes periodically and providing them to Handbook recipients. To ensure that you will receive these updates, please copy the reader response card in Appendix W and mail it to the address on the reverse.

The Handbook also contains a listing, by title and date, of the guidance issued since the Handbook was first published in 1983 that is incorporated in the Second Edition. Copies of these documents are available upon request.

The *Water Quality Standards Handbook - Second Edition* provides guidance on the national water quality standards program. EPA regional offices and States may have additional guidance that provides more detail on selected topics of regional interest. For information on regional or State guidance, contact the appropriate regional water quality standards coordinator listed in Appendix U.

EPA invites participation from interested parties in the water quality standards program, and appreciates questions on this guidance as well as suggestions and comments for improvement. Questions or comments may be directed to the EPA regional water quality standards coordinators or to:

David Sabock, Chief
U.S. Environmental Protection Agency
Water Quality Standards Branch (4305)
401 M Street, S.W.
Washington, D.C. 20460
Telephone (202) 475-7315

Betsy Southerland, Acting Director
Standards and Applied Science Division

Note to the Reader

The Water Quality Standards Handbook, first issued in 1983, is a compilation of EPA's guidance on the water quality standards program and provides direction for States in reviewing, revising and implementing water quality standards. The *Water Quality Standards Handbook - Second Edition* retains all the guidance in the 1983 Handbook unless such guidance was specifically revised in subsequent years. An annotated list of the major guidance and policy documents on the water quality standards program issued since 1983 is included in the Introduction and material added to the Second Edition by periodic updates since 1993 is summarized in Appendix X. Material in the Handbook contains only guidance previously issued by EPA; it contains no new guidance.

The guidance contained in each of the documents listed in the Introduction is either: 1) incorporated in its entirety, or summarized, in the text of the appropriate section of this Handbook, or 2) attached as an appendix (see Table of Contents). If there is uncertainty or perceived inconsistency on any of the guidance incorporated into this Handbook, the reader is directed to review the original guidance documents or call the Water Quality Standards Branch at (202) 260-1315. Copies of all original guidance documents not attached as appendices may be obtained from the source listed for each document in the Reference section of this Handbook.

Limited free copies of this Handbook may be obtained from:

Office of Water Resource Center, RC-4100
U. S. Environmental Protection Agency
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Telephone: (202) 260-7786 (voice mail publication request line)

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Robert S. Shippen
Editor

TABLE OF CONTENTS

Appendices:

GLOSSARY

WATER QUALITY STANDARDS HANDBOOK

SECOND EDITION

GLOSSARY

The "Act" refers to the Clean Water Act (Public Law 92-500, as amended (33 USC 1251, et seq.) (40 CFR 131.3.)

"Acute" refers to a stimulus severe enough to rapidly induce an effect; in aquatic toxicity tests, an effect observed in 96- hours or less is typically considered acute. When referring to aquatic toxicology or human health, an acute affect is not always measured in terms of lethality (USEPA, 1991a.)

"Acute-chronic ratio" (ACR) is the ratio of the acute toxicity of an effluent or a toxicant to its chronic toxicity. It is used as a factor for estimating chronic toxicity on the basis of acute toxicity data, or for estimating acute toxicity on the basis of chronic toxicity data (USEPA, 1991a.)

"Acutely toxic conditions" are those acutely toxic to aquatic organisms following their short-term exposure within an affected area (USEPA, 1991a.)

"Additivity" is the characteristic property of a mixture of toxicants that exhibits a total toxic effect equal to the arithmetic sum of the effects of the individual toxicants (USEPA, 1991a.)

"Ambient toxicity" is measured by a toxicity test on a sample collected from a water body (USEPA, 1991a.)

"Antagonism" is the characteristic property of a mixture of toxicants that exhibits a less-than-additive total toxic effect (USEPA, 1991a.)

"Aquatic community" is an association of interacting populations of aquatic organisms in a given water body or habitat (USEPA, 1990; USEPA, 1991a.)

"Averaging period" is the period of time over which the receiving water concentration is averaged for comparison with criteria concentrations. This specification limits the duration of concentrations above the criteria (USEPA, 1991a.)

"Bioaccumulation" is the process by which a compound is taken up by an aquatic organism, both from water and through food (USEPA, 1991a.)

"Bioaccumulation factor" (BAF) is the ratio of a substance's concentration in tissue versus its concentration in ambient water, in situations where the organism and the food chain are exposed (USEPA, 1991a.)

"Bioassay" is a test used to evaluate the relative potency of a chemical or a mixture of chemicals by comparing its effect on a living organism with the effect of a standard preparation on the same type of organism. Bioassays are frequently used in the pharmaceutical industry to evaluate the potency of vitamins and drugs (USEPA, 1991a.)

"Bioavailability" is a measure of the physicochemical access that a toxicant has to the biological processes of an organism. The less the bioavailability of a toxicant, the less its toxic effect on an organism (USEPA, 1991a.)

"Bioconcentration" is the process by which a compound is absorbed from water through gills or epithelial tissues and is concentrated in the body (USEPA, 1991a.)

"Bioconcentration factor" (BCF) is the ratio of a substance's concentration in tissue versus its concentration in water, in situations where the food chain is not exposed or contaminated. For non-metabolized substances, it represents equilibrium partitioning between water and organisms (USEPA, 1991a.)

"Biological criteria" are narrative expressions or numeric values of the biological characteristics of aquatic communities based on appropriate reference conditions. As such, biological criteria serve as an index of aquatic community health. It is also known as **biocriteria** (USEPA, 1991a.)

"Biological integrity" is the condition of the aquatic community inhabiting unimpaired water bodies of a specified habitat as measured by community structure and function (USEPA, 1991a.)

"Biological monitoring" describes the use of living organisms in water quality surveillance to indicate compliance with water quality standards or effluent limits and to document water quality trends. Methods of biological monitoring may include, but are not limited to, toxicity testing (such as ambient toxicity testing or whole-effluent toxicity testing) and biological surveys. It is also known as **biomonitoring** (USEPA, 1991a.)

"Biological survey or biosurvey" is collecting, processing, and analyzing a representative portion of the resident aquatic community to determine its structural and/or functional characteristics (USEPA. 1991a.)

"Biomagnification" is the process by which the concentration of a compound increases in species occupying successive trophic levels (USEPA, 1991a.)

"Cancer potency slope factor" (q_1*) is an indication of a chemical's human cancer-causing potential derived using animal studies or epidemiological data on human exposure; based on extrapolation of high-dose levels over short periods of time to low-dose levels and a lifetime exposure period through the use of a linear model (USEPA, 1991a.)

"Chronic" defines a stimulus that lingers or continues for a relatively long period of time, often one-tenth of the life span or more. Chronic should be considered a relative term depending on the life span of an organism. The measurement of a chronic effect can be reduced growth, reduced reproduction, etc., in addition to lethality (USEPA, 1991a.)

"Community component" is a general term that may pertain to the biotic guild (fish, invertebrates, algae), the taxonomic category (order, family, genus, species), the feeding strategy (herbivore, omnivore, predator), or the organizational level (individual, population, assemblage) of a biological entity within the aquatic community (USEPA, 1991a.)

"Completely mixed condition" is defined as no measurable difference in the concentration of a pollutant exists across a transect of the water body (e.g., does not vary by 5%) (USEPA, 1991a.)

"Criteria" are elements of State water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use (40 CFR 131.3.)

"Criteria continuous concentration" (CCC) is the EPA national water quality criteria recommendation for the highest instream concentration of a toxicant or an effluent to which organisms can be exposed indefinitely without causing unacceptable effect (USEPA, 1991a.)

"Criteria maximum concentration" (CMC) is the EPA national water quality criteria recommendation for the highest instream concentration of a toxicant or an effluent to which organisms can be exposed for a brief period of time without causing an acute effect (USEPA, 1991a.)

"Critical life stage" is the period of time in an organism's lifespan in which it is the most susceptible to adverse effects caused by exposure to toxicants, usually during early development (egg, embryo, larvae). Chronic toxicity tests are often run on critical life stages to replace long duration, life cycle tests since the most toxic effect usually occurs during the critical life stage (USEPA, 1991a.)

"Critical species" is a species that is commercially or recreationally important at the site, a species that exists at the site and is listed as threatened or endangered under section 4 of the Endangered Species Act, or a species for which there is evidence that the loss of the species from the site is likely to cause an unacceptable impact on a commercially or recreationally important species, a threatened or endangered species, the abundances of a variety of other species, or the structure or function of the community (USEPA, 1994a.)

"Design flow" is the flow used for steady-state waste load allocation modeling (USEPA, 1991a.)

"Designated uses" are those uses specified in water quality standards for each water body or segment whether or not they are being attained (40 CFR 131.3.)

"Discharge length scale" is the square root of the cross-sectional area of any discharge outlet (USEPA, 1991a.)

"Diversity" is the number and abundance of biological taxa in a specified location (USEPA, 1991a.)

"Effective concentration" (EC) is a point estimate of the toxicant concentration that would cause an observable adverse effect (such as death, immobilization, or serious incapacitation) in a given percentage of the test organisms (USEPA, 1991a.)

"Existing uses" are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards (40 CFR 131.3.)

"Federal Indian Reservation," "Indian Reservation," or "Reservation" is defined as all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and including rights-of-way running through the reservation (40 CFR 131.3.)

"Final acute value" (FAV) is an estimate of the concentration of the toxicant corresponding to a cumulative probability of 0.05 in the acute toxicity values for all genera for which acceptable acute tests have been conducted on the toxicant (USEPA, 1991a.)

"Frequency" is how often criteria can be exceeded without unacceptably affecting the community (USEPA, 1991a.)

"Harmonic mean flow" is the number of daily flow measurements divided by the sum of the reciprocals of the flows. That is, it is the reciprocal of the mean of reciprocals (USEPA, 1991a.)

"Indian Tribe" or "Tribe" describes any Indian Tribe, band, group, or community recognized by the Secretary of the Interior and exercising governmental authority over a Federal Indian reservation (40 CFR 131.3.)

"Inhibition concentration" (IC) is a point estimate of the toxicant concentration that would cause a given percent reduction (e.g., IC25) in a non-lethal biological measurement of the test organisms, such as reproduction or growth (USEPA, 1991a.)

"Lethal concentration" is the point estimate of the toxicant concentration that would be lethal to a given percentage of the test organisms during a specified period (USEPA, 1991a.)

"Lipophilic" is a high affinity for lipids (fats) (USEPA, 1991a.)

"Load allocations" (LA) the portion of a receiving water TMDL that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources (USEPA, 1991a.)

"Lowest-observed-adverse-effect-level" (LOAEL) is the lowest concentration of an effluent or toxicant that results in statistically significant adverse health effects as observed in chronic or subchronic human epidemiology studies or animal exposure (USEPA, 1991a.)

"Magnitude" is how much of a pollutant (or pollutant parameter such as toxicity), expressed as a concentration or toxic unit is allowable (USEPA, 1991a.)

"Minimum level" (ML) refers to the level at which the entire analytical system gives recognizable mass spectra and acceptable calibration points when analyzing for pollutants of concern. This level corresponds to the lowest point at which the calibration curve is determined (USEPA, 1991a.)

"Mixing zone" is an area where an effluent discharge undergoes initial dilution and is extended to cover the secondary mixing in the ambient water body. A mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented (USEPA, 1991a.)

"**Navigable waters**" refer to the waters of the United States, including the territorial seas (33 USC 1362.)

"**No-observed-adverse-effect-level**" **(NOAEL)** is a tested dose of an effluent or a toxicant below which no adverse biological effects are observed, as identified from chronic or subchronic human epidemiology studies or animal exposure studies (USEPA, 1991a.)

"**No-observed-effect-concentration**" **(NOEC)** is the highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specific time of observation. Determined using hypothesis testing (USEPA, 1991a.)

"**Nonthreshold effects**" are associated with exposure to chemicals that have no safe exposure levels. (i.e., cancer) (USEPA, 1991a.)

"**Persistent pollutant**" is not subject to decay, degradation, transformation, volatilization, hydrolysis, or photolysis (USEPA, 1991a.)

"**Pollution**" is defined as the man-made or man-induced alteration of the chemical, physical, biological and radiological integrity of water (33 USC 1362.)

"**Priority pollutants**" are those pollutants listed by the Administrator under section 307(a) of the Act (USEPA, 1991a.)

"**Reference ambient concentration**" **(RAC)** is the concentration of a chemical in water which will not cause adverse impacts to human health; RAC is expressed in units of mg/l (USEPA, 1991a.)

"**Reference conditions**" describe the characteristics of water body segments least impaired by human activities. As such, reference conditions can be used to describe attainable biological or habitat conditions for water body segments with common watershed/catchment characteristics within defined geographical regions.

"**Reference tissue concentration**" **(RTC)** is the concentration of a chemical in edible fish or shellfish tissue which will not cause adverse impacts to human health when ingested. RTC is expressed in units of mg/kg (USEPA, 1991a.)

"**Reference dose**" **(RfD)** is an estimate of the daily exposure to human population that is likely to be without appreciable risk of deleterious effect during a lifetime; derived from NOAEL or LOAEL (USEPA, 1991a.)

"**Section 304(a) criteria**" are developed by EPA under authority of section 304(a) of the Act based on the latest scientific information on the relationship that the effect of a constituent concentration has on particular aquatic species and/or human health. This information is issued periodically to the States as guidance for use in developing criteria (40 CFR 131.3.)

"**Site-specific aquatic life criterion**" is a water quality criterion for aquatic life that has been derived to be specifically appropriate to the water quality characteristics and/or species composition at a particular location (USEPA, 1994a.)

"**States**" include: the 50 States, the District of Columbia, Guam, the Commonwealth of Puerto Rico, Virgin Islands, American Samoa, the Trust Territory of the Pacific Islands, and the Commonwealth of the Northern Mariana Islands, and Indian Tribes that EPA determines qualify for treatment as States for the purposes of water quality standards (40 CFR 131.3.)

"**Steady-state model**" is a fate and transport model that uses constant values of input variables to predict constant values of receiving water quality concentrations (USEPA, 1991a.)

"**STORET**" is EPA's computerized water quality database that includes physical, chemical, and biological data measured in water bodies throughout the United States (USEPA, 1991a.)

"**Sublethal**" refers to a stimulus below the level that causes death (USEPA, 1991a.)

"**Synergism**" is the characteristic property of a mixture of toxicants that exhibits a greater-than-additive total toxic effect (USEPA, 1991a.)

"**Threshold effects**" result from chemicals that have a safe level (i.e., acute, subacute, or chronic human health effects) (USEPA, 1991a.)

"**Total maximum daily load**" **(TMDL)** is the sum of the individual waste load allocations (WLAs) and load allocations (LAs); a margin of safety is included with the two types of allocations so that any additional loading, regardless of source, would not produce a violation of water quality standards (USEPA, 1991a.)

"**Toxicity test**" is a procedure to determine the toxicity of a chemical or an effluent using living organisms. A toxicity test measures the degree of effect on exposed test organisms of a specific chemical or effluent (USEPA, 1991a.)

"**Toxic pollutant**" refers to those pollutants, or combination of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, or on the basis of information available to the administrator, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring (33 USC section 1362.)

"**Toxic units**" **(TUs)** are a measure of toxicity in an effluent as determined by the acute toxicity units (TUa) or chronic toxicity units (TUc) measured (USEPA, 1991a.)

"**Toxic unit acute**" **(TUa)** is the reciprocal of the effluent concentration that causes 50 percent of the organisms to die by the end of the acute exposure period (i.e., $100/LC_{50}$) (USEPA, 1991a.)

"**Toxic unit chronic**" **(TUc)** is the reciprocal of the effluent concentration that causes no observable effect on the test organisms by the end of the chronic exposure period (i.e., 100/NOEC) (USEPA, 1991a.)

"Use attainability analysis" (UAA) is a structured scientific assessment of the factors affecting the attainment of the use which may include physical, chemical, biological, and economic factors as described in section 131.10(g) (40 CFR 131.3.)

"Waste load allocation" (WLA) is the portion of a receiving water's TMDL that is allocated to one of its existing or future point sources of pollution (USEPA, 1991a.)

"Waters of the United States" refer to:

(1) all waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) all interstate waters, including interstate wetlands;

(3) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use or degradation of which would affect or could affect interstate or foreign commerce, including any such waters:

   (i) which are or could be used by interstate or foreign travelers for recreational or other purposes;

   (ii) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

   (iii) which are or could be used for industrial purposes by industries in interstate commerce.

(4) all impoundments of waters otherwise defined as waters of the United States under this definition;

(5) tributaries of waters in paragraphs (1) through (4) of this definition;

(6) the territorial sea; and

(7) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (1) through (6) of this definition. "Wetlands" are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Act (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria for this definition) are not waters of the United States. (40 CFR 232.2.)

"Water-effect ratio" (WER) is an appropriate measure of the toxicity of a material obtained in a site water divided by the same measure of the toxicity of the same material obtained simultaneously in a laboratory dilution water (USEPA, 1994a.)

"Water quality assessment" is an evaluation of the condition of a water body using biological surveys, chemical-specific analyses of pollutants in water bodies, and toxicity tests (USEPA, 1991a.)

"Water quality limited segment" refers to any segment where it is known that water quality does not meet applicable water quality standards and/or is not expected to meet applicable water quality standards even after application of technology-based effluent limitations required by sections 301(b)(1)(A) and (B) and 306 of the Act (40 CFR 131.3.)

"Water quality standards" (WQS) are provisions of State or Federal law which consist of a designated use or uses for the waters of the United States, water quality criteria for such waters based upon such uses. Water quality standards are to protect public health or welfare, enhance the quality of the water and serve the purposes of the Act (40 CFR 131.3.)

"Whole-effluent toxicity" is the total toxic effect of an effluent measured directly with a toxicity test (USEPA, 1991a.)

INTRODUCTION

WATER QUALITY STANDARDS HANDBOOK

SECOND EDITION

INTRODUCTION

HISTORY OF THE WATER QUALITY STANDARDS PROGRAM

Statutory History

The first comprehensive legislation for water pollution control was the Water Pollution Control Act of 1948 (Public Law 845, 80th Congress). This law, passed after a half century of debate on the responsibility of the Federal Government for resolving water pollution problems, adopted principles of State-Federal cooperative program development, limited Federal enforcement authority, and provided limited financial assistance. These concepts were continued in the Federal Water Pollution Control Act (FWPCA) of 1956 (Public Law 660, 84th Congress) and in the Water Quality Act of 1965. Under the 1965 Act, States were directed to develop water quality standards for interstate waters. As a result of enforcement complexities and other problems, however, this approach was not sufficiently effective. In the FWPCA Amendments of 1972 (Public Law 92-500), Congress established a discharge permit system and provided a broader Federal role through more extensive Federal grants to finance local sewage treatment systems and through Federal (EPA) setting of technology-based effluent limitations. The 1972 Amendments extended the water quality standards program to intrastate waters and provided for implementation of water quality standards through discharge permits.

Section 303(c) of the 1972 FWPCA Amendments (33 USC 1313(c)) established the statutory basis for the current water quality standards program. It completed the transition from the previously established program of water quality standards for interstate waters to one requiring standards for all surface waters of the United States.

Although the major innovation of the 1972 FWPCA was technology-based controls, Congress maintained the concept of water quality standards both as a mechanism to establish goals for the Nation's waters and as a regulatory requirement when standardized technology controls for point source discharges and/or nonpoint source controls were inadequate. In recent years, Congress and EPA have given these water quality-based controls new emphasis in the continuing quest to enhance and maintain water quality to protect the public health and welfare.

Briefly stated, the key elements of section 303(c) are as follows:

(1) A water quality standard is defined as the designated beneficial uses of a water segment and the water quality criteria necessary to support those uses;

(2) The minimum beneficial uses to be considered by States in establishing water quality standards are specified as public water supplies, propagation of fish and wildlife, recreation, agricultural uses, industrial uses, and navigation;

(3) A requirement specifies that State standards must protect public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act;

(4) A requirement specifies that States must review their standards at least once each 3-year period using a process that includes public participation;

(5) The process is described for EPA review of State standards that might ultimately result in the promulgation of a superseding Federal rule in cases where a State's standards are not consistent with the applicable requirements of the CWA, or in situations where the Agency determines that Federal standards are necessary to meet the requirements of the Act.

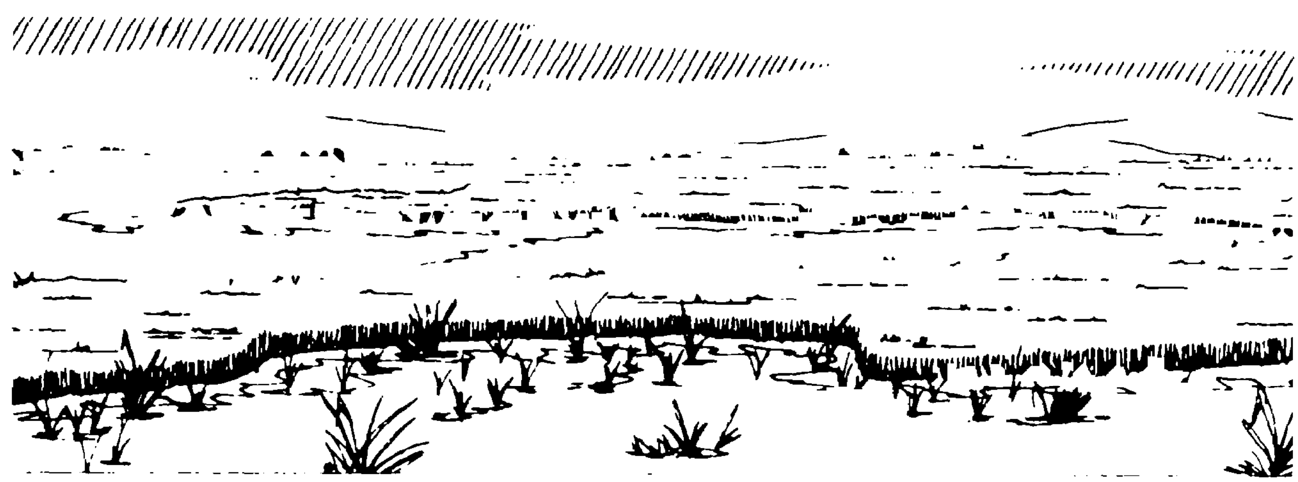
The Federal Water Pollution Control Act, including the major 1977, 1981, and 1987 Amendments are commonly referred to as the "Clean Water Act" (the Act or CWA).

On February 4, 1987, Congress enacted the Water Quality Act of 1987 (Public Law 100-4), making substantial additions to the Clean Water Act and directly affecting the standards program. Congress concluded that toxic pollutants in water constitute one of the most pressing water pollution problems. The Water Quality Act provided a new approach to controlling toxic pollutants by requiring ". . . States to identify waters that do not meet water quality standards due to the discharge of toxic substances, to adopt numerical criteria for the pollutants in such waters, and to establish effluent limitations for individual discharges to such water bodies" (from Senator Mitchell, 133 Congressional Record S733). As now amended, the Clean Water Act requires that States adopt numeric criteria for toxic pollutants listed under section 307(a) of the Clean Water Act for which section 304(a) criteria have been published, if the presence of these pollutants is likely to adversely affect the water body's use. Guidance on these changes is discussed in detail in section 3.4 of this Handbook. Additionally, for the first time, the Act explicitly recognizes antidegradation (see section 303(d)(4) of the Act).

Regulatory History

EPA first published a water quality standards regulation in 1975 (40 CFR 130.17, promulgated in 40 F.R. 55334, November 28, 1975) as part of EPA's water quality management regulations, mandated under section 303(e) of the Act. The first Water Quality Standards Regulation did not specifically address toxic pollutants or any other criteria. It simply required "appropriate" water quality criteria necessary to support designated uses.

In the late 1970s and early 1980s, the public and Congress raised concerns about toxic pollutant control. EPA realized that promulgating effluent guidelines or effluent standards under section 307 of the Act would not comprehensively address toxic pollutants. So, EPA decided to use the statutory connection between water quality standards and NPDES permits provided by section 301(b)(1)(C) to effectively control a range of toxic pollutants from point sources. To best accomplish this process, the Agency decided to amend the Water Quality Standards Regulation to explicitly address toxic criteria requirements in State



standards. Other legal and programmatic issues also necessitated a revision of the Standards Regulation. The culmination of this effort was the promulgation of the present Water Quality Standards Regulation on November 8, 1983 (54 F.R. 51400).

The present Water Quality Standards Regulation (40 CFR Part 131) is a much more comprehensive regulation than its predecessor. In subpart B, the Regulation addresses both the designated use component and the criteria component of a water quality standard. Section 131.11 of the Regulation requires States to review available information and ". . . to identify specific water bodies where toxic pollutants may be adversely affecting water quality . . . and must adopt criteria for such toxic pollutants applicable to the water body sufficient to protect the designated use." The Regulation provides that either or both numeric and narrative criteria may be appropriately used in water quality standards.

Since the middle of the 1980's, EPA's annual program guidance to the States reflected the increasing emphasis on controlling toxics. States were strongly encouraged to adopt criteria in their standards for the pollutants listed pursuant to section 307(a) of the Act, especially where EPA has published criteria guidance under section 304(a) of the Act.

State reaction to EPA's initiative was mixed. Several States proceeded to adopt large numbers of numeric toxic pollutant criteria, although primarily for the protection of aquatic life. Other States relied on a narrative "free from" toxicity criterion, using so-called "action levels" for toxic pollutants or for calculating site-specific criteria. Few States specifically addressed human health protection outside the National Primary Drinking Water Standards promulgated under the Safe Drinking Water Act.

In support of its 1983 regulation, EPA simultaneously issued program guidance entitled *Water Quality Standards Handbook* (December 1983). The foreword to the guidance noted that EPA's approach to controlling toxics included both chemical-specific numeric criteria and biological testing in whole-effluents or ambient waters. More detailed programmatic guidance on the application of biological testing was provided in the *Technical Support Document for Water Quality-based Toxics Control* (EPA 44/4-85-032, September 1985). This document provides the information needed to convert chemical-specific and biologically based criteria into permit limits for point source dischargers.

State water quality standards reviews submitted began to show the effects of EPA's efforts. More and more numeric criteria for toxics were being included in State standards as well as more aggressive use of the "free from toxics" narratives in setting protective NPDES permit limits. However, because of perceived problems in adopting numeric toxic pollutant criteria in State rulemaking proceedings, many States were reluctant to adopt numeric toxics criteria. Thus, in 1987, Congress responded to the lack of numeric criteria for toxic pollutants within State standards by mandating State adoption of such criteria.

In response to this new congressional mandate, EPA redoubled its efforts to promote and assist State adoption of water quality standards for priority toxic pollutants. EPA's efforts included the development and issuance of guidance to the States on December 12, 1988, which contained acceptable implementation procedures for several new sections of the Act, including sections 303(c)(2)(B).

EPA, in devising guidance for section 303(c)(2)(B), attempted to provide States with the maximum flexibility that complied with the express statutory language but also with the overriding congressional objective: prompt adoption and implementation of numeric toxics criteria. EPA believed that flexibility was important so that each State could comply with section 303(c)(2)(B) and to the extent possible, accommodate its existing water quality standards regulatory approach. The options EPA identified are described in section 3.4.1 of this Handbook.

EPA's December 1988 guidance also addressed the timing issue for State compliance with section 303(c)(2)(B). The statutory directive was clear: all State standards triennial reviews initiated after passage of the Act must include a consideration of numeric toxic criteria.

States significantly responded to the 1987 requirement for numeric criteria for toxic pollutants. For example, in 1986 on average, each State had 10 numeric criteria for freshwater aquatic life. By February 1990, the average number of freshwater aquatic life criteria was increased to 30. Also, States averaged 36 numeric criteria for human health in February 1990. However, by September 1990, many States had failed to fully satisfy the requirements of section 303(c)(2)(B).

The addition of section 303(c)(2)(B) to the Clean Water Act was an unequivocal signal to the States that Congress wanted toxics criteria in the State's water quality standards. EPA, consistent with this mandate, initiated Federal promulgation of toxic criteria for those States that had not complied with the Act. EPA proposed Federal criteria for toxic pollutants for 22 States and Territories, based on a preliminary assessment of compliance, on November 19, 1991 (56 F.R. 58420), and promulgated toxic criteria for 14 of those States on December 22, 1992 (57 F.R. 60848).

HANDBOOK CHANGES SINCE 1983

In December, 1983, EPA published its first *Water Quality Standards Handbook.* The 1983 Handbook was designed to help States implement the Water Quality Standards Regulation as revised in November 1983 (48 F.R. 51400). Since then, Congress enacted the Water Quality Act of 1987 (Public Law 100-4), making substantial additions to the Clean Water Act (CWA) directly affecting the standards program. In response to the Water Quality Act of 1987, and as a result of Federal promulgation actions, EPA amended the Water Quality Standards Regulation several times (see Appendices A and B). Since 1983 EPA also issued additional guidance to assist in the implementation of the WQS Regulation. *Water Quality Standards Handbook - Second Edition* incorporates all the WQS guidance issued since the 1983 Handbook was published. A summary of these guidance documents are as follows.

EPA Guidance on the Water Quality Act of 1987

On February 4, 1987, Congress enacted the Water Quality Act of 1987 (Public Law 100-4), making substantial additions to the Clean Water Act directly affecting the standards program. Section 303(c)(2)(B) of the Clean Water Act requires States to adopt numeric criteria for toxic pollutants listed under section 307(a) of the Clean Water Act for which section 304(a) criteria have been published, if the presence of these pollutants is likely to affect a water body's use. EPA published *Guidance for State Implementation of WQS for CWA section 303(c)(2)(B)* on December 12, 1988 (USEPA, 1988b). This guidance is incorporated into this Handbook at section 3.4.1.

The 1987 Act also added a new section 518, which requires EPA to promulgate a regulation specifying how the Agency will authorize qualified Indian Tribes to administer CWA programs including section 303 (water quality standards) and section 401 (certification) programs. Section 518 also requires EPA, in promulgating this regulation, to establish a mechanism to resolve unreasonable consequences that may result from an Indian Tribe and a State adopting differing water quality standards on common bodies of water. EPA promulgated a final regulation on December 12, 1991 (56 F.R. 64875). Guidance on water quality standards for Indian Tribes is contained in chapter 1.

Other EPA Guidance

Since 1983, EPA also developed additional policies and guidance on virtually all areas of the WQS Regulation. Following is a complete list of these guidance documents.

State Water Quality Standards Approvals: Use Attainability Analysis Submittals (USEPA, 1984d), clarifies EPA policy on several issues regarding approval of water body use designations less than the fishable/swimmable goal of the CWA. See section 6.2 for a discussion of this topic.

Interpretation of the Term "Existing Use" (USEPA, 1985e), expands on EPA's interpretation of when a use becomes an "existing use" as defined by the WQS Regulation. Discussion of "existing uses" is contained in section 4.4.

Selection of Water Quality Criteria in State Water Quality Standards (USEPA, 1985f), established EPA policy regarding the selection of appropriate water quality criteria for toxic pollutants in State water quality standards. This guidance preceded both the *Guidelines for Deriving Numerical National Water Quality Criteria for the for the Protection of Aquatic Organisms and Their Uses* (USEPA, 1985b), and the 1988 guidance on section 303(c)(2)(B) of the CWA, discussed above. Both of these later documents expand upon the February 1985 guidance, but the policy established therein has not been substantively changed. Adoption of criteria for toxic pollutants is discussed in section 3.4.

Variances in Water Quality Standards (USEPA, 1985g), reinterprets the factors that could be considered when granting water quality standards variances. Variances are discussed in section 5.3.

Antidegradation, Waste loads, and Permits (USEPA, 1985h), clarifies that the antidegradation policy is an integral component of water quality standards and must be considered when developing waste load allocations and NPDES permits. Antidegradation is discussed in chapter 4.

Questions and Answers on Antidegradation (Appendix G), provides guidance on various aspects of the antidegradation policy where questions had arisen since the 1983 Regulation and Handbook were published.

Antidegradation Policy (USEPA, 1985i), reiterates the need for all States to have: (1) an antidegradation policy that fully complies with the Federal requirements, and (2) a procedure for consistently implementing that policy.

Answers to Questions on Nonpoint Sources and WQS (USEPA, 1986e), responded to two questions on nonpoint source pollution and water quality standards. The relationship between nonpoint source pollution and water quality standards is discussed in section 7.

Determination of "Existing Uses" for Purposes of Water Quality Standards Implementation (USEPA, 1986f), responds to concerns expressed to EPA on the interpretation of when a recreational use becomes an "existing use" as defined by the Regulation. Discussion of "existing uses" is contained in section 4.4.

Nonpoint Source Controls and Water Quality Standards (USEPA, 1987d), provides further guidance on nonpoint sources pollution and water quality standards reflecting the requirements of section 319 of the CWA as added by the 1987 CWA amendments.

EPA Designation of Outstanding National Resource Waters (USEPA, 1989f), restates the basis for EPA's practice of not designating State waters as Outstanding National Resource Waters (ONRW) where a State does not do so. ONRWs are discussed in section 4.6.

Guidance for the Use of Conditional Approvals for State WQS (USEPA, 1989g), provides guidelines for regional offices to use in granting State water quality standards approvals conditioned on the performance of specified actions by the State. Conditional approvals are discussed in section 6.2.3.

Application of Antidegradation Policy to the Niagara River (USEPA, 1989c), provides guidance on acceptable interpretations of the antidegradation policy to help attain the CWA objective to "restore and maintain" the integrity of the Nation's waters.

Designation of Recreation Uses (USEPA, 1989h), summarizes previously issued guidance, and outlines a number of acceptable State options for designating recreational uses. The use designation process is discussed in chapter 2.

Biological Criteria: National Program Guidance for Surface Waters (Appendix C), provides guidance on the effective development and application of biological criteria in the water quality standards program. Biological criteria are discussed in section 3.5.3.

National Guidance: Water Quality Standards for Wetlands (Appendix D), provides guidance for meeting the EPA priority to develop water quality standards for wetlands.

Section 401 certification and FERC licenses (USEPA, 1991h), clarifies the range of water quality standards elements that States need to apply when making CWA section 401 certification decisions. Section 401 of the CWA is discussed in section 7.6.3.

Technical Support Document for Water Quality-based Toxics Control, (USEPA, 1991a), provides technical guidance for assessing and regulating the discharge of toxic substances to the waters of the United States.

Policy on the Use of Biological Assessments and Criteria in the Water Quality Program (USEPA, 1991i), provides the basis for EPA's policy that biological surveys shall be fully integrated with toxicity and chemical-specific assessment methods in State water quality programs. Further discussion of this policy is contained in section 3.3.

Numeric Water Quality Criteria for Wetlands (Appendix E), evaluates EPA's numeric aquatic life criteria to determine how they can be applied to wetlands. Wetland aquatic life criteria are discussed in section 3.5.6.

Endangered Species Act Joint Guidance (Appendix F), establishes a procedure by which EPA, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service will consult on the development of water quality criteria and standards.

Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria (USEPA, 1993f), transmits Office of Water (OW) policy and guidance on the interpretation and implementation of aquatic life criteria for the management of metals. Section 3.6 discusses EPA's policy on aquatic life metals criteria.

Interpretation of Federal Antidegradation Regulatory Requirement (USEPA, 1994a), provides guidance on the interpretation of the antidegradation policy in 40 CFR 131.12(a)(2) as it relates to nonpoint sources. Antidegradation and nonpoint sources are discussed in Section 4.6.

Interim Guidance on Determination and Use of Water-Effect Ratios for Metals (Appendix L), provides interim guidance concerning the experimental determination of water-effect ratios (WERs) for metals and supersedes all guidance concerning water-effect ratios and the Indicator Species Procedure in USEPA, 1983a and in USEPA, 1984f. It also supersedes the guidance in these earlier documents for the Recalculation Procedure for performing site-specific aquatic life criteria modifications. Site-specific aquatic life criteria are discussed in Section 3.7.

The guidance contained in each of the above documents is either incorporated into the text of the appropriate section of this Handbook or attached as appendices (see Table of Contents). The reader is directed to the original guidance documents for the explicit guidance on the topics discussed. Copies of all original guidance documents not attached as appendices may be obtained from the source listed for each document in the Reference section of this Handbook.

The *Water Quality Standards Handbook - Second Edition* is reorganized from the 1983 Handbook. An overview to Water Quality Standards and Water Quality Management programs has been added, and chapters 1 through 6 are organized to parallel the provisions of the Water Quality Standards Regulation. Chapter 7 briefly introduces the role of water quality standards in the water quality-based approach to pollution control.

The *Water Quality Standards Handbook - Second Edition* retains all the guidance in the 1983 Handbook unless such guidance was specifically revised in subsequent years.

OVERVIEW OF THE WATER QUALITY STANDARDS PROGRAM

A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water, by setting criteria necessary to protect the uses, and by preventing degradation of water quality through antidegradation provisions. States adopt water quality standards to protect public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act.

"Serve the purposes of the Act" (as defined in sections 101(a), 101(a)(2), and 303(c) of the Act) means that water quality standards:

- include provisions for restoring and maintaining chemical, physical, and biological integrity of State waters;
- wherever attainable, achieve a level of water quality that provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water ("fishable/swimmable"); and
- consider the use and value of State waters for public water supplies, propagation of fish and wildlife, recreation, agriculture and industrial purposes, and navigation.

Section 303(c) of the Clean Water Act provides the statutory basis for the water quality standards program. The regulatory requirements governing the program, the *Water Quality Standards Regulation*, are published at 40 CFR 131. The Regulation is divided into four subparts (A through D), which are summarized below.

General Provisions (40 CFR 131 - Subpart A)

Subpart A includes the scope (section 131.1) and purpose (section 131.2) of the Regulation, definitions of terms used in the Regulation (section 131.3), State (section 131.4) and EPA (section 131.5) authority for water quality standards, and the minimum requirements for a State water quality standards submission (section 131.6).

On December 12, 1991, the EPA promulgated amendments to Subpart A of the Water Quality Standards Regulation in response to the CWA section 518 requirements (see 56 F.R. 64875). The Amendments:

- establish a mechanism to resolve unreasonable consequences that may result from an Indian Tribe and a State adopting differing water quality standards on common bodies of water (section 131.7); and
- add procedures by which an Indian Tribe can qualify for the section 303 water quality standards and section 401 certification programs of the Clean Water Act (section 131.8).

The sections of Subpart A are discussed in chapter 1.

Establishment of Water Quality Standards - (Subpart B)

Subpart B contains regulatory requirements that must be included in State water quality standards: designated uses (section 131.10), criteria that protect the designated uses (section 131.11), and an antidegradation policy that protects existing uses and high water quality (section 131.12). Subpart B also provides for State discretionary policies, such as mixing zones and water quality standards variances (section 131.13).

Each of these sections is summarized below and discussed in detail in chapters 2 through 5 respectively.

Designation of Uses

The Water Quality Standards Regulation requires that States specify appropriate water uses to be achieved and protected by taking into consideration the use and value of the water body for public water supply, for propagation of fish, shellfish, and wildlife, and for recreational, agricultural, industrial, and navigational purposes. In designating uses for a water body, States examine the suitability of a water body for the uses based on the physical, chemical, and biological characteristics of the water body, its geographical setting and scenic qualities, and the social-economic and cultural characteristics of the surrounding area. Each water body does not necessarily require a unique set of uses. Instead, the characteristics necessary to support a use can be identified so that water bodies having those characteristics might be grouped together as supporting particular uses.

Any water body with standards not consistent with the section 101(a)(2) goals of the Act must be reexamined every 3 years to determine if new information has become available that would warrant a revision of the standard. In addition, the Regulation requires that where existing water quality standards specify designated uses less than those which are presently being attained, the State shall revise its standards to reflect the uses actually being attained.

When reviewing uses, States must perform and submit to EPA a use attainability analysis if:

- either the State designates or has designated uses that do not include the uses specified in section 101(a)(2) of the Act;

- the State wishes to remove a designated use that is specified in section 101(a)(2); or

- the State wishes to adopt subcategories of uses specified in section 101(a)(2) that require less stringent criteria than are currently adopted.

States may adopt seasonal uses as an alternative to reclassifying a water body or segment thereof to uses requiring less stringent criteria. In no case may a State remove an existing use. No use attainability analysis is required when designating uses that include those specified in section 101(a)(2) of the Act.

Criteria Development and Review

States adopt water quality criteria with sufficient coverage of parameters and of adequate stringency to protect designated uses. In adopting criteria to protect the designated uses, States may:

- adopt the criteria that EPA publishes under section 304(a) of the Act;

- modify the section 304(a) guidance to reflect site-specific conditions; or

- use other scientifically defensible methods.

Section 131.11 encourages States to adopt both numeric and narrative criteria. Numeric criteria are important where the cause of toxicity is known or for protection against pollutants with potential human health impacts or potential for bioaccumulation. Narrative toxic criteria, based on whole-effluent toxicity (WET) testing, can be the basis for limiting toxicity in waste discharges where a specific pollutant can be identified as causing or contributing to the toxicity but there are no numeric criteria in the State standards or where toxicity cannot be traced to a particular pollutant. Whole-effluent toxicity testing is also appropriate for discharges containing multiple pollutants because WET testing provides a method for evaluating synergistic and antagonistic effects on aquatic life.

Section 303(c)(2)(B) requires States to adopt criteria for all section 307(a) toxic pollutants for which the Agency has published criteria under section 304(a) of the Act, if the discharge or presence of the pollutant could reasonably be expected to interfere with the designated uses of the water body. The section 307(a) list contains 65 compounds and families of compounds, which the Agency has interpreted to include 126 "priority" toxic pollutants for regulatory purposes. If data indicate that it is reasonable to expect that one or more of the section 307(a) toxic pollutants will interfere with the attainment of the designated use, or is actually interfering with the designated use, then the State must adopt a numeric limit for the specific pollutant. Section 303(c)(2)(B) also provides that where EPA-recommended numeric criteria are not available, States shall adopt criteria based on biological monitoring or assessment methods.

Antidegradation Policy and Implementation Methods

Water quality standards include an antidegradation policy and methods through which the State implements the antidegradation policy. Section 131.12 sets out a three-tiered approach for the protection of water quality.

"Tier 1" (40 CFR 131.12(a)(1)) of antidegradation maintains and protects existing uses and the water quality necessary to protect these uses. An existing use can be established by demonstrating that fishing, swimming, or other uses have actually occurred since November 28, 1975, or that the water quality is suitable to allow such uses to occur, whether or not such uses are designated uses for the water body in question.

"Tier 2" (section 131.12(a)(2)) protects the water quality in waters whose quality is better than that necessary to protect "fishable/ swimmable" uses of the water body. 40 CFR 131.12(a)(2) requires that certain procedures be followed and certain showings be made (an "antidegradation review") before lowering water quality in high-quality waters. In no case may water quality on a Tier II water body be lowered to the level at which existing uses are impaired.

"Tier 3" (section 131.12 (a)(3)) protects outstanding national resource waters (ONRWs), which are provided the highest level of protection under the antidegradation policy. ONRWs generally include the highest quality waters of the United States. However, the ONRW antidegradation classification also offers special protection for waters of "exceptional ecological significance," i.e., those water bodies which are important, unique, or sensitive ecologically, but whose water quality, as measured by the traditional parameters such as dissolved oxygen or pH, may not be particularly high. Waters of exceptional ecological significance also include waters whose characteristics cannot adequately be described by traditional parameters (such as wetlands and estuaries).

Antidegradation implementation procedures address how States will ensure that the permits and control programs meet water quality standards and antidegradation policy requirements.

General Policies

The Water Quality Standards Regulation allows States to include in their standards State policies and provisions regarding water quality standards implementation, such as mixing zones, variances, and low-flow exemptions subject to EPA review and approval. These policies and provisions should be specified in the State's water quality standards document. The State's rationale and supporting documentation should be submitted to EPA for review during the water quality standards review and approval process.

Mixing Zones

States may, at their discretion, allow mixing zones for dischargers. The States' water quality standards should describe the methodology for determining the location, size, shape, outfall design, and in-zone quality of mixing zones. Careful consideration must be given to the

appropriateness of a mixing zone where a substance discharged is bioaccumulative, persistent, carcinogenic, mutagenic, or teratogenic.

Low-Flow Provisions

State water quality standards should protect water quality for the designated and existing uses in critical low-flow situations. States may, however, designate a critical low-flow below which numerical water quality criteria do not apply. When reviewing standards, States should review their low-flow provisions for conformance with EPA guidance.

Water Quality Standards Variances

As an alternative to removing a designated use, a State may wish to include a variance as part of a water quality standard, rather than change the standard across the board, because the State believes that the standard ultimately can be attained. By maintaining the standard rather than changing it, the State will assure that further progress is made in improving water quality and attaining the standard. EPA has approved State-adopted variances in the past and will continue to do so if:

- the variance is included as part of the water quality standard;
- the variance is subjected to the same public review as other changes in water quality standards;
- the variance is granted based on a demonstration that meeting the standard is not feasible due to the presence of any of the same conditions as if the State were removing a designated use (these conditions are listed in section 131.10(g) of the Regulation); and
- existing uses will be fully protected.

Water Quality Standards Review and Revision Process - (Subpart C)

The Clean Water Act requires States to hold a public hearing(s) to review their water quality standards at least once every 3 years and revise them if appropriate. After State water quality standards are officially adopted, a Governor or designee submits the standards to the appropriate EPA Regional Administrator for review. EPA reviews the State standards to determine whether the analyses performed are adequate. The Agency also evaluates whether the designated uses and criteria are compatible throughout the water body and whether the downstream water quality standards are protected. After reviewing the standards, EPA makes a determination whether the standards meet the requirements of the law and EPA's water quality standards regulations. If EPA disapproves a standard, the Agency indicates what changes must be made for the standard to be approved. If a State fails to make the required changes, EPA promulgates a Federal standard, setting forth a new or revised water quality standard applicable to the State.

State Review and Revision

States identify additions or revisions necessary to existing standards based on their 305(b) reports, other available water quality monitoring data, previous water quality standards reviews, or requests from industry, environmental groups, or the public. Water quality standards reviews and revisions may take many forms, including additions to and modifications in uses, in criteria, in the antidegradation policy, in the antidegradation implementation procedures, or in other general policies.

Some States review parts of their water quality standards every year. Other States perform a comprehensive review every 3 years. Such reviews are necessary because new scientific and technical data may become available. Environmental changes over time may also necessitate the need for the review.

EPA Review

When States adopt new or revised WQS, the State is required under CWA section 303(c) to submit such standards to EPA for review and approval/disapproval. EPA reviews and approves/disapproves the standards based on whether the standards meet the requirements of the CWA. As a result of the EPA review process, three actions are possible:

- EPA approval (in whole or in part) of the submitted State water quality standards; or
- EPA disapproval (in whole or in part) of the submitted State water quality standards; or
- EPA conditional approval (in whole or in part) of the submitted State water quality standards.

Revisions to State water quality standards that meet the requirements of the Act and the WQS Regulation are approved by the appropriate EPA Regional Administrator. If only a partial approval is made, the Region, in notifying the State, identifies the portions which should be revised (e.g., segment-specific requirements).

If the Regional Administrator determines that the revisions submitted are not consistent with or do not meet the requirements of the Act or the WQS Regulation, the Regional Administrator disapproves the standards within 90 days with a written notification to the State. The letter notifies the State that the Administrator will initiate promulgation proceedings if the State fails to adopt and submit the necessary revisions within 90 days after notification. The State water quality standard remains in effect, even though disapproved by EPA, until the State revises it or EPA promulgates a rule that supersedes the State water quality standard.

Federally Promulgated Water Quality Standards - (Subpart D)

As discussed above, EPA may promulgate Federal Water Quality Standards. Section 303 of the Clean Water Act permits the Administrator to promulgate Federal standards:

- if a revised or new water quality standards submitted by the State is determined by the Administrator not to be consistent with the applicable requirements of the Act; or
- in any case where the Administrator determines that a new or revised standard is necessary to meet the requirements of the Act.

Federal promulgations are codified under Subpart D of the Regulation.

THE ROLE OF WQS IN THE WATER QUALITY MANAGEMENT PROGRAM

State water quality standards play a central role in a State's water quality management program, which identifies the overall mechanism States use to integrate the various Clean Water Act quality control requirements into a coherent management framework. This framework includes, for example:

- setting and revising standards for water bodies;
- Water Quality Assessments to determine attainment of designated uses;
- CWA section 305(b) water quality monitoring to provide information upon which water quality-based decisions will be made, progress evaluated, and success measured;
- calculating total maximum daily loads (TMDLs), waste load allocations (WLAs) for point sources of pollution, and load allocations (LAs) for nonpoint sources of pollution;
- developing a water quality management plan, certified by the Governor and approved by EPA, which lists the standards and prescribes the regulatory and construction activities necessary to meet the standards;
- preparing section 305(b) reports and lists that document the condition of the State's water quality;
- developing, revising, and implementing an effective CWA section 319 program and CZARA section 6217 program to control NPS pollution;
- making decisions involving CWA section 401 certification of Federal permits or licenses; and
- issuing NPDES permits for all point source discharges. Permits are written to meet applicable water quality standards.

The Act provides the basis for two different kinds of pollution control programs. Water quality standards are the basis of the water quality-based control program. The Act also provides for technology-based limits known as best available treatment technology economically achievable for industry and secondary treatment for publicly owned treatment works. In some cases, application of these technologically based controls will result in attaining water quality standards. Where such is not the case, the Act requires the development of more stringent limitations to meet the water quality standards.

Regulations, policy, and guidance have been issued on all the activities mentioned in this section. Chapter 7 contains a brief discussion of how water quality standards relate to many of these activities in the water quality-based approach to pollution control, but additional details on these other programs is beyond the scope of this Handbook. For further information, see the EPA guidance documents referenced in chapter 7.

FUTURE PROGRAM DIRECTIONS

Since the 1960's, the water science program has moved from solving a limited set of problems in a limited set of waters to one that is solving a broad range of complex problems in categories of U.S. waters and addressing cross-media aspects of water quality decisions. Initial efforts focused on the more visible sources of pollution such as organic loadings, solids, oil, and grease, and then shifted to toxics and more complex mixtures of pollutants.

Developments in two areas have significantly affected the scientific underpinnings of the water program. First is the science of risk assessment used to estimate risk to human health and the environment from exposure to contaminants. Second is our ability to measure pollutants in the environment at an increasing level of precision. The evolution of methods and capabilities within these two scientific disciplines has significantly advanced the sophistication of scientific analyses used to manage the water program.

As the water science program moves toward the 21st Century, we must provide technical information and tools that allow States, the regulated community, and the public to understand and apply the methods, criteria, and standards to environmental systems. This includes updating science and adapting technologies as appropriate to keep the foundation of our program solid as well as employing or modifying these approaches when appropriate for new problems.

The CWA provides broad authority through its goals and policy, such as:

> . . . to restore and maintain the chemical, physical, and biological integrity of the Nation's waters (section 101(a)); and

> . . . wherever attainable . . . water quality which provides for the protection and propagation of fish, shellfish, and wildlife . . . to protect the water of the United States (section 101(a)(2)).

The breadth of this authority is also reflected in specific EPA mandates such as those in section 304(a):

> [EPA] shall develop and publish . . . criteria for water accurately reflecting the latest scientific knowledge (A) on the kind and extent of all identifiable effects on health and welfare . . . (B) on the concentration and dispersion of pollutants . . . through biological, physical, and chemical processes; and (C) the effects of pollutants on biological community diversity, productivity, stability . . . including eutrophication and rates of . . . sedimentation . . . (CWA section 304(a)(1)); and

> [EPA] shall develop and publish . . . information (A) on the factors necessary to restore and maintain the chemical, physical, and biological integrity . . . (B) on the factors necessary for the protection and propagation of shellfish, fish, and wildlife . . . and to allow recreational activities in and on the water . . .".) (304(a)(2))(CWA section 304(a)(2))

EPA has traditionally focused on criteria for chemical pollutants, but has also developed criteria for a limited number of physical (e.g., color, turbidity, dissolves solids) and biological (bacteria, "free from" nuisance aquatic life) parameters (NAS/NAE, 1973; USEPA, 1976). However, as EPA's water quality protection program has evolved, it has become apparent that chemical criteria alone, without the criteria for the biological and physical/habitat components of water bodies, are insufficient to fully achieve the goals of the CWA.

Future directions in the criteria and standards program will focus on providing scientific and technical tools to aid regional, State, and local environmental managers in (1) implementating the standards program, and (2) developing new science and technology that will reduce human and ecological risks resulting from exposure to unaddressed contaminants and prevent pollution from point and nonpoint sources.

Setting future national program priorities will be based on the consideration of risk assessment; statutory and court-mandated obligations; the expressed needs of regional, State, and local environmental managers and the regulated community; and the potential effectiveness of a program to influence real environmental improvement.

EPA will be developing methodologies and criteria in areas beyond the traditional chemical-specific type criteria of the past. Areas of scientific examination and potential regulatory controls include criteria to protect wildlife, wetlands, and sediment quality; biological criteria to better define desired biological communities in aquatic ecosystems; and nutrient criteria. EPA has also moved in the direction of the physical and habitat components of water quality protection in other water quality programs. For example, the CWA section 404(b)(1) Guidelines (40 CFR 230) evaluate physical characteristics (such as suspended particulates, flow, and hydroperiod), and habitat components (such as food web organisms, breeding/nesting areas, and cover). Implementation of these various types of criteria will be influenced by the environmental concerns in specific watersheds.

To protect human health, program emphasis will shift to focus on the human health impacts of pathogenic microorganisms in ambient waters that cause illness in humans, and will address concerns about the risk that contaminated fish may pose to sensitive populations whose daily diet includes large quantities of fish.

In an expanded effort to protect ecology, there will be increasing emphasis on the watershed approach by assessing all potential and actual threats to a watershed's integrity. Risk assessment of the watershed and setting priorities based on those risks will become increasingly important in future program efforts in criteria and standards as supporting elements to the watershed approach.

Over the next few years, there will be more emphasis on developing effective risk reduction strategies that include both traditional and non-traditional controls and approaches.

Future program directions in criteria development and then adoption and implementation of water quality standards will be based on the principle of ecological and human health risk reduction through sound and implementable science.

Endangered Species Act

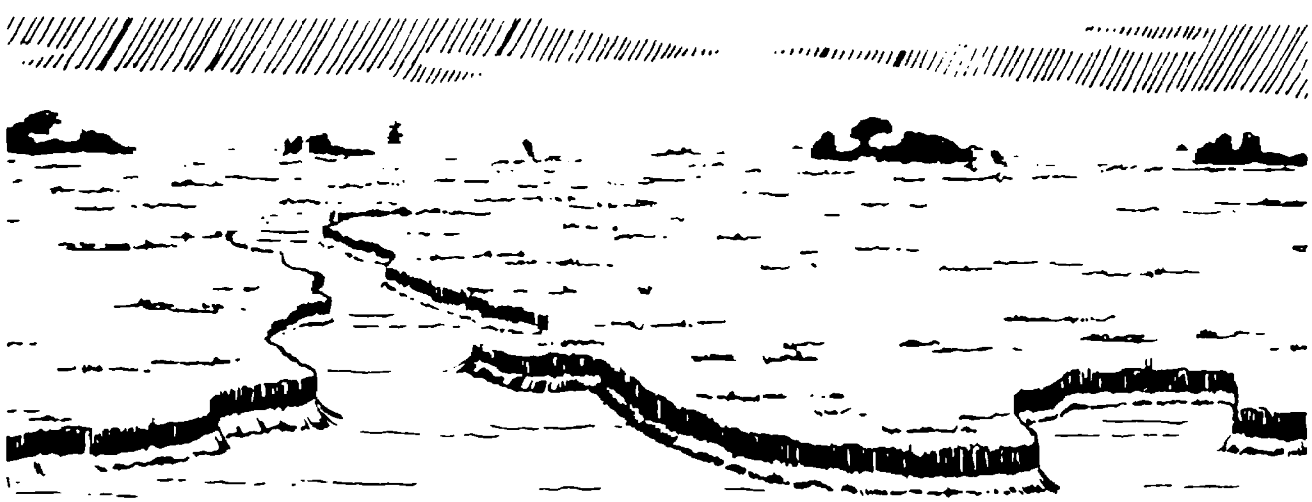
An important consideration in future criteria and standards development will be the conduct of the consultation provisions of the Endangered Species Act (ESA) and the implementation of any revisions to standards resulting from those consultations. Section 7 of the Endangered Species Act requires all Federal agencies, in consultation with the Fish and Wildlife Service and the National Marine Fisheries Service (the Services) to assure that any action authorized, funded, or implemented by a Federal agency does not jeopardize the existence of endangered or threatened species or result in the destruction or adverse modification of their critical habitat. The definition of a Federal action is very broad and encompasses virtually every water program administered by EPA.

The responsibility for ensuring that consultation occurs with the Services lies with EPA, although in fulfilling the requirements a non-Federal representative may be designated for informal consultation. (Note: Consultation may be formal or informal; the latter form is the most prevalent.) Protection of threatened and endangered species and their habitat is a critical national priority, and the criteria and standards programs can be effective tools to meet this national priority. All aspects of standards, including aquatic life criteria, uses, antidegradation, and implementation actions related to the standards are subject to consultation. All future revised aquatic life criteria, sediment, wildlife, and biological criteria will be subject to the consultation requirements as will their adoption into enforceable standards.

To form an effective partnership between the Services and EPA in creating a framework for meeting the responsibilities under section 7 of the Endangered Species Act and applicable EPA regulations, the Services and EPA entered into a joint guidance agreement in July 1992 (see Appendix F). This agreement sets forth the procedures to be followed by the Services and EPA to assure compliance with section 7 of the ESA in the development of water quality criteria published pursuant to section 304(a) of the CWA and the adoption of water quality standards under section 303(c). This agreement also indicated that the regional and field offices of EPA and the Services could establish sub-agreements specifying how they would implement the joint national guidance.

During the preparation of this second edition Handbook, the Services and EPA initiated a work group to develop a more extensive joint agreement. This group was charged with the responsibility of reviewing the July 1992 agreement, making appropriate revisions to the water quality criteria and standards sections, and adding a new section discussing the consultation procedures to be followed for the NPDES permit program. When the revised agreement is approved by the Agencies, it will replace the agreement included in this Handbook as Appendix F.

Both the current agreement and the proposed revision seek to ensure a nationally consistent consultation process that allows flexibility to deal with site-specific issues and to streamline the process to minimize the regulatory burden. The overriding goal is to provide for the protection and support of the recovery of threatened and endangered species and the ecosystems on which they depend.



CHAPTER 1

GENERAL PROVISIONS

(40 CFR 131 - Subpart A)

Table of Contents

CHAPTER 1
GENERAL PROVISIONS

1.1 Scope - 40 CFR 131.1

The Water Quality Standards Regulation (40 CFR 131) describes State requirements and procedures for developing, reviewing, revising, and adopting water quality standards (WQS), and EPA requirements and procedures for reviewing, approving, disapproving, and promulgating water quality standards as authorized by section 303(c) of the Clean Water Act. This Handbook serves as guidance for implementing the Water Quality Standards Regulation and its provisions.

1.2 Purpose - 40 CFR 131.2

A water quality standard defines the water quality goals for a water body, or portion thereof, by designating the use or uses to be made of the water, by setting criteria necessary to protect the uses, and by protecting water quality through antidegradation provisions. States adopt water quality standards to protect public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act (the Act). "Serve the purposes of the Act" means that water quality standards should:

- wherever attainable, achieve a level of water quality that provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water, and take into consideration the use and value of public water supplies, and agricultural, industrial, and other purposes, including navigation (sections 101(a)(2) and 303(c) of the Act); and

- restore and maintain the chemical, physical, and biological integrity of the Nation's waters (section 101(a)).

CLEAN WATER ACT GOALS

- Achieve a level of water quality that provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water, where attainable.

- Restore and maintain the chemical, physical, and biological integrity of the Nation's waters.

These standards serve dual purposes: They establish the water quality goals for a specific water body, and they serve as the regulatory basis for establishing water quality-based treatment controls and strategies beyond the technology-based levels of treatment required by sections 301(b) and 306 of the Act.

1.3 Definitions - 40 CFR 131.3

Terms used in the Water Quality Standards Regulation are defined in section 131.3 of the regulation. These definitions, as well as others appropriate to the water quality standards program, are contained in the glossary of this Handbook. No additional guidance is necessary to explain the definitions; however, some background information on the definitions of "States" and "waters of the United States" may be helpful.

1.3.1 States

Indian Tribes may now qualify for the water quality standards and 401 certification programs. The February 4, 1987, Amendments to the Act added a new section 518 requiring EPA to promulgate regulations specifying how the Agency will treat qualified Indian Tribes as States for the purposes of, the section 303 (water quality standards) programs, the section 401 (certification) programs, and other programs. On December 12, 1991, the EPA promulgated amendments to Subpart A of the Water Quality Standards Regulation in response to the CWA section 518 requirements (see 56 F.R. 64893). These amendments modified the definition of States by adding the phrase ". . . and Indian Tribes that EPA determines qualify for treatment as States for purposes of water quality standards."

1.3.2 Waters of the United States

Section 303(c) of the CWA requires States to adopt water quality standards for "navigable waters," which are defined at section 502(7) of the Act as "waters of the United States." The Water Quality Standards Regulation contains no definition of "waters of the United States," although this term is used in the definition of "water quality standards." The phrase "waters of the United States" has been defined elsewhere in Federal regulations (e.g., in regulations governing the National Pollutant Discharge Elimination System (NPDES) and section 404 programs (40 CFR sections 122.2, 230.3, and 232.3, respectively). This definition appears in the glossary of this Handbook and is used in interpreting the phrase "water quality standards."

The definition of "waters of the United States" emphasizes protection of a broad range of waters, including interstate and intrastate lakes, streams, wetlands, other surface waters, impoundments, tributaries of waters, and the territorial seas.

EPA believes that some States may not be providing the same protection to wetlands that they provide to other surface waters. Therefore, EPA wishes to emphasize that wetlands deserve the same protection under water quality standards. For more information on the application of water quality standards to wetlands, see Appendix D of this Handbook.

WATERS OF THE UNITED STATES

- **Interstate/intrastate lakes**
- **Streams**
- **Wetlands**
- **Other surface waters**
- **Impoundments**
- **Tributaries of waters**
- **Territorial seas**

Concerns have been raised regarding applicability of water quality standards to riparian areas other than riparian wetlands. "Riparian areas" are areas in a stream's floodplain with life characteristic of a floodplain. Wetlands are often found in portions of riparian areas. The Clean Water Act requires States to adopt water quality standards only for "waters of the United States," such as wetland portions of riparian areas that meet the regulatory definition. Of course, States may, at their discretion, choose to adopt water quality standards or other mechanisms to protect other riparian areas.

1.4 State Authority - 40 CFR 131.4

States (including Indian Tribes qualified for the purposes of water quality standards) are responsible for reviewing, establishing, and revising water quality standards. Under section 510 of the Act, States may develop water quality standards more stringent than required by the Water Quality Standards Regulation.

Under section 401 of the Act, States also have authority to issue water quality certifications for federally permitted or licensed activities. This authority is granted because States have jurisdiction over their waters and can influence the design and operation of projects affecting those waters. Section 401 is intended to ensure that Federal permits and licenses comply with applicable water quality requirements, including State water quality standards, and applies to all

Federal agencies that grant a license or permit. (For example, EPA-issued permits for point source discharges under section 402 and discharges of dredged and fill material under section 404 of the Clean Water Act; permits for activities in navigable waters that may affect navigation under sections 9 and 10 of the Rivers and Harbors Act (RHA); and licenses required for hydroelectric projects issued under the Federal Power Act). Section 401 certifications are normally issued by the State in which the discharge originates.

States may deny certification, approve certification, or approve certification with conditions. If the State denies certification, the Federal permitting or licensing agency is prohibited from issuing the permit or license. Certifications are subject to objection by downstream States where the downstream State determines that the proposed activity would violate its water quality standards. [For more information on the 401 certification process, refer to *Wetlands and 401 Certification: Opportunities for States and Eligible Indian Tribes* (USEPA, 1989a).]

1.5 EPA Authority - 40 CFR 131.5

Under section 303(c) of the Act, EPA is to review and to approve or disapprove State-adopted water quality standards. This review involves a determination of whether:

- the State has adopted water uses consistent with the requirements of the Clean Water Act;
- the State has adopted criteria that protect the designated water uses;
- the State has followed its legal procedures for revising or adopting standards;
- the State standards that do not include the uses specified in section 101(a)(2) of the Act are based upon appropriate technical and scientific data and analyses; and
- the State submission meets the requirements included in section 131.6 of the Water Quality Standards Regulation.

EPA reviews State water quality standards to ensure that the standards meet the requirements of the Clean Water Act. If EPA determines that State water quality standards are consistent with the five factors listed above, EPA approves the standards. EPA disapproves the State water quality standards and may promulgate Federal standards under section 303(c)(4) of the Act if State-adopted standards are not consistent with the factors listed above. Section 510 of the Act provides that the States are not precluded from adopting requirements regarding control or abatement of pollution as long as such requirements are not less stringent than the requirements of the Clean Water Act. The Agency is not authorized to disapprove a State water quality standard on the basis that EPA considers the standard to be too stringent. EPA may also promulgate a new or revised standard where necessary to meet the requirements of the Act. In certain cases, EPA may conditionally approve a State's standards. A conditional approval is appropriate only:

- to correct minor deficiencies in a State's standards; <u>and</u>
- when a State agrees to a specific time schedule to make the corrections in as short a time as possible. Section 6.2 provides guidance on conditional approvals.

EPA also has the authority to issue section 401 certification where a State or interstate agency has no authority to do so.

1.6 Requirements for Water Quality Standards Submission - 40 CFR 131.6

The following elements must be included in each State's water quality standards submittal to EPA for review:

- use designations consistent with the provisions of sections 101(a)(2) and 303(c)(2) of the Act;
- methods used and analyses conducted to support water quality standards revisions;
- water quality criteria sufficient to protect the designated uses, including criteria for priority toxic pollutants and biological criteria;
- an antidegradation policy and implementation methods consistent with section 131.12 of the Water Quality Standards Regulation;
- certification by the State Attorney General or other appropriate legal authority within the State that the water quality standards were duly adopted pursuant to State law; and
- general information to aid the Agency in determining the adequacy of the scientific bases of the standards that do not include the uses specified in section 101(a)(2) of the Act as well as information on general policies applicable to State standards that may affect their application and implementation.

EPA may also request additional information from the State to aid in determining the adequacy of the standards.

1.7 Dispute Resolution Mechanism - 40 CFR 131.7

Section 518 of the Act requires EPA to establish a "mechanism for the resolution of any unreasonable consequences that may arise as a result of differing water quality standards that may be set by States and Indian Tribes located on common bodies of water." EPA's primary responsibility in response to this requirement is to establish a practical procedure to address and, where possible, resolve such disputes as they arise. However, the Agency's authority is limited.

For example, EPA does not believe that section 518 grants EPA authority to override section 510 of the Act. EPA believes that the provisions of section 510 would apply to Indian Tribes that qualify for treatment as States. Section 518(e) and its accompanying legislative history suggest that Congress intended for section 510 to apply to Tribes as well as States. Were Tribes prohibited from establishing standards more stringent than minimally approvable by EPA, there would be little need for the dispute resolution mechanism required by section 518(e)(2). Therefore, EPA does not believe that section 518 authorizes the Agency to disapprove a State or Tribe water quality standard and promulgate a less stringent standard as a means of resolving a State/Tribe dispute.

EPA also believes there are strong policy reasons to allow Tribes to set any water quality standards consistent with the Water Quality Standards Regulation. First, it puts Tribes and States on equal footing with respect to standards setting. There is no indication that Congress intended to treat Tribes as "second class" States under the Act. Second, treating Tribes as essentially equivalent to States is consistent with EPA's 1984 Indian Policy. Third, EPA believes it would be unfeasible to require Tribes to adopt "minimum" standards allowed under Federal law. EPA has no procedures in place for defining a "minimum" level of standards for Indian Tribes. EPA evaluates only whether the standards are stringent enough, not how much more stringent than any Federal minimum.

1.7.1 Responsibility Is With Lead EPA Regional Administrator

EPA's role in dispute resolution is to work with all parties to the dispute in an effort to reach an agreement that resolves the dispute. The Agency does not automatically support the Indian position in all disputes over water quality standards. Rather, EPA employees serving as mediators or arbitrators will serve outside the normal Agency chain of command and are expected to act in a neutral fashion.

The lead EPA Regional Administrator will be determined using OMB Circular A-95. The lead Region is expected to enlist the aid of other affected Regions in routine dispute resolution. EPA Headquarters will also oversee the process to ensure that the interests of all affected Regions are represented. Designation as the lead Region for resolving a dispute or programmatic issues within EPA does not mean that the lead Region has a license to act unilaterally. Rather, designation as lead Region assigns the responsibility to ensure that the process leading to a decision is fair to all parties.

The Regional Administrator may include other parties besides Tribes and States in the dispute resolution process. In some cases, the inclusion of permittees or landowners subject to nonpoint source restrictions may be needed to arrive at a meaningful resolution of the dispute. However, only the Tribe and State are in a position to implement a change in water quality standards and are, thus, the only "necessary" parties in the dispute resolution.

1.7.2 When Dispute Resolution May Be Initiated

The regulation establishes conditions under which the Regional Administrator would be responsible for initiating a dispute resolution action. Such actions would be initiated where, in the judgment of the Regional Administrator:

- there are unreasonable consequences;
- the dispute is between a State and a Tribe (i.e., not between a Tribe and another Tribe or a State and another State);
- a reasonable effort has been made to resolve the dispute before requesting EPA involvement;
- the requested relief is within the authority of the Act (i.e., not a request to replace State or Tribe standards that comply with the Act with less stringent Federal standards);
- the differing standards have been adopted pursuant to State or Tribe law and approved by EPA;
- a valid written request for EPA involvement has been submitted to the Regional Administrator by the State or Tribe.

Although the Regional Administrator may decline to initiate a dispute resolution action based on any of the above factors, EPA is willing to discuss specific situations. EPA is also willing to informally mediate disputes between Tribes consistent with the procedures for mediating disputes between States (see 48 F.R. 51412).

The regulation does not define "unreasonable consequences" because:

- it would be a presumptuous and unjustified Federal intrusion into local and State concerns for EPA to define what an unreasonable consequence might be as a basis for a national rule;
- EPA does not want to unnecessarily narrow the scope of problems to be addressed by the dispute resolution mechanism; and
- the possibilities of what might constitute an unreasonable consequence are so numerous as to defy a logical regulatory requirement.

Also, the occurrence of such "unreasonable" consequences is dependent on the unique circumstances associated with the dispute. For example, what might be viewed as an unreasonable consequence on a stream segment in a large, relatively unpopulated, water-poor area with a single discharge would likely be viewed quite differently in or near an area characterized by numerous discharges and/or large water resources. The Regional Administrator has discretion to determine when consequences warrant initiating a dispute resolution action.

1.7.3 Who May Request Dispute Resolution and How

Either the State or the Tribe may request EPA involvement in the dispute. The requesting party must include the following items in its written request:

- a statement describing the unreasonable consequences;
- description of the actions taken to resolve the dispute before requesting EPA involvement;
- a statement describing the water quality standards provision (such as the particular criterion) that has resulted in the unreasonable consequences;
- factual data substantiating the claim of unreasonable consequences; and
- a statement of relief sought (that is, the desired outcome of the dispute resolution action).

1.7.4 EPA Procedures in Response to Request

When the Regional Administrator decides that EPA involvement is appropriate (based on the factors discussed in section 1.7.2, above), the Regional Administrator will notify the parties in writing that EPA dispute resolution action is being initiated and will solicit their written response. The Regional Administrator will also make reasonable efforts to ensure that other interested individuals or groups have notice of this action. These "reasonable efforts" will include, and are not limited to, the following:

- written notice to responsible Indian and State Agencies and other affected Federal Agencies;
- notice to the specific individual or entity that is claiming that an unreasonable consequence is resulting from differing standards having been adopted for a common water body;
- public notice in local newspapers, radio, and television, as appropriate;
- publication in trade journal newsletters; and
- other appropriate means.

1.7.5 When Tribe and State Agree to a Resolution

EPA encourages Tribes and States to resolve the differences without EPA involvement and to consider jointly establishing a mechanism to resolve disputes before such disputes arise. The Regional Administrator has responsibility to review and either approve or disapprove the Tribe-State agreement. Section 518(d) provides that Tribe-State agreements in general for water quality management are to be approved by EPA. As a general rule, EPA will defer to the procedure for resolving disputed jointly established by the Tribe and State so long as the procedure and the end result are consistent with the provisions of the CWA and Water Quality Standards Regulation.

1.7.6 EPA Options for Resolving the Dispute

The dispute resolution mechanism included in the final "Indian Rule" provides EPA Regional Administrators with several alternative courses of action. The alternatives are mediation, non-binding arbitration, and a default procedure.

The first technique, mediation, would allow the Regional Administrator to appoint a mediator whose primary function would be to facilitate discussions between the parties with the objective of arriving at a State/Tribe agreement or other resolution acceptable to the parties. The mediated negotiations could be informal or formal, public or private. The mediator could also establish an advisory group, consisting of representatives from the affected parties, to study the problem and recommend an appropriate resolution.

The second technique, non-binding arbitration, would require the Regional Administrator to appoint an arbitrator (or arbitration panel) whose responsibilities would include gathering all information pertinent to the dispute, considering the factors listed in the Act, and recommending an appropriate solution. The parties would not be obligated, however, to abide by the arbitrator's or arbitration panel's decision. The arbitrator or arbitration panel would be responsible for issuing a written recommendation to all parties and the Regional Administrator. Arbitrators or arbitration panel members who are EPA employees would be allowed to operate independently from the normal chain of commend within the Agency while conducting the arbitration process. Arbitrators or arbitration panel members would not be allowed to have *ex parte* communication pertaining to the dispute, except that they would be allowed to contact EPA's Office of the General Counsel for legal advise.

EPA has also provided for a dispute resolution default procedure to be used where one or more parties refuse to participate in mediation or arbitration. The default procedure will be used only as a last resort, after all other avenues of resolving the dispute have been exhausted. This dispute resolution technique would be similar to arbitration, but has been included as a separate Regional Administrator option because arbitration generally refers to a process whereby all parties participate voluntarily.

The default procedure simply provides for the Agency to review available information and to issue a recommendation for resolving the dispute. EPA's recommendation in this situation would have no enforceable impact. The Agency hopes that public presentation of its position will result in either public pressure or reconsideration by either affected party to continue resolution negotiations. Any written recommendation resulting from this procedure would be provided to all parties involved in the dispute.

EPA envisions a number of possible outcomes that, individually or in combination, would likely resolve most of the disputes that would arise. These actions might include, but are not limited to, the following:

- a State or Tribe agrees to revise the limits of a permit to ensure that downstream water quality standards are met;
- a State or Tribe agrees to permanently remove a use (consistent with 40 CFR 131.10(g));
- a State or Tribe issues a variance from water quality standards for a particular discharge;
- a permittee or landowner agrees to provide additional water pollution control;
- EPA assumes permit-issuing authority for a State or Tribe and re-issues a permit to ensure that downstream water quality standards are met; or
- EPA promulgates Federal water quality standards where a State or Tribe standard does not meet the requirements of the Act.

In some cases (last example, above), EPA recognizes that the Agency will have to act to resolve the dispute. An example would be where a National Pollutant Discharge Elimination System (NPDES) permit for an upstream discharger does not provide for the attainment of the water quality standards for a downstream jurisdiction. The existing NPDES permitting and certification processes under the Act may be used by the downstream jurisdiction to prevent such situations. Today's rule does not alter or minimize the role of these processes in establishing appropriate permit limits to ensure attainment of water quality standards. States and Tribes are encouraged to participate in these permitting and certification processes rather than wait for unreasonable consequences to occur.

In these cases, EPA believes that the Agency has authority to object to the upstream NPDES permit and, if necessary, to assume permitting authority. This authority was upheld in a case in which EPA assumed authority to issue a permit for a North Carolina discharge that, among other factors, did not meet Tennessee's downstream water quality standards.[1]

Mediators and arbitrators may be EPA employees, employees of other Federal agencies, or other individuals with appropriate qualifications. Because of resource constraints, EPA anticipates that mediators and arbitrators will generally be EPA employees rather than consultants. Employees from other Federal agencies would be selected where appropriate, subject to their availability. EPA intends for mediators and arbitrators to conduct the dispute resolution mechanism in a fair and impartial manner, and will select individuals who have not been involved with the particular dispute. Members of arbitration panels will be selected by the Regional Administrator in consultation with the parties. In some cases, such panels may consist of one representative from each party to the dispute plus one neutral panel member. Implicit in the regulation is the sense that mediators and arbitrators will act fairly and impartially. Although not specifically covered in the regulation, EPA believes it is well within the Regional Administrator's power to remove any mediator or arbitrator for any reason (including showing bias or unfairness or taking illegal or unethical actions).

Arbitrators and arbitration panel members shall be selected to include only individuals who are agreeable to all affected parties, are knowledgeable concerning the water quality standards program requirements, have a basic understanding of the political and economic interests of Tribes, and will fulfill the duties fairly and impartially. These requirements are not applicable to mediators. EPA did not provide for State or Tribe approval of mediators because EPA believes that such an approval process would provide too great an opportunity to delay the initiation of the mediation process and because the role of the mediator is limited to acting as a neutral facilitator. There is no prohibition against the Regional Administrator consulting with the parties regarding a mediator; there is just no requirement to do so.

Where one of the parties to the dispute believes that an arbitrator has recommended an action to resolve the dispute which is not authorized by the Act, the regulation allows the party to appeal the arbitrator's decision to the Regional Administrator. Such requests must be in writing and must include a statement of the statutory basis for altering the arbitrator's recommendation.

1.7.7 Time Frame for Dispute Resolution

The regulation does not include a fixed time frame for resolving disputes. While EPA intends to proceed as quickly as possible and to encourage parties to the dispute to resolve it quickly and to establish informal time frames, the variety of potential disputes to be resolved would appear to preclude EPA from specifying a single regulatory time limit. EPA believes it is better to obtain a reasonable agreement or decision than to arbitrarily establish a time frame within which an agreement or decision must be made.

1.8 Requirements for Indian Tribes To Qualify for the WQS Program - 40 CFR 131.8

Consistent with the statutory requirement of section 518 of the Act, the Water Quality Standards Regulation establishes procedures by which an Indian Tribe may qualify for the water quality standards and section 401 certification programs. Section 131.8 of the Water Quality Standards Regulation is intended to ensure that Tribes treated as States for standards are qualified, consistent with Clean Water Act requirements, to conduct a standards program protective of public health and the environment. The procedures are not intended to act as a barrier to tribal program assumption. For the section 401 certification program, 131.4(c) establishes that where EPA determines that a Tribe is qualified for the water quality standards program, that Tribe would, without further effort or submission of information, also qualify for the section 401 certification program.

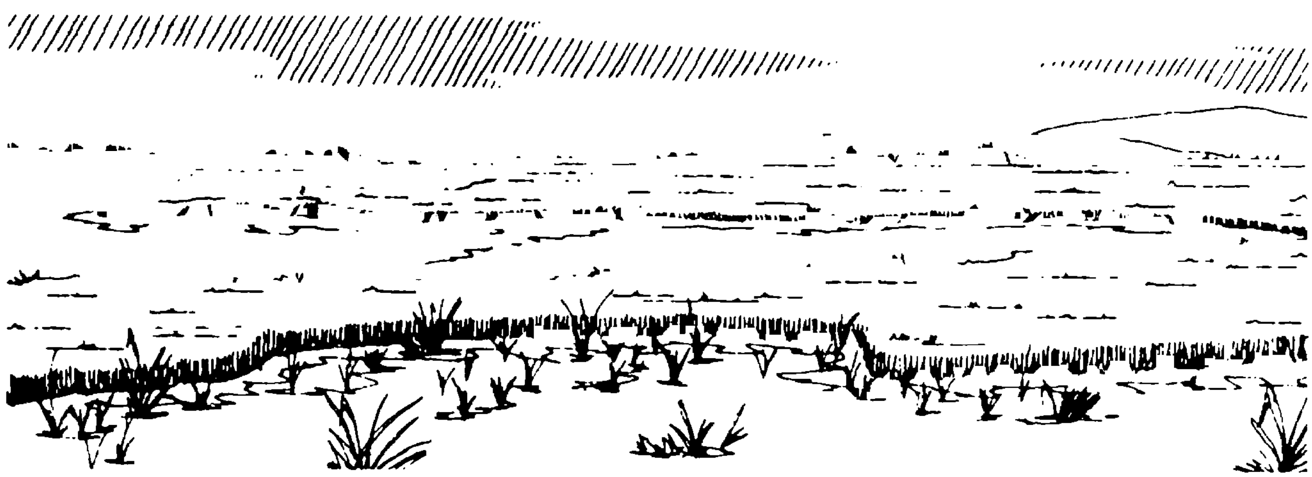
Section 518 authorizes EPA to qualify a Tribe for programs involving water resources that are:

> . . . held by an Indian Tribe, held by the U.S. in trust for Indians, held by a member of an Indian Tribe if such property interest is subject to a trust restriction on alienation, or otherwise within the borders of an Indian reservation . . . .

Tribes are limited to obtaining program authorization only for water resources within the borders of the reservation over which they possess authority to regulate water quality. The meaning of the term "reservation" must, of course, be determined in light of statutory law and with reference to relevant case law. EPA considers trust lands formally set apart for the use of Indians to be "within a reservation" for purposes of section 518 (e)(2), even if they have not been formally designated as "reservations."[2] This means it is the status and use of the land that determines if it is to be considered "within a reservation" rather than the label attached to it. EPA believes that it was the intent of Congress to limit Tribes authority to lands within the reservation. EPA bases this conclusion, in part, on the definition of "Indian Tribe" found in CWA section 518(h)(2). EPA also does not believe that section 518(e)(2) prevents EPA from recognizing tribal authority over non-Indian water resources located within the reservation if the Tribe can demonstrate (1) the requisite authority over such water resources, and (2) the authority to regulate as necessary to protect the public health, safety, and welfare of its tribal members.

1.8.1 Criteria Tribes Must Meet

New section 131.8 of the Water Quality Standards Regulation includes the criteria Tribes are required to meet to be authorized to administer the water quality standards and 401 certification programs. These criteria are provided in section 518 of the Act. The Tribe must:



- be federally recognized;
- carry out substantial governmental duties and powers over a Federal Indian reservation;
- have appropriate authority to regulate the quality of reservation waters; and
- be reasonably expected to be capable of administering the standards program.

The first criterion requires the Tribe to be recognized by the Department of the Interior. The Tribe may address this requirement by stating that it is included on the list of federally recognized Tribes published periodically by the Department of the Interior, or by submitting other appropriate documentation (e.g., the Tribe is federally recognized but not yet included on the Department of the Interior list).

The second criterion requires the Tribe to have a governing body that is carrying out substantial governmental duties and powers. EPA defines "substantial governmental duties and powers" to mean that the Tribe is currently performing governmental functions to promote the health, safety, and welfare of the affected population within a defined geographical area. Examples of such functions include, but are not limited to, the power to tax, the power of eminent domain, and police power. Federal recognition by the Department of the Interior does not, in and of itself, satisfy this criterion. Tribes must submit a narrative statement describing the form of tribal government, describing the types of essential governmental functions currently performed, and identifying the sources of authorities to perform these functions (e.g., tribal constitutions, codes).

The third criterion, concerning tribal authority, means that EPA may authorize an Indian Tribe to administer the water quality standards program only where the Tribe already possesses and can adequately demonstrate authority to manage and protect water resources within the reservation borders. The Clean Water Act authorizes use of existing tribal regulatory authority for managing EPA programs, but the Act does not grant additional authority to Tribes. EPA recognizes that, in general, Tribes possess the authority to regulate activities affecting water quality on the reservation. The Agency does not believe, however, that it is appropriate to recognize tribal authority and approve tribal administration of the water quality standards program in the absence of verifying documentation. EPA will not delegate water quality standards program authority to a Tribe unless the Tribe adequately shows that it possesses the requisite authority.

EPA does not read the Supreme Court's decision in *Brendale*[3] as preventing EPA from recognizing Tribes' authority to regulate water quality on fee lands within the reservation, even if section 518 is not an express delegation of authority. The primary significance of *Brendale* is its result, fully consistent with *Montana* v. *United States*,[4] which previously had held:

> To be sure, Indian tribes retain inherent sovereign power to exercise some forms of civil jurisdiction over non-Indians on their reservations, even on non-Indian fee lands. A tribe may regulate . . . the activities of non-members who enter consensual relationships with the tribe or its members, through commercial dealing, contracts, leases, or other arrangements. . . . A tribe may also retain inherent power to exercise civil authority over the conduct of non-Indians on fee lands within its reservation when that conduct threatens or has some direct effect on the political integrity, the economic security, or the health or welfare of the tribe.

The ultimate decision regarding tribal authority must be made on a Tribe-by-Tribe basis, and EPA has finalized the proposed process for making those determinations. EPA sees no reason in light of *Brendale* to assume that Tribes would be *per se* unable to demonstrate authority over water quality management on fee lands within reservation borders. EPA believes that as a general matter there are substantial legal and factual reasons to assume that Tribes ordinarily have the legal authority to regulate surface water quality within a reservation.

In evaluating whether a Tribe has authority to regulate a particular activity on land owned in fee by nonmembers but located within a reservation, EPA will examine the Tribe's authority in light of the evolving case law as reflected in *Montana* and *Brendale*. The extent of such tribal authority depends on the effect of that activity on the Tribe. As discussed above, in the absence of a contrary statutory policy, a Tribe may regulate the activities of non-Indians on fee lands within its reservation when those activities threaten or have a direct effect on the political integrity, the economic security, or the health or welfare of the Tribe.

The Supreme Court, in recent cases, has explored several options to ensure that the impacts upon Tribes of the activities of non-Indians on fee land, under the *Montana* test, are more than *de minimis*, although to date the Court has not agreed, in a case on point, on any one reformulation of the test. In response to this uncertainty, the Agency will apply, as an interim operating rule, a formulation of the standard that will require a showing that the potential impacts of regulated activities on the Tribe are serious and substantial.

The choice of an Agency operating rule containing this standard is taken solely as a matter of prudence in light of judicial uncertainty and does not reflect an Agency endorsement of this standard *per se*. Moreover, as discussed below, the Agency believes that the activities regulated under the various environmental statutes generally have serious and substantial impacts on human health and welfare. As a result, the Agency believes that Tribes usually will be able to meet the Agency's operating rule, and that use of such a rule by the Agency should not create an improper burden of proof on Tribes or create the administratively undesirable result of checker-boarding reservations.

Whether a Tribe has jurisdiction over activities by nonmembers will be determined case by case, based on factual findings. The determination as to whether the required effect is present in a particular case depends on the circumstances.

Nonetheless, the Agency may also take into account the provisions of environmental statutes, and any legislative findings that the effects of the activity are serious, in making a generalized finding that Tribes are likely to possess sufficient inherent authority to control reservation environmental quality.[5] As a result, in making the required factual findings as to the impact of a water-related activity on a particular Tribe, it may not be necessary to develop an extensive and detailed record in each case. The Agency may also rely on its special expertise and practical experience regarding the importance of water management, recognizing that clean water, including critical habitat (e.g., wetlands, bottom sediments, spawning beds), is absolutely crucial to the survival of many Indian reservations.

The Agency believes that congressional enactment of the Clean Water Act establishes a strong Federal interest in effective management of water quality. Indeed, the primary objective of the CWA "is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" (section 101(a)), and to achieve that objective, the Act establishes the goal of eliminating all discharges of pollutants into the navigable waters of the United States and attaining a level of water quality that is fishable and swimmable (sections 101(a)(1) and (2)). Thus the statute itself constitutes, in effect, a legislative determination that activities affecting surface water and critical habitat quality may have serious and substantial impacts.

EPA also notes that, because of the mobile nature of pollutants in surface waters and the relatively small length or size of stream segments or other water bodies on reservations, it would be very difficult to separate the effects of water quality impairment on non-Indian fee land within a reservation as compared with those on tribal portions. In other words, any impairment that occurs on, or as a result of, activities on non-Indian fee lands is very likely to impair the water and critical habitat quality of the tribal lands. This also suggests that the serious and substantial effects of water quality impairment within the non-Indian portions of a reservation are very likely to affect the tribal interest in water quality. EPA believes that a "checkerboard" system of regulation, whereby the Tribe and State split up regulation of surface water quality on the reservation, would ignore the difficulties of assuring compliance with water quality standards when two different sovereign entities are establishing standards for the same small stream segments.

EPA also believes that Congress has expressed a preference for tribal regulation of surface water quality to ensure compliance with CWA goals. This is confirmed by the text and legislative history of section 518 itself. The CWA establishes a policy of "recogniz[ing], preserv[ing], and protect[ing] the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution, [and] to plan the development and use (including restoration, preservation, and enhancement) of land and water resources" (section 101(b)). By extension, the treatment of Indian Tribes as States means that Tribes are to be primarily responsible for the protection of reservation water resources. As Senator Burdick, floor manager of the 1987 CWA Amendments, explained, the purpose of section 518 was to "provide clean water for the people of this Nation" (133 Congressional Record S1018, daily ed., Jan. 21, 1987). This goal was to be accomplished, he asserted, by giving "tribes . . . the primary authority to set water quality standards to assure fishable and swimmable water and to satisfy all beneficial uses."[6]

In light of the Agency's statutory responsibility for implementing the environmental statutes, its interpretations of the intent of Congress in allowing for tribal management of water quality within the reservation are entitled to substantial deference.[7]

The Agency also believes that the effects on tribal health and welfare necessary to support tribal regulation of non-Indian activities on the reservation may be easier to establish in the context of water quality management than with regard to zoning, which was at issue in *Brendale*. There is a significant distinction between land use planning and water quality management. The Supreme Court has explicitly recognized such a distinction: "Land use planning in essence chooses particular uses for the land; environmental regulation . . . does not mandate particular uses of the land but requires only that, however the land is used, damage to the environment is kept within prescribed limits."[8] The Court has relied on this distinction to support a finding that States retain authority to carry out environmental regulation even in cases where their ability to carry out general land use regulation is preempted by Federal law.[9]

Further, water quality management serves the purpose of protecting public health and safety, which is a core governmental function whose exercise is critical to self-government. The special status of governmental actions to protect public health and safety is well established. By contrast, the power to zone can be exercised to achieve purposes that have little or no direct nexus to public health and safety.[10] Moreover, water pollution is by nature highly mobile, freely migrating from one local jurisdiction to another, sometimes over large distances. By contrast, zoning regulates the uses of particular properties with impacts that are much more likely to be contained within a given local jurisdiction.

Operationally, EPA's generalized findings regarding the relationship of water quality to tribal health and welfare will affect the legal analysis of a tribal submission by, in effect, supplementing the factual showing a Tribe makes in applying for authority to administer the water quality standards program. Thus, a tribal submission meeting the requirements of section 131.8 of this regulation will need to make a relatively simple showing of facts that there are waters within the reservation used by the Tribe or tribal members (and thus that the Tribe or tribal members could be subject to exposure to pollutants present in, or introduced into, those waters), and that the waters and critical habitat are subject to protection under the Clean Water Act. The Tribe must also explicitly assert that impairment of such waters by the activities of non-Indians would have a serious and substantial effect on the health and welfare of the Tribe. Once the Tribe meets this initial burden, EPA will, in light of the facts presented by the Tribe and the generalized statutory and factual findings regarding the importance of reservation water quality discussed above, presume that there has been an adequate showing of tribal jurisdiction on fee lands, unless an appropriate governmental entity (e.g., an adjacent Tribe or State) demonstrates a lack of jurisdiction on the part of the Tribe.

The Agency recognizes that jurisdictional disputes between Tribes and States can be complex and difficult and that it will, in some circumstances, be forced to address such disputes. However, EPA's ultimate responsibility is protection of the environment. In view of the mobility of environmental problems, and the interdependence of various jurisdictions, it is imperative that all affected sovereigns work cooperatively for environmental protection rather than engage in confrontations over jurisdiction.

To verify authority, the Tribe is required to include a statement signed by the tribal legal counsel, or an equivalent official, explaining the legal basis for the Tribe's regulatory authority. Tribe also is required to provide appropriate additional documentation (e.g., maps, tribal codes, and ordinances).

The fourth criterion requires that the Tribe, in the Regional Administrator's judgment, should be reasonably capable of administering an effective standards program. The Agency recognizes that certain Tribes have not had substantial experience in administering surface water quality programs. For this reason, the Agency requires that Tribes either show that they have the necessary management and technical skills or submit a plan detailing steps for acquiring the necessary management and technical skills. The plan must also address how the Tribe will obtain the funds to acquire the administrative and technical expertise. When considering tribal capability, the Agency will also consider whether the Tribe can demonstrate the existence of institutions that exercise executive, legislative, and judicial functions, and whether the Tribe has a history of successful managerial performance of public health or environmental programs.

1.8.2 Application for Authority To Administer the Water Quality Standards Program

The specific information required for tribal applications to EPA is described in 40 CFR. The application is required, in general, to include a statement on tribal recognition by the Department of the Interior, documentation that the tribal governing body has substantial duties and powers, documentation of tribal authority to regulate water quality on the federally recognized reservation, a narrative statement of tribal capability to administer water quality standards programs, and any other information requested by the Regional Administrator.

When evaluating tribal experience in public health and environmental programs (under paragraph 131.8(b)(4)(ii), EPA will look for indications that the Tribe has participated in such programs, whether the programs are administered by EPA, other Federal agencies, or Tribes. For example, several Tribes are known to have participated in developing areawide water management plans or tribal water quality standards. EPA will also look for evidence of historical budget allocations dealing with public health or environmental programs along with any experience in monitoring related programs.

The regulation allows a Tribe to describe either how it presently has the capability to manage an effective water quality standards program or how it proposes to acquire the additional administrative and technical expertise to manage such a program. EPA will carefully review for reasonableness any plans that propose to acquire expertise. EPA will not approve tribal capability demonstrations where such plans do not include reasonable provisions for acquisition of needed personnel as well as reliable funding sources. This requirement is consistent with other Clean Water Act programs. Tribes may wish to apply for section 106 funds to support their water quality standards programs and may include this source in any discussion of obtaining necessary funds.

If the Tribe has qualified to administer other Clean Water Act or Safe Drinking Water Act programs, then the Tribe need only provide the information that has not been submitted previously.

Qualifying for administration of the water quality standards program is optional for Indian Tribes and there is no time frame limiting when such application may be made. As a general policy, EPA will not deny a tribal application. Rather than formally deny the Tribe's request, EPA will continue to work cooperatively with the Tribe in a continuing effort to resolve deficiencies in the application or the tribal program so that tribal authorization may occur. EPA also concurs with the view that the intent of Congress and the EPA Indian Policy is to support tribal governments in assuming authority to manage various water programs. Authority exists for EPA to re-assert control over certain water programs due to the failure of the State or Tribe to execute the programs properly. Specifically, in the water quality standards program, the Administrator has authority to promulgate Federal standards.

1.8.3 Procedure Regional Administrator Will Apply

The review procedure established in section 131.8 is the same procedure applicable to all water programs. Although experience with the initial application in other programs indicated some delay in the process, EPA believes that as EPA and the Tribes gain experience with the procedures, delays will be minimal.

The EPA review procedure in paragraph 131.8(c) specifies that following receipt of tribal applications, the Regional Administrator will process such applications in a timely manner. The procedure calls for prompt notification to the Tribe that the application has been received, notification within 30 days to appropriate governmental entities (e.g., States and other governmental entities located contiguous to the reservation and that possess authority to regulate water quality under section 303 of the Act) of the application and the substance and basis for the Tribe's assertion of authority over reservation waters, and allowance of 30 days for review of the Tribe's assertion of authority.

EPA recognizes that city and county governments which may be subject to or affected by tribal standards may also want to comment on the Tribe's assertion of authority. Although EPA believes that the responsibility to coordinate with local governments falls primarily on the State, the Agency will make an effort to provide notice to local governments by placing an announcement in appropriate newspapers. Because the rule limits EPA to considering comments from governmental entities with Clean Water Act section 303 authority, such newspaper announcements will advise interested parties to direct comments on tribal authority to appropriate State governments.

Where a Tribe's assertion of authority is challenged, the Regional Administrator, in consultation with the Tribe, the governmental entity challenging the Tribe's assertion of authority, and the Secretary of the Interior, will determine whether the Tribe has adequately demonstrated authority to regulate water quality on the reservation. Where the Regional Administrator concludes that the Tribe has not adequately demonstrated its authority with respect to an area in dispute, then tribal assumption of the standards program would be restricted accordingly. If the authority in dispute were focused on a limited area, this would not necessarily delay the Agency's decision to authorize the Tribe to administer the program for the nondisputed areas.

The procedure allowing participation by other governmental entities in EPA's review of tribal authority does not imply that States or Federal agencies (other than EPA) have veto power over tribal applications for treatment as a State. Rather, the procedure is simply intended to identify any competing jurisdictional claim and thereby ensure that the Tribe has the necessary authority to administer the standards program. EPA will not rely solely on the assertions of a commenter who challenges the Tribe's authority; EPA will make an independent evaluation of the tribal showing and all available information.

When evaluating tribal assertions of authority, EPA will apply the test from *Montana* v. *United States*, 450 U.S. 544 (1981), and will consider the following:

- all information submitted with the Tribe's assertion of authority;
- all information submitted during the required 30-day comment period by the governmental entities identified in 40 CFR 131.8(c)(2); and
- all information obtained by the Agency via consultation with the Department of the Interior (such consultation is required where the Tribe's assertion of authority is challenged).

EPA and the Department of the Interior have agreed to procedures for conducting consultations between the agencies. The procedure established as the Secretary of the Interior's designees the Associate Solicitor, Division of Indian Affairs, and the Deputy Assistant Secretary - Indian Affairs (Trust and Economic Development). EPA will forward a copy of the application and any documents asserting a competing or conflicting claim of authority to such designees as soon as possible. For most applications, an EPA-DOI conference will be scheduled from 1 to 3 weeks after the date the Associate Solicitor receives the application. Comments from the Interior Department will discuss primarily the law applicable to the issue to assist EPA in its own deliberations. Responsibility for legal advice to the EPA Administrator or other EPA decision makers will remain with the EPA General Counsel. EPA does not believe that the consultation process with the Department of the Interior should involve notice and opportunity for States and Tribes because such parties are elsewhere provided appropriate opportunities to participate in EPA's review of tribal authority.

EPA will take all reasonable means to advise interested parties of the decision reached regarding challenges of tribal assertions of authority. At least, written notice will be provided to State(s) and other governmental entities sent notice of the tribal application. In addition, the Water Quality Standards Regulation requires EPA to publish an annual list of standards approval actions taken within the preceding year. EPA will expand that listing to include Indian Tribes qualifying for treatment as States in the preceding year.

Comments on tribal compliance with criteria necessary for assuming the program is limited to the criterion for tribal authority. The Clean Water Act does not require EPA to provide public comment on the entire tribal application, nor does EPA believe that public comment will assist with EPA's decision- making regarding the other criteria. (The other criteria are the recognition of the Tribe by the Department of the Interior, a description of the tribal governing body, and the capability of the Tribe to administer an effective standards program.) EPA believes that providing public comment on these three criteria would unnecessarily complicate and potentially delay the process.

1.8.4 Time Frame for Review of Tribal Application

EPA has not specified a time frame for review of tribal application. The Agency believes it is impossible to approve or disapprove all applications within a designated time frame. Because EPA has no reasonable way to predetermine how complete initial applications might be, what challenges might arise, or how numerous or complex the issues might be, the Agency deems it inappropriate to attempt to establish time frames that might not allow sufficient time for resolution. Similarly, EPA's experience with States applying for various EPA programs indicates that, at times, meetings and discussions between EPA and the States are necessary before all requirements are met. The Agency believes that the same communication with Tribes will be important to ensure expeditious processing of tribal applications.

1.8.5 Effect of Regional Administrator's Decision

A decision by the Regional Administrator that a Tribe does not meet the requirements for administering the water quality standards program does not preclude the Tribe from resubmitting the application at a future date. Rather than formally deny the Tribe's request, EPA will continue to work cooperatively with the Tribe in a continuing effort to resolve deficiencies in the application or the tribal program so that tribal authorization may occur. EPA believes that the intent of Congress and of EPA's Indian Policy is to support tribal governments in assuming authority to manage various water programs.

Where the Regional Administrator determines that the tribal application satisfies all of the requirements of section 131.8, the Regional Administrator will promptly notify the Tribe that the Tribe has qualified to administer the water quality standards program.

1.8.6 Establishing Water Quality Standards on Indian Lands

Where Tribes qualify to be treated as States for the purposes of water quality standards, EPA has the responsibility to assist the Tribe in establishing standards that are appropriate for the reservation and consistent with the Clean Water Act. EPA recognizes that Tribes have limited resources for development of water quality standards.

EPA considers the following three options acceptable to complete the task of establishing water quality standards on Indian lands:

- the Tribe may negotiate a cooperative agreement with an adjoining State to apply the State's standards to the Indian lands;
- the Tribe may incorporate the standards from an adjacent State as the Tribe's own; or
- the Tribe may independently develop and adopt standards that account for unique site-specific conditions and water body uses.

The first two options would be the quickest and least costly ways for establishing tribal water quality standards. Under option 1, the negotiated agreement could also cover requirements such as monitoring, permitting, certifications, and enforcement of water quality standards on the reservation. Option 2 would make full use of information and data developed by the State which may apply to the reservation. Tribes, as sovereign governments, have the legal authority to negotiate cooperative agreements with a State to apply that State's standards to waters on the reservation or to use State standards as the basis for tribal standards. These options do not suggest that the Tribe relinquishes its sovereign powers or enforcement authority or that the State can unilaterally apply its standards to reservation waters.

Option 3 would require more time and resources to implement because it would require the Tribe to create an entire set of standards "from scratch." EPA does not intend to discourage this approach, but notes that Indian Tribes may want to make full use, where appropriate, of programs of adjacent States. Tribes should use this Handbook as guidance when developing standards.

EPA emphasizes that the development of tribal water quality standards is an iterative process, and that the standards development option initially selected by the Tribe can change in subsequent years. For example, a Tribe may want to use option 1 or 2 to get the standards program started. This does not preclude the Tribe from developing its own water quality standards in subsequent years.

Tribes establishing standards for the first time should carefully consider which water body uses are appropriate. Once designated uses are adopted, removing the use or adopting a subcategory of use would be subject to the requirements of section 131.10 of the Water Quality Standards Regulation.

EPA expects that, where Tribes qualify to be treated as States for the purposes of water quality standards, standards will be adopted and submitted to EPA for review within 3 years (a triennium) from the date that the Tribe is notified that it is qualified to administer the standards program. This time frame corresponds to that provided to States under the provisions of the 1965 Federal Water Pollution Control Act, when the water quality standards program was created. EPA believes that this is an equitable arrangement, and that the Tribes should be allowed sufficient time to develop their programs and adopt appropriate standards for reservation waters.

Once EPA determines that a Tribe qualifies to administer the standards program, tribal development, review, and adoption of water quality standards are subject to the same requirements that States are subject to under the Clean Water Act and EPA's implementing regulations.

Until Tribes qualify for the standards program and adopt standards under the Clean Water Act, EPA will, when possible, assume that existing water quality standards remain applicable. EPA's position on this issue was expressed in a September 9, 1988, letter from EPA's then General Counsel, Lawrence Jensen, to Dave Frohnmayer, Attorney General for the State of Oregon. This letter states: "if States have established standards that purport to apply to Indian reservations, EPA will assume without deciding that those standards remain applicable until a Tribe is authorized to establish its own standards or until EPA otherwise determines in consultation with a State and Tribe that the State lacks jurisdiction . . . ." This policy is not an assertion that State standards apply on reservations as a matter of law, but the policy merely recognizes that fully implementing a role for Tribes under the Act will require a transition period. EPA may apply State standards in this case because (1) there are no Federal standards that apply generally, and (2) to ignore previously developed State standards would be a regulatory void that EPA believes would not be beneficial to the reservation water quality. However, EPA will give serious consideration to Federal promulgation of water quality standards on Indian lands where EPA finds a particular need.

Where a State asserts authority to establish future water quality standards for a reservation, EPA policy is to ensure that the affected Tribe is made aware of the assertion so that any issues the Tribe may wish to raise can be reviewed as part of the normal standards setting process. EPA also encourages State-Tribe communication on standards issues, with one possible outcome being the establishment of short-term cooperative working agreements pertaining to standards and NPDES permits on reservations.

1.8.7 EPA Promulgation of Standards for Reservations

If EPA determines that a Tribe possesses authority to regulate water quality on a reservation but the Tribe declines to seek authority to administer the water quality standards program, EPA has the authority under section 303 of the Act to promulgate Federal water quality standards. EPA's responsibility stems from the Act's directive to establish water quality standards for all "navigable waters." Depending on the circumstances, EPA may use the standards of an adjacent State as a starting point for such a promulgation. EPA will prioritize the promulgations based on various factors, not the least of which is availability of Agency resources to undertake the Federal rulemaking process. Because the Federal promulgation process is slow and complex, EPA may promulgate water quality standards in conjunction with re-issuing permits on the reservations.

The intent of the Clean Water Act is for States and Tribes qualifying for treatment as States to have the first opportunity to set standards. Thus, EPA prefers to work cooperatively with States and Tribes on water quality standards issues and to initiate Federal promulgation actions only where absolutely necessary.

EPA's entire policy with respect to Federal promulgation is straightforward. EPA much prefers to work with the States and have them adopt standards that comply with CWA requirements. Where Federal promulgation is necessary to achieve CWA compliance, however, EPA will act. This same philosophy will apply to Indian Tribes authorized to administer the program.

1.9 Adoption of Standards for Indian Reservation Waters

This guidance recognizes that Tribes have varying abilities to develop water quality standards. Some Tribes have more technical capability and experience in drafting implementable regulations than other Tribes and may be capable of adopting more complex standards. However, most Tribes may not have access to sufficient resources, either in personnel or in contractor funds, to pursue this course. Moreover, EPA does not have the resources to provide substantial technical assistance to individual Tribes to develop other than basic water quality standards.

1.9.1 EPA's Expectations for Tribal Water Quality Standards

Tribal water quality standards, initially at least, should focus on basic contents and reflect existing uses and existing water quality. The standards must be established for an inventory of "waters of the United States," including wetlands. The Tribes should focus on the basic structure of a water quality standards system: designated uses for identified water segments, appropriate narrative and numeric criteria, an antidegradation policy, and other general implementation policies. How complex or sophisticated these elements need to be depends upon the abilities of the Tribe and the environmental concerns affected by tribal standards.

EPA has consistently recommended to Tribes that they use directly, or with slight modification, the standards of the adjacent States as a beginning for tribal standards. Tribal water quality standards should be developed considering the quality and designated uses of waters entering and leaving reservations. It is important that the Tribes recognize what the surrounding State (or another Indian reservation) water quality standards are even though there is no requirement to match those standards, although the water quality standards regulation does require consideration of downstream water quality standards (see section 2.2, this Handbook).

At a minimum, tribal water quality standards should be established upstream and downstream from point sources where NPDES permits are applicable. It is also desirable that water quality standards be applied to waters where significant nonpoint sources enter so that the effectiveness of best management practices on the reservation's waters can be evaluated.

Water quality criteria should be carefully selected recognizing that making criteria more stringent in subsequent water quality standards reviews is more feasible than attempting relaxation of stringent criteria. While there is no mandatory list of criteria, the following should be considered the minimum:

- narrative "free froms";
- dissolved oxygen;
- pH;
- temperature;
- bacteriological criteria (for recreational and ceremonial uses); and
- toxics (including nonconventionals, e.g., ammonia and chlorine). [Use of option 1, section 2.1.3, is recommended.]

1.9.2 Optional Policies

The Tribes must also specify which optional policies they wish to use pursuant to 40 CFR 131.13 (see chapter 6, this Handbook). These include the following:

- mixing zones for point sources;
- variances for point sources;
- design low-flow specification for the application of numeric criteria; and
- schedules of compliance for criteria in NPDES, and permits.

Guidance for applying these policies are generally available in either this Handbook or in the *Technical Support Document for Water Quality-based Toxics Control* (USEPA, 1991a).

1.9.3 Tribal Submission and EPA Review

The initial submission of the tribal water quality standards must contain the items listed in 40 CFR 131.6 plus use attainability analyses for all waters not classified "fishable/swimmable" (see section 2.9, this Handbook). In addition, it should contain identification of endangered or threatened aquatic species or wildlife subject to protection by water quality standards. There should also be included a record containing information on the regulatory and public participation aspects of the water quality standards, public comments made, and the Tribe's responses to those comments and other relevant material required by 40 CFR 131.20.

1.9.4 Regional Reviews

The Regions should carefully coordinate the reviews within the Water Management Divisions to ensure:

- that the required items in section 131.6 are included;
- that all waters with NPDES permits have water quality standards; and
- that the tribal rulemaking meets the requirements of 40 CFR 131.20.

In commenting on tribal water quality standards, the Regions should identify situations where the dispute resolution mechanism in 40 CFR 131.7 may ultimately be called into play and should attempt to de-fuse such situations as early as possible in the standards adoption process. One possibility is to encourage Tribes and States to establish review procedures <u>before</u> any specific problem develops as suggested in section 131.7(e) of the regulation.

Where NPDES permits exist, the downstream jurisdiction and the Region should determine if total maximum daily loads or waste load allocations will be needed. Where this burden falls on the Tribe, EPA may need to assist the Tribe in these assessments or perform the necessary modeling for the Tribe. The Region also should assess the scope of any section 401 procedures needed in future NPDES permit renewals. The interstate nature of tribal water quality standards may become important to EPA because of the recent *Arkansas* v. *Oklahoma* U.S. Supreme Court case (112 section 1046, February 26, 1992), especially when EPA is the permit writing authority.

NOTE: Additional discussion supporting the Agency's rulemaking with respect to Indian Tribes and EPA's views on related questions may be found in the preamble discussion to the final rule (56 F.R. 64893, December 12, 1991).

Endnotes

1. *Champion International Corp. v. EPA*, 850 F.2d 182 (4th Cir. 1988)

2. *Oklahoma Tax Commission v. Citizen Band Potawatomi Indian Tribe of Oklahoma*, 111 S.Ct. 905, 910 (1991).

3. *Brendale v. Confederated Tribes and Bands of the Yakima Nation*, 492 U.S. 408, (1989)

4. *Montana v. United States*, 450 U.S. at 565-66 (citations omitted).

5. See, *e.g.*, *Keystone Bituminous Coal Assoc. v. DeBenedictis*, 480 U.S. 470, 476-77 and notes 6, 7 (1987).

6. *Id.*

7. *Washington Dept. of Ecology v. EPA*, 752 F.2d 1465, 1469 (9th Cir. 1985); see generally *Chevron, USA v. NRDC*, 467 U.S. 837, 843-45 (1984).

8. *California Coastal Commission v. Granite Rock Co.*, 480 U.S. 572, 587 (1987).

9. *Id.* at 587-89.

10. See *e.g. Brendale*, 492 U.S. at 420 n.5 (White, J.) (listing broad range of consequences of state zoning decision).

CHAPTER 2

DESIGNATION OF USES

(40 CFR 131.10)

Table of Contents

CHAPTER 2
DESIGNATION OF USES

2.1 Use Classification - 40 CFR 131.10(a)

A water quality standard defines the water quality goals of a water body or portion thereof, in part, by designating the use or uses to be made of the water. States adopt water quality standards to protect public health or welfare, enhance the quality of water, and serve the purposes of the Clean Water Act. "Serve the purposes of the Act" (as defined in sections 101(a)(2), and 303(c) of the Act) means that water quality standards should:

- provide, wherever attainable, water quality for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water ("fishable/swimmable"), and
- consider the use and value of State waters for public water supplies, propagation of fish and wildlife, recreation, agriculture and industrial purposes, and navigation.

These sections of the Act describe various uses of waters that are considered desirable and should be protected. The States must take these uses into consideration when classifying State waters and are free to add use classifications. Consistent with the requirements of the Act and Water Quality Standards Regulation, States are free to develop and adopt any use classification system they see as appropriate, except that waste transport and assimilation is not an acceptable use in any case (see 40 CFR 131.10(a)). Among the uses listed in the Clean Water Act, there is no hierarchy. EPA's Water Quality Standards Regulation emphasizes the uses specified in section 101(a)(2) of the Act (first bullet, above). To be consistent with the 101(a)(2) interim goal of the Act, States must provide water quality for the *protection and propagation of fish, shellfish, and wildlife, and provide for recreation in and on the water* ("fishable/swimmable") where attainable (see 40 CFR 131.10(j)).

> **DESIGNATED USES**
> **40 CFR 131.3(f)**
>
> Uses specified in Water Quality Standards for each water body or segment whether or not they are being attained.

2.1.1 Public Water Supplies

This use includes waters that are the source for drinking water supplies and often includes waters for food processing. Waters for drinking water may require treatment prior to distribution in public water systems.

2.1.2 Protection and Propagation of Fish, Shellfish, and Wildlife

This classification is often divided into several more specific subcategories, including coldwater fish, warmwater fish, and shellfish. For example, some coastal States have a use specifically for oyster propagation. The use may also include protection of aquatic flora. Many States differentiate between self-supporting fish populations and stocked fisheries. Wildlife protection should include waterfowl, shore birds, and other water-oriented wildlife.

To more fully protect aquatic habitats and provide more comprehensive assessments of aquatic life use attainment/non-attainment, it is EPA's policy that States should designate aquatic life uses that appropriately address biological integrity and adopt biological criteria necessary to protect those uses (see Appendix R).

TYPES OF USES
CWA SECTION 303(c)(2)(A)

- Public water supplies
- Protection and propagation of fish, shellfish, and wildlife
- Recreation
- Agriculture
- Industry
- Navigation
- Coral reef preservation
- Marinas
- Groundwater recharge
- Aquifer protection
- Hydroelectric power

2.1.3 Recreation

Recreational uses have traditionally been divided into primary contact and secondary contact recreation. The primary contact recreation classification protects people from illness due to activities involving the potential for ingestion of, or immersion in, water. Primary contact recreation usually includes swimming, water-skiing, skin-diving, surfing, and other activities likely to result in immersion. The secondary contact recreation classification is protective when immersion is unlikely. Examples are boating, wading, and rowing. These two broad uses can be logically subdivided into an almost infinite number of subcategories (e.g., wading, fishing, sailing, powerboating, rafting.). Often fishing is considered in the recreational use categories.

Recreation in and on the water, on the other hand, may not be attainable in certain waters, such as wetlands, that do not have sufficient water, at least seasonally. However, States are encouraged to recognize and protect recreational uses that do not directly involve contact with water, including hiking, camping, and bird watching.

A number of acceptable State options may be considered for designation of recreational uses.

Option 1

Designate primary contact recreational uses for all waters of the State, and set bacteriological criteria sufficient to support primary contact recreation. This option fully conforms with the requirement in section 131.6 of the Water Quality Standards Regulation to designate uses consistent with the provisions of sections 101(a)(2) and 303(c)(2) of the CWA. States are not required to conduct use attainability analyses (for recreation) when primary contact recreational uses are designated for all waters of the State.

Option 2

Designate either primary contact recreational uses or secondary contact recreational uses for all waters of the State and, where secondary contact recreation is designated, set bacteriological criteria sufficient to support primary contact recreation. EPA believes that a secondary contact recreational use (with criteria sufficient to support primary contact recreation) is consistent with the CWA section 101(a)(2) goal. The rationale for this option is discussed in the preamble to the Water Quality Standards Regulation, which states: ". . . even though it may not make sense to encourage use of a stream for swimming because of the flow, depth or the velocity of the water, the States and EPA must recognize that swimming and/or wading may occur anyway. In order to protect public health, States must set criteria to reflect recreational uses if it appears that recreation will in fact occur in the stream." Under this option, future revisions to the bacteriological criterion for specific stream segments would be subject to the downgrading provisions of the Federal Water Quality Standards Regulation (40 CFR 131.10).

Option 3

Designate either primary contact recreation, secondary contact recreation (with bacteriological criteria sufficient to support primary contact recreation), or conduct use attainability analyses demonstrating that recreational uses consistent with the CWA section 101(a)(2) goal are not attainable for all waters of the State. Such use attainability analyses are required by section 131.10 of the Water Quality Standards Regulation, which also specifies six factors that may be used by States in demonstrating that attaining a use is not feasible. Physical factors, which are important in determining attainability of aquatic life uses, may not be used as the basis for not designating a recreational use consistent with the CWA section 101(a)(2) goal. This precludes States from using 40 CFR 131.10(g) factor 2 (pertaining to low-flows) and factor 5 (pertaining to physical factors in general). The basis for this policy is that the States and EPA have an obligation to do as much as possible to protect the health of the public. In certain instances, people will use whatever water bodies are available for recreation, regardless of the physical conditions. In conducting use attainability analyses (UAAs) where available data are scarce or nonexistent, sanitary surveys are useful in determining the sources of bacterial water quality indicators. Information on land use is also useful in predicting bacteria levels and sources.

Other Options

- States may apply bacteriological criteria sufficient to support primary contact recreation with a rebuttable presumption that the indicators show the presence of human fecal pollution. Rebuttal of this presumption, however, must be based on a sanitary survey that demonstrates a lack of contamination from human sources. The basis for this option is the absence of data demonstrating a relationship between high densities of bacteriological water quality indicators and increased risk of swimming-associated illness in animal-contaminated waters. Maine is an example of a State that has successfully implemented this option.

- Where States adopt a standards package that does not support the swimmable goal and does not contain a UAA to justify the omission, EPA may conditionally approve the package provided that (1) the State commits, in writing, to a schedule for rapid completion of the UAAs, generally within 90 days (see conditional approval guidance in section 6.2 of this Handbook); and (2) the omission may be considered a minor deficiency (i.e., after consultation with the State, EPA determines that there is no basis for concluding that the UAAs would support upgrading the use of the water body). Otherwise, failure to support the swimmable goal is a major deficiency and must be disapproved to allow prompt Federal promulgation action.

- States may conduct basinwide use attainability analyses if the circumstances relating to the segments in question are sufficiently similar to make the results of the basinwide analyses reasonably applicable to each segment.

States may add other recreation classifications as they see fit. For example, one State protects "consumptive recreation" (i.e., "human consumption of aquatic life, semi-aquatic life, or terrestrial wildlife that depend on surface waters for survival and well-being"). States also may adopt seasonal recreational uses (see section 2.6, this Handbook).

2.1.4 Agriculture and Industry

The agricultural use classification defines waters that are suitable for irrigation of crops, consumption by livestock, support of vegetation for range grazing, and other uses in support of farming and ranching and protects livestock and crops from injury due to irrigation and other exposures.

The industrial use classification includes industrial cooling and process water supplies. This classification protects industrial equipment from damage from cooling and/or process waters. Specific criteria would depend on the industry involved.

The *Report of the Committee on Water Quality Criteria*, the "Green Book" (FWPCA, 1968) and *Water Quality Criteria 1972*, the "Blue Book" (NAS/NAE, 1973) provide information for certain parameters on protecting agricultural and industrial uses, although section 304(a)(1) criteria for protecting these uses have not been specifically developed for numerous other parameters, including toxics.

Where criteria have not been specifically developed for agricultural and industrial uses, the criteria developed for human health and aquatic life are usually sufficiently stringent to protect these uses. States also may establish criteria specifically designed to protect these uses.

2.1.5 Navigation

This use classification is designed to protect ships and their crews and to maintain water quality so as not to restrict or prevent navigation.

2.1.6 Other Uses

States may adopt other uses they consider to be necessary. Some examples include coral reef preservation, marinas, groundwater recharge, aquifer protection, and hydroelectric power. States also may establish criteria specifically designed to protect these uses.

2.2 Consider Downstream Uses - 40 CFR 131.10(b)

When designating uses, States should consider extraterritorial effects of their standards. For example, once States revise or adopt standards, upstream jurisdictions will be required, when revising their standards and issuing permits, to provide for attainment and maintenance of the downstream standards.

Despite the regulatory requirement that States ensure downstream standards are met when designating and setting criteria for waters, occasionally downstream standards are not met owing to an upstream pollutant source. The Clean Water Act offers three solutions to such problems.

First, the opportunity for public participation for new or revised water quality standards provides potentially affected parties an approach to avoiding conflicts of water quality standards. States and Tribes are encouraged to keep other States informed of their water quality standards efforts and to invite comment on standards for common water bodies.

Second, permit limits under the National Pollutant Discharge Elimination System (NPDES) program (see section 402 of the Act) are required to be developed such that applicable water quality standards are achieved. The permit issuance process also includes opportunity for public participation and, thus, provides a second opportunity to consider and resolve potential problems regarding extraterritorial effects of water quality standards. In a decision in *Arkansas* v. *Oklahoma* (112 section 1046, February 26, 1992), the U.S. Supreme Court held that the Clean Water Act clearly authorized EPA to require that point sources in upstream States not violate water quality standards in downstream States, and that EPA's interpretation of those standards should govern.

Third, NPDES permits issued by EPA are subject to certification under the requirements of section 401 of the Act. Section 401 requires that States grant, deny, or condition "certification" for federally permitted or licensed activities that may result in a discharge to waters of the United States. The decision to grant or to deny certification, or to grant a conditional certification is based on a State's determination regarding whether the proposed activity will comply with applicable water quality standards and other provisions. Thus, States may deny certification and prohibit EPA from issuing an NPDES permit that would violate water quality standards. Section 401 also allows a State to participate in extraterritorial actions that will affect that State's waters if a federally issued permit is involved.

In addition to the above sources for solutions, when the problem arises between a State and an Indian Tribe qualified for treatment as a State for water quality standards, the dispute resolution mechanism could be invoked (see section 1.7, of this Handbook).

2.3 Use Subcategories - 40 CFR 131.10(c)

States are required to designate uses considering, at a minimum, those uses listed in section 303(c) of the Clean Water Act (i.e., public water supplies, propagation of fish and wildlife, recreation, agriculture and industrial purposes, and navigation). However, flexibility inherent in the State process for designating uses allows the development of subcategories of uses within the Act's general categories to refine and clarify specific use classes. Clarification of the use class is particularly helpful when a variety of surface waters with distinct characteristics fit within the same use class, or do not fit well into any category. Determination of non-attainment in waters with broad use categories may be difficult and open to alternative interpretations. If a determination of non-attainment is in dispute, regulatory actions will be difficult to accomplish (USEPA, 1990a).

The State selects the level of specificity it desires for identifying designated uses and subcategories of uses (such as whether to treat recreation as a single use or to define a subcategory for secondary recreation). However, the State must be at least as specific as the uses listed in sections 101(a) and 303(c) of the Clean Water Act.

Subcategories of aquatic life uses may be on the basis of attainable habitat (e.g., coldwater versus warmwater habitat); innate differences in community structure and function (e.g., high versus low species richness or productivity); or fundamental differences in important community components (e.g., warmwater fish communities dominated by bass versus catfish). Special uses may also be designated to protect particularly unique, sensitive, or valuable aquatic species, communities, or habitats.

Data collected from biosurveys as part of a developing biocriteria program may assist States in refining aquatic life use classes by revealing consistent differences among aquatic communities inhabiting different waters of the same designated use. Measurable biological attributes could then be used to divide one class into two or more subcategories (USEPA, 1990a).

If States adopt subcategories that do not require criteria sufficient to fully protect the goal uses in section 101(a)(2) of the Act (see section 2.1, above), a use attainability analysis pursuant to 40 CFR 131.10(j) must be conducted for waters to which these subcategories are assigned. Before adopting subcategories of uses, States must provide notice and opportunity for a public hearing because these actions are changes to the standards.

2.4 Attainability of Uses - 40 CFR 131.10(d)

When designating uses, States may wish to designate only the uses that are attainable. However, if the State does not designate the uses specified in section 101(a)(2) of the Act, the State must perform a use attainability analysis under section 131.10(j) of the regulation. States are encouraged to designate uses that the State believes can be attained in the future.

"Attainable uses" are, at a minimum, the uses (based on the State's system of water use classification) that can be achieved 1) when effluent limits under sections 301(b)(1)(A) and (B) and section 306 of the Act are imposed on point source dischargers and 2) when cost-effective and reasonable best management practices are imposed on nonpoint source dischargers.

2.5 Public Hearing for Changing Uses - 40 CFR 131.10(e)

The Water Quality Standards Regulation requires States to provide opportunity for public hearing before adding or removing a use or establishing subcategories of a use. As mentioned in section 2.2 above, the State should consider extraterritorial effects of such changes.

2.6 Seasonal Uses - 40 CFR 131.10(f)

In some areas of the country, uses are practical only for limited seasons. EPA recognizes seasonal uses in the Water Quality Standards Regulation. States may specify the seasonal uses and criteria protective of that use as well as the time frame for the ". . . season, so long as the criteria do not prevent the attainment of any more restrictive uses attainable in other seasons."

For example, in many northern areas, body contact recreation is possible only a few months out of the year. Several States have adopted primary contact recreational uses, and the associated microbiological criteria, for only those months when primary contact recreation actually occurs, and have relied on less stringent secondary contact recreation criteria to protect for incidental exposure in the "non-swimming" season.

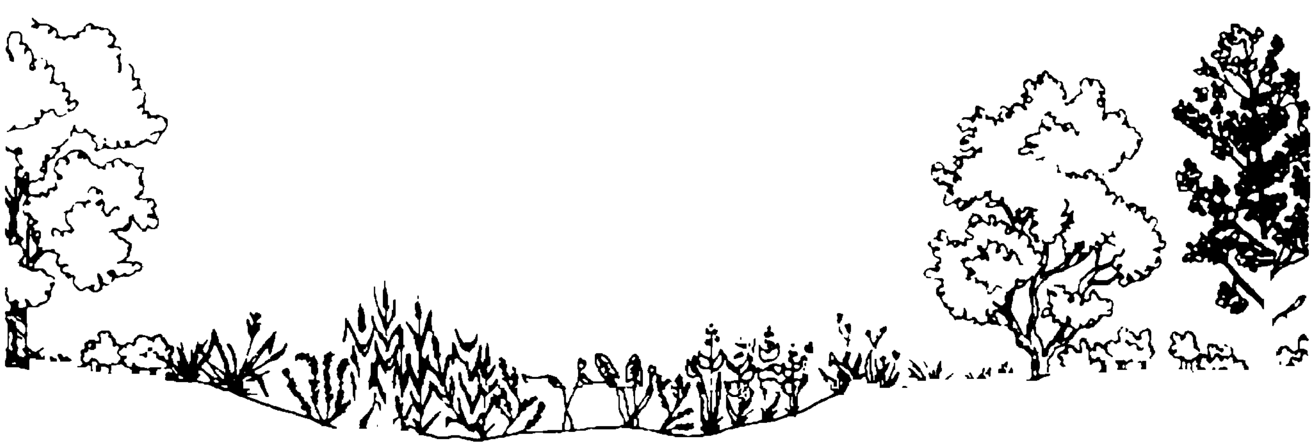
Seasonal uses that may require more stringent criteria are uses that protect sensitive organisms or life stages during a specific season such as the early life stages of fish and/or fish migration (e.g., EPA's *Ambient Water Quality Criteria for Dissolved Oxygen* (see Appendix I) recommends more stringent dissolved oxygen criteria for the early life stages of both coldwater and warmwater fish).

2.7 Removal of Designated Uses - 40 CFR 131.10(g) and (h)

Figure 2-1 shows how and when designated uses may be removed.

2.7.1 Step 1 - Is the Use Existing?

Once a use has been designated for a particular water body or segment, the water body or water body segment cannot be reclassified for a different use except under specific conditions. If a designated use is an existing use (as defined in 40 CFR 131.3) for a particular water body, the existing use cannot be removed unless a use requiring more stringent criteria is added (see



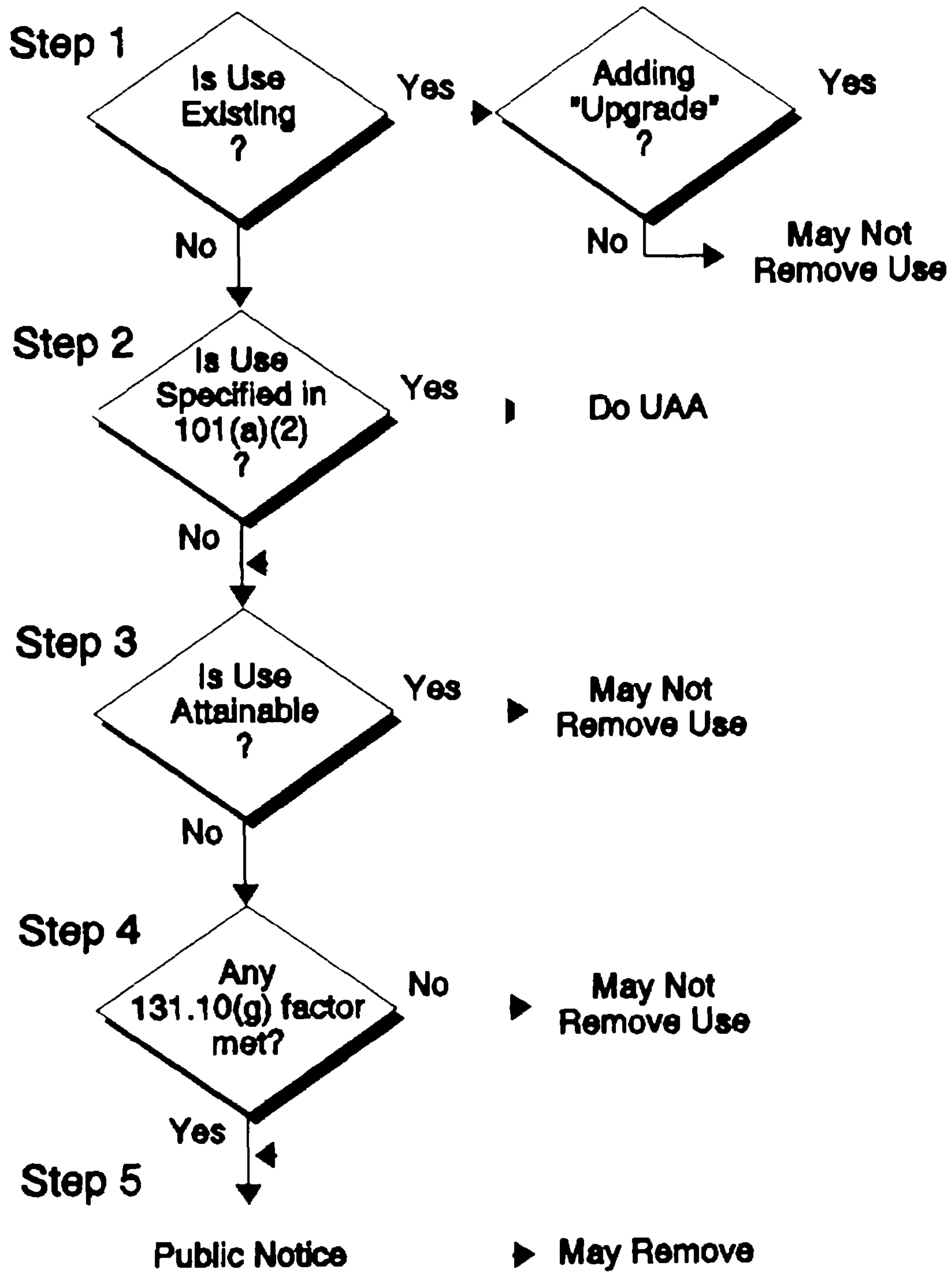


Figure 2-1. Process for Removing a Designated Use

section 4.4, this Handbook, for further discussion of existing uses). However, uses requiring more stringent criteria may always be added because doing so reflects the goal of further improvement of water quality. Thus, a recreational use for wading may be deleted if a recreational use for swimming is added, or the State may add the swimming use and keep the wading use as well.

2.7.2 Step 2 - Is the Use Specified in Section 101(a)(2)?

If the State wishes to remove a designated use specified in section 101(a)(2) of the Act, the State must perform a use attainability analysis (see section 131.10(j)). Section 2.9 of this Handbook discusses use attainability analyses for aquatic life uses.

2.7.3 Step 3 - Is the Use Attainable?

A State may change activities within a specific use category but may not change to a use that requires less stringent criteria, unless the State can demonstrate that the designated use cannot be attained. (See section 2.4, above, for the definition of "attainable uses.") For example, if a State has a broad aquatic life use, EPA generally assumes that the use will support all aquatic life. The State may demonstrate that, for a specific water body, such parameters as dissolved oxygen or temperature will not support trout but will support perch when technology-based effluent limitations are applied to point source dischargers and when cost-effective and reasonable best management practices are applied to nonpoint sources.

2.7.4 Step 4 - Is a Factor from 131.10(g) Met?

Even after the previous steps have been considered, the designated use may be removed, or subcategories of a use established, only under the conditions given in section 131.10(g). The State must be able to demonstrate that attaining the designated use is not feasible because:

(1) naturally occurring pollutant concentrations prevent the attainment of the use;

(2) natural, ephemeral, intermittent, or low-flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met;

(3) human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place;

(4) dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use;

(5) physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to [chemical] water quality, preclude attainment of aquatic life protection uses; or

(6) controls more stringent than those required by sections 301(b)(1)(A) and (B) and 306 of the Act would result in substantial and widespread economic and social impact.

2.7.5 Step 5 - Provide Public Notice

As provided for in section 131.10(e), States must provide notice and opportunity for public hearing in accordance with section 131.20(b) (discussed in section 6.1 of this Handbook). Of course, EPA intends for States to make appropriate use of all public comments received through such notice.

2.8 Revising Uses to Reflect Actual Attainment - 40 CFR 131.10(i)

When performing its triennial review, the State must evaluate what uses are being attained. If a water body is designated for a use that requires less stringent criteria than a use that is being attained, the State must revise the use on that water body to reflect the use that is being attained.

2.9 Use Attainability Analyses - 40 CFR 131.10(j) and (k)

Under section 131.10(j) of the Water Quality Standards Regulation, States are required to conduct a use attainability analysis (UAA) whenever:

(1) the State designates or has designated uses that do not include the uses specified in section 101(a)(2) of the Act; or

(2) the State wishes to remove a designated use that is specified in section 101(a)(2) of the Act or adopt subcategories of uses specified in section 101(a)(2) that require less stringent criteria.

States are not required to conduct UAAs when designating uses that include those specified in section 101(a)(2) of the Act, although they may conduct these or similar analyses when determining the appropriate subcategories of section 101(a)(2) goal uses.

States may also conduct generic use attainability analyses for groups of water body segments provided that the circumstances relating to the segments in question are sufficiently similar to make the results of the generic analyses reasonably applicable to each segment.

As defined in the Water Quality Standards Regulation (40 CFR 131.3), a use attainability analysis is:

> . . . a structured scientific assessment of the factors affecting the attainment of a use which may include physical, chemical, biological, and economic factors as described in section 131.10(g).

The evaluations conducted in a UAA will determine the attainable uses for a water body (see sections 2.4 and 2.8, above).

The physical, chemical, and biological factors affecting the attainment of a use are evaluated through a *water body survey and assessment*. The guidance on water body survey and assessment techniques that appears in this Handbook is for the evaluation of fish, aquatic life, and wildlife uses only (EPA has not developed guidance for assessing recreational uses). Water body surveys and assessments conducted by the States should be sufficiently detailed to answer the following questions:

- What are the aquatic use(s) currently being achieved in the water body?
- What are the causes of any impairment of the aquatic uses?
- What are the aquatic use(s) that can be attained based on the physical, chemical, and biological characteristics of the water body?

The analysis of economic factors determines whether substantial and widespread economic and social impact would be caused by pollution control requirements more stringent than (1) those required under sections 301(b)(1)(A) and (B) and section 306 of the Act for point source dischargers, and (2) cost-effective and reasonable best management practices for nonpoint source dischargers.

2.9.1 Water Body Survey and Assessment - Purpose and Application

The purpose of this section is to identify the physical, chemical, and biological factors that may be examined to determine whether an aquatic life protection use is attainable for a given water body. The specific analyses included in this guidance are optional. However, they represent the type of analyses EPA believes are sufficient for States to justify changes in uses designated in a water quality standard and to determine uses that are attainable. States may use alternative analyses as long as they are scientifically and technically supportable. This guidance specifically addresses streams and river systems. More detailed guidance is given in the *Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analyses, Volume I* (USEPA, 1983c). EPA has also developed guidance for estuarine and marine systems and lakes, which is summarized in following sections. More detailed guidance for these aquatic systems is available in the *Technical Support Manual, Volume II, Estuarine Systems*, and *Volume III, Lake Systems* (USEPA, 1984a,b).

Several approaches for analyzing the aquatic life protection uses to determine if such uses are appropriate for a given water body are discussed. States are encouraged to use existing data to perform the physical, chemical, and biological evaluations presented in this guidance document. Not all of these evaluations are necessarily applicable. For example, if an assessment reveals that the physical habitat is the limiting factor precluding a use, a chemical evaluation would not be required. In addition, wherever possible, States also should consider grouping together water bodies having similar physical, chemical, and biological characteristics either to treat several water bodies or stream segments as a single unit or to establish representative conditions applicable to other similar water bodies or stream segments within a river basin. Using existing data and establishing representative conditions applicable to a number of water bodies or segments should conserve the limited resources available to the States.

Table 2-1 summarizes the types of physical, chemical, and biological factors that may be evaluated when conducting a UAA. Several approaches can be used for conducting the physical, chemical, and biological evaluations, depending on the complexity of the situation. Details on the various evaluations can be found in the *Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analyses, Volume I* (USEPA, 1983c). A survey need not consider all of the parameters listed; rather, the survey should be designed on the basis of the water body characteristics and other considerations relevant to a particular survey.

These approaches may be adapted to the water body being examined. Therefore, a close working relationship between EPA and the States is essential so that EPA can assist States in determining the appropriate analyses to be used in support of any water quality standards revisions. These analyses should be made available to all interested parties before any public forums on the water quality standards to allow for full discussion of the data and analyses.

2.9.2 Physical Factors

Section 101(a) of the Clean Water Act recognizes the importance of preserving the physical integrity of the Nation's water bodies. Physical habitat plays an important role in the overall aquatic ecosystem and impacts the types and number of species present in a particular body of water. Physical parameters of a water body are examined to identify factors that impair the propagation and protection of aquatic life and to determine what uses could be obtained in the water body given such limitations. In general, physical parameters such as flow, temperature, water depth, velocity,

PHYSICAL FACTORS	CHEMICAL FACTORS	BIOLOGICAL FACTORS
♦ **instream characteristics** - size (mean width/depth) - flow/velocity - annual hydrology - total volume - reaeration rates - gradient/pools/ riffles - temperature - sedimentation - channel modifications - channel stability ♦ **substrate composition and characteristics** ♦ **channel debris** ♦ **sludge deposits** ♦ **riparian characteristics** ♦ **downstream characteristics**	♦ **dissolved oxygen** ♦ **toxicants** ♦ **suspended solids** ♦ **nutrients** - nitrogen - phosphorus ♦ **sediment oxygen demand** ♦ **salinity** ♦ **hardness** ♦ **alkalinity** ♦ **pH** ♦ **dissolved solids**	♦ **biological inventory (existing use analysis)** - fish - macroinvertebrates - microinvertebrates - phytoplankton - periphyton - macrophytes ♦ **biological potential analysis** - diversity indices - HSI models - tissue analyses - recovery index - intolerant species analysis - omnivore-carnivore analysis ♦ **biological potential analysis** - reference reach comparison

Table 2-1. Summary of Typical Factors Used in Conducting a Water Body Survey and Assessment

substrate, reaeration rates, and other factors are used to identify any physical limitations that may preclude attainment of the designated use. Depending on the water body in question, any of the physical parameters listed in Table 2-1 may be appropriately examined. A State may use any of these parameters to identify physical limitations and characteristics of a water body. Once a State has identified any physical limitations based on evaluating the parameters listed, careful consideration of "reversibility" or the ability to restore the physical integrity of the water body should be made. Such considerations may include whether it would cause more environmental damage to correct the problem than to leave the water body as is, or whether physical impediments such as dams can be operated or modified in a way that would allow attainment of the use.

Several assessment techniques have been developed that correlate physical habitat characteristics to fishery resources. The identification of physical factors limiting a fishery is a critical assessment that provides important data for management of the water body. The U.S. Fish and Wildlife Service has developed habitat evaluation procedures (HEP) and habitat suitability indices (HSI). Several States have begun developing their own models and procedures for habitat assessments. Parameters generally included in habitat assessment procedures are temperature, turbidity, velocity, depth, cover, pool and riffle sizes, riparian vegetation, bank stability, and siltation. These parameters are correlated to fish species by evaluating the habitat variables important to the life cycle of the species. The value of habitat for other groups of aquatic organisms such as macroinvertebrates and periphyton also may be considered. Continued research and refinement of habitat evaluation procedures reflect the importance of physical habitat.

If physical limitations of a stream restrict the use, a variety of habitat modification techniques might restore a habitat so that a species could thrive where it could not before. Some of the techniques that have been used are bank stabilization, flow control, current deflectors, check dams, artificial meanders, isolated oxbows, snag clearing when determined not to be detrimental to the life cycle or reproduction of a species, and installation of spawning beds and artificial spawning channels. If the habitat is a limiting factor to the propagation and/or survival of aquatic life, the feasibility of modifications might be examined before additional controls are imposed on dischargers.

2.9.3 Chemical Evaluations

The chemical characteristics of a water body are examined to determine why a designated use is not being met and to determine the potential of a particular species to survive in the water body if the concentration of particular chemicals were modified. The State has the discretion to determine the parameters required to perform an adequate water chemistry evaluation. A partial list of the parameters that may be evaluated is provided in Table 2-1.

As part of the evaluation of the water chemistry composition, a natural background evaluation is useful in determining the relative contribution of natural background contaminants to the water body; this may be a legitimate factor that effectively prevents a designated use from being met. To determine whether the natural background concentration of a pollutant is adversely impacting the survival of species, the concentration may be compared to one of the following:

- 304(a) criteria guidance documents; or
- site-specific criteria; or
- State-derived criteria.

Another way to obtain an indication of the potential for the species to survive is to determine if the species are found in other waterways with similar chemical concentrations.

In determining whether human-caused pollution is irreversible, consideration needs to be given to the permanence of the damage, the feasibility of abating the pollution, or the additional environmental damage that may result from removing the pollutants. Once a State identifies the chemical or water quality characteristics that are limiting attainment of the use, differing levels of remedial control measures may be explored. In addition, if instream toxicants cannot be removed by natural processes and cannot be removed by human effort without severe long-term environmental impacts, the pollution may be considered irreversible.

In some areas, the water's chemical characteristics may have to be calculated using predictive water quality models. This will be true if the receiving water is to be impacted by new dischargers, changes in land use, or improved treatment facilities. Guidance is available on the selection and use of receiving water models for biochemical oxygen demand, dissolved oxygen, and ammonia for instream systems (USEPA, 1983d,e) and dissolved oxygen, nitrogen, and phosphorus for lake systems, reservoirs, and impoundments (USEPA, 1983f).

2.9.4 Biological Evaluations

In evaluating what aquatic life protection uses are attainable, the biology of the water body should be evaluated. The interrelationships between the physical, chemical, and biological characteristics are complex, and alterations in the physical and/or chemical parameters result in biological changes. The biological evaluation described in this section encourages States to:

- provide a more precise statement of which species exist in the water body and should be protected;
- determine the biological health of the water body; and
- determine the species that could potentially exist in the water body if the physical and chemical factors impairing a use were corrected.

This section of the guidance will present the conceptual framework for making these evaluations. States have the discretion to use other scientifically and technically supportable assessment methodologies deemed appropriate for specific water bodies on a case-by-case basis. Further details on each of the analyses presented can be found in the *Technical Support Manual for Conducting Use Attainability Analyses* (USEPA, 1983c).

Biological Inventory (Existing Use Analysis)

The identification of which species are in the water body and should be protected serves several purposes:

- By knowing what species are present, the biologist can analyze, in general terms, the health of the water body. For example, if the fish species present are principally carnivores, the quality of the water is generally higher than in a water body dominated by omnivores. It also allows the biologist to assess the presence or absence of intolerant species.
- Identification of the species enables the State to develop baseline conditions against which to evaluate any remedial actions. The development of a regional baseline based upon several site-specific species lists increases an understanding of the regional fauna. This allows for easier grouping of water bodies based on the biological regime of the area.
- By identifying the species, the decision-maker has the data needed to explain the present condition of the water body to the public and the uses that must be maintained.

The evaluation of the existing biota may be simple or complex depending on data availability. As much information as possible should be gathered on the categories of organisms listed in Table 2-1. It is not necessary to obtain complete data for all six categories. However, it is recommended that fish should be included in any combination of categories chosen because:

- the general public can relate better to statements about the condition of the fish community;
- fish are typically present even in the smallest streams and in all but the most polluted waters;
- fish are relatively easy to identify, and samples can be sorted and identified at the field site;
- life-history information is extensive for many fish species so that stress effects can be evaluated (Karr, 1981). In addition, since fish are mobile, States are encouraged to evaluate other categories of organisms.

Before any field work is conducted, existing data should be collected. EPA can provide data from intensive monitoring surveys and special studies. Data, especially for fish, may be available from State fish and game departments, recreation agencies, and local governments, or through environmental impact statements, permit reviews, surveys, and university or other studies.

Biological Condition/Biological Health Assessment

The biological inventory can be used to gain insight into the biological health of the water body by evaluating:

- species richness or the number of species;
- presence of intolerant species;
- proportion of omnivores and carnivores;
- biomass or production; and
- number of individuals per species.

The role of the biologist becomes critical in evaluating the health of the biota because the knowledge of expected richness or expected species comes only from understanding the general biological traits and regimes of the area. Best professional judgments by local biologists are important. These judgments are based on many years of experience and on observations of the physical and chemical changes that have occurred over time.

Many methods for evaluating biotic communities have been and continue to be developed. The *Technical Support Manual for Conducting Use Attainability Analyses* (USEPA, 1983c) and *Rapid Bioassessment Protocols for Use in Streams and Rivers* (USEPA, 1989e) describe methods that States may want to consider using in their biological evaluations.

A number of other methods have been and are being developed to evaluate the health of biological components of the aquatic ecosystem including short-term *in situ* or laboratory bioassays and partial or full life-cycle toxicity tests. These methods are discussed in several EPA publications, including the *Biological Methods Manual* (USEPA, 1972). Again, it is not the intent of this document to specify tests to be conducted by the States. This will depend on the information available, the predictive accuracy required, site-specific conditions of the water body being examined, and the cooperation and assistance the State receives from the affected municipalities and industries.

Biological Potential Analysis

A significant step in the use attainability analysis is the evaluation of what communities could potentially exist in a particular water body if pollution were abated or if the physical habitat were modified. The approach presented is to compare the water body in question to reference reaches within a region. This approach includes the development of baseline conditions to facilitate the comparison of several water bodies at less cost. As with the other analyses mentioned previously, available data should be used to minimize resource impacts.

The biological potential analysis involves:

- defining boundaries of fish faunal regions;
- selecting control sampling sites in the reference reaches of each area;
- sampling fish and recording observations at each reference sampling site;
- establishing the community characteristics for the reference reaches of each area; and
- comparing the water body in question to the reference reaches.

In establishing faunal regions and sites, it is important to select reference areas for sampling sites that have conditions typical of the region.

The establishment of reference areas may be based on physical and hydrological characteristics. The number of reference reaches needed will be determined by the State depending on the variability of the waterways within the State and the number of classes that the State may wish to establish. For example, the State may want to use size, flow, and substrate as the defining characteristics and may consequently desire to establish classes such as small, fast running streams with sandy substrate or large, slow rivers with cobble bottom. It is at the option of the State to:

- choose the parameters to be used in classifying and establishing reference reaches; and
- determine the number of classes (and thus the refinement) within the faunal region.

This approach can also be applied to other aquatic organisms such as macroinvertebrates (particularly freshwater mussels) and algae.

Selection of the reference reaches is of critical importance because the characteristics of the aquatic community will be used to establish baseline conditions against which similar reaches (based on physical and hydrological characteristics) are compared. Once the reference reaches are established, the water body in question can be compared to the reference reach. The results of this analysis will reveal whether the water body in question has the typical biota for that class or a less desirable community and will provide an indication of what species may potentially exist if pollution were abated or the physical habitat limitations were remedied.

2.9.5 Approaches to Conducting the Physical, Chemical, and Biological Evaluations

In some cases, States that assess the status of their aquatic resources, will have relatively simple situations not requiring extensive data collection and evaluation. In other situations, however, the complexity resulting from variable environmental conditions and the stress from multiple uses of the resource will require both intensive and extensive studies to produce a sound evaluation of the system. Thus, procedures that a State may develop for conducting a water body assessment should be flexible enough to be adaptable to a variety of site-specific conditions.

A common experimental approach used in biological assessments has been a hierarchical approach to the analyses. This can be a rigidly tiered approach. An alternative is presented in Figure 2-2.

The flow chart is a general illustration of a thought process used to conduct a use attainability analysis. The process illustrates several alternative approaches that can be pursued separately or, to varying degrees, simultaneously depending on:

- the amount of data available on the site;
- the degree of accuracy and precision required;
- the importance of the resource;
- the site-specific conditions of the study area; and
- the controversy associated with the site.

The degree of sophistication is variable for each approach. Emphasis is placed on evaluating available data first. If information is found to be lacking or incomplete, then field testing or field surveys should be conducted.

The major elements of the process are briefly described below.

Steps 1 and 2

Steps 1 and 2 are the basic organizing steps in the evaluation process. By carefully defining the objectives and scope of the evaluation, there will be some indication of the level of sophistication required in subsequent surveys and testing. States and the regulated community can then adequately plan and allocate resources to the analyses. The designated use of the water body in question

Step 1

- Define objectives
- Determine designated use
- Determine physical, chemical, and biological minimum [illegible] for use
- Establish data needs
- Gather existing data

↓

Step 2

Analyze existing data

Data inadequate ↓ — Data adequate - proceed to Step 6

Step 3

Based on following criteria choose one approach (Step 5) for conducting [illegible]

1 - Available data
2 - Accuracy and precision needed
3 - Importance of resource
4 - Site-specific conditions
5 - Time and money available

↓

Step 4

Select reference water bodies

Step 5

↓

Approaches for Additional Evaluations

A - Conduct general survey:
- Physical habitat survey, if appropriate
- Chemical survey, if appropriate
- Biological survey, if appropriate

or

B - Evaluate physical habitat and water quality [illegible]
- Identify type, source, area of impact
- Examine physical, chemical, biological variables
- Conduct [illegible] *in situ* or lab bioassay tests if toxics suspected

or

C - Evaluate temporal and/or spatial changes in physical, chemical, biological variables
- Increase frequency and number of samples to quantify variables
- Conduct chemical survey to characterize distribution/[illegible] of compounds if chronic toxicity suspected
- Conduct biological and chemical surveillance if toxicity varies
- Conduct tissue analysis if bioaccumulation suspected

or

D - Refine estimates of physical, chemical, biological effects
- Analyze habitat requirements and tolerance limits for representative and important species
- Conduct partial or full life cycle chronic tests, behavioral and [illegible] assays, production/population estimates

↓

Step 6

- Integrate information
- Summarize conclusions
- Determine if additional information is needed

↓

Step 7

Make determinations concerning water body potential, desired level of attainability, and use designation

Figure 2-2. Steps in a Use Attainability Analysis

should be identified as well as the minimum chemical, physical, and biological requirements for maintaining the use. Minimum requirements may include, for example, dissolved oxygen levels, flow rates, temperature, and other factors. All relevant information on the water body should be collected to determine if the available information is adequate for conducting an appropriate level of analysis. It is assumed that all water body evaluations, based on existing data, will either formally or informally be conducted through Steps 1 and 2.

Steps 3 and 4

If the available information proves inadequate, then decisions regarding the degree of sophistication required in the evaluation process will need to be made. These decisions will, most likely, be based on the five criteria listed in Step 3 of Figure 2-2. Based on these decisions, reference areas should be chosen (Step 4), and one or more of the testing approaches should be followed.

Steps 5A, B, C, D

These approaches are presented to illustrate several possible ways of analyzing the water body. For example, in some cases chemical data may be readily available for a water body but little or no biological information is known. In this case, extensive chemical sampling may not be required, but enough samples should be taken to confirm the accuracy of the available data set. Thus, to accurately define the biological condition of the resource, 5C may be chosen, but 5A may be pursued in a less intensive way to supplement the chemical data already available.

Step 5A is a general survey to establish relatively coarse ranges for physical and chemical variables, and the numbers and relative abundances of the biological components (fishes, invertebrates, primary producers) in the water body. Reference areas may or may not need to be evaluated here, depending on the types of questions being asked and the degree of accuracy required.

Step 5B focuses more narrowly on site-specific problem areas with the intent of separating, where possible, biological impacts due to physical habitat alteration versus those due to chemical impacts. These categories are not mutually exclusive but some attempt should be made to define the causal factors in a stressed area so that appropriate control measures can be implemented if necessary.

Step 5C would be conducted to evaluate possibly important trends in the spatial and/or temporal changes associated with the physical, chemical, and biological variables of interest. In general, more rigorous quantification of these variables would be needed to allow for more sophisticated statistical analyses between reference and study areas which would, in turn, increase the degree of accuracy and confidence in the predictions based on this evaluation. Additional laboratory testing may be included, such as tissue analyses, behavioral tests, algal assays, or tests for flesh tainting. Also, high-level chemical analyses may be needed, particularly if the presence of toxic compounds is suspected.

Step 5D is, in some respects, the most detailed level of study. Emphasis is placed on refining cause-effect relationships between physical-chemical alterations and the biological responses previously established from available data or steps 5A through 5C. In many cases, state-of-the-art techniques will be used. This pathway would be conducted by the States only where it may be necessary to establish, with a high degree of confidence, the cause-effect relationships that are producing the biological community characteristics of those areas. Habitat requirements or tolerance limits for representative or important species may have to be determined for those factors limiting the potential of the ecosystem. For these evaluations, partial or full life-cycle toxicity tests, algal assays, and sediment bioassays may be needed along with the shorter term bioassays designed to elucidate sublethal effects not readily apparent in toxicity tests (e.g., preference-avoidance responses, production-respiration estimates, and bioconcentration estimates).

Steps 6 and 7

After field sampling is completed, all data must be integrated and summarized. If this information is still not adequate, then further testing may be required and a more detailed pathway chosen. With adequate data, States should be able to make reasonably specific recommendations concerning the natural potential of the water body, levels of attainability consistent with this potential, and appropriate use designations.

The evaluation procedure outlined here allows States a significant degree of latitude for designing assessments to meet their specific goals in water quality and water use.

2.9.6 Estuarine Systems

This section provides an overview of the factors that should be considered in developing use attainability analyses for estuaries. Anyone planning to conduct a use attainability analysis for an estuary should consult the *Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analyses, Volume II: Estuarine Systems* (USEPA, 1984a) for more detailed guidance. Also, much of the information for streams and rivers that is presented above and in Volume I of the Technical Support Manual, particularly with respect to chemical evaluations, will apply to estuaries and is not repeated here.

The term "estuaries" is generally used to denote the lower reaches of a river where tide and river flows interact. Estuaries are very complex receiving waters that are highly variable in description and are not absolutes in definition, size, shape, aquatic life, or other attributes. Physical, chemical, and biological attributes may require consideration unique to estuaries and are discussed below.

Physical Processes

Estuarine flows are the result of a complex interaction of the following physical factors:

- tides;
- wind shear;
- freshwater inflow (momentum and buoyancy);
- topographic frictional resistance;
- Coriolis effect;
- vertical mixing; and
- horizontal mixing.

In performing a use attainability study, one may simplify the complex prototype system by determining which of these effects or combination of effects is most important at the time scale of the evaluation (days, months, seasons, etc.).

Other ways to simplify the approach to analyzing an estuary is to place it in a broad classification system to permit comparison of similar types of estuaries. The most common groupings are based on geomorphology, stratification, circulation patterns, and time scales. Each of these groupings is discussed below.

Geomorphological classifications can include types such as drowned river valleys (coastal plain estuaries), fjords, bar-built estuaries, and other estuaries that do not fit the first three classifications (those produced by tectonic activity, faulting, landslides, or volcanic eruptions).

Stratification is most often used for classifying estuaries influenced by tides and freshwater inflows. Generally, highly stratified estuaries have large river discharges flowing into them, partially mixed estuaries have medium river discharges; and vertically homogeneous have small river discharges.

Circulation in an estuary (i.e., the velocity patterns as they change over time) is primarily affected by the freshwater outflow, the tidal inflow, and the effect of wind. In turn, the difference in density between outflow and inflow sets up secondary currents that ultimately affect the salinity distribution across the estuary. The salinity distribution is important because it affects the distribution of fauna and flora within the estuary. It is also important because it is indicative of the mixing properties of the estuary as they may affect the dispersion of pollutants (flushing properties). Additional factors such as friction forces and the size and geometry of the estuary also contribute to the circulation patterns. The complex geometry of estuaries, in combination with the presence of wind, the effect of the Earth's rotation (Coriolis effect), and other effects, often results in residual currents (i.e., of longer period than the tidal cycle) that strongly influence the mixing processes in estuaries.

Consideration of time scales of the physical processes being evaluated is very important for any water quality study.

Short-term conditions are much more influenced by a variety of short-term events that perhaps have to be analyzed to evaluate a "worst case" scenario. Longer term (seasonal) conditions are influenced predominantly by events that are averaged over the duration of that time scale.

Estuary Substrate Composition

Characterization of sediment/substrate properties is important in a use attainability analysis because such properties:

- determine the extent to which toxic compounds in sediments are available to the biota; and
- determine what types of plants and animals could potentially become established, assuming no interference from other factors such as nutrient, dissolved oxygen (DO), and/or toxics problems.

The bottom of most estuaries is a mix of sand, silt, and mud that has been transported and deposited by ocean currents or by freshwater sources. Rocky areas may also be present, particularly in the fjord-type estuary. None of these substrate types is particularly hospitable to aquatic plants and animals, which accounts in part for the paucity of species seen in an estuary.

The amount of material transported to the estuary will be determined by the types of terrain through which the river passes, and upon land use practices that may encourage runoff and erosion. It is important to take land use practices into consideration when examining the attainable uses of the estuary. Deposition of particles varies with location in the estuaries and velocity of the currents.

It is often difficult for plants to colonize estuaries because of a lack of suitable anchorage points and because of the turbidity of the water, which restricts light penetration (McLusky, 1971). Submerged aquatic vegetation (SAV) (macrophytes) develops in sheltered areas where silt and mud accumulate. These plants help to slow the currents, leading to further deposition of silt. The growth of plants often keeps pace with rising sediment levels so that over a long period of time substantial deposits of sediment and plant material may be seen.

SAV serves very important roles as habitat and as a food source for much of the biota of the estuary. Major estuary studies have shown that the health of SAV communities serves as an important indicator of estuary health.

Adjacent Wetlands

Tidal and freshwater wetlands adjacent to the estuary can serve as a buffer to protect the estuary from external phenomena. This function may be particularly important during wet weather periods when relatively high stream flows discharge high loads of sediment and pollutants to the estuary. The wetlands slow the peak velocity, to some extent alleviate the sudden shock of salinity changes, and filter some of the sediments and nutrients that would otherwise be discharged directly into the estuary.

Hydrology and Hydraulics

The two most important sources of freshwater to the estuary are stream flow and precipitation. Stream flow generally represents the greatest contribution to the estuary. The location of the salinity gradient in a river-controlled estuary is to a large extent a function of stream flow. Location of the iso-concentration lines may change considerably, depending upon whether stream flow is high or low. This in turn may affect the biology of the estuary, resulting in population shifts as biological species adjust to changes in salinity. Most estuarine species are adapted to survive temporary changes in salinity either by migration or some other mechanism (e.g., mussels can close their shells). However, many cannot withstand these changes indefinitely. Response of an estuary to rainfall events depends upon the intensity of rainfall, the drainage area affected by the rainfall, and the size of the estuary. Movement of the salt front is dependent upon tidal influences and freshwater flow to the estuary. Variations in salinity generally follow seasonal patterns such that the salt front will occur farther down-estuary during a rainy season than during a dry season. The salinity profile also may vary from day to day, reflecting the effect of individual rainfall events, and may undergo major changes due to extreme meteorological events.

Anthropogenic activity also may have a significant effect on salinity in an estuary. When feeder streams are used as sources of public water supply and the withdrawals are not returned, freshwater flow to the estuary is reduced, and the salt wedge is found farther up the estuary. If the water is returned, usually in the form of wastewater effluent, the salinity gradient of the estuary may not be affected, although other problems attributable to nutrients and other pollutants in the wastewater may occur.

Salinity also may be affected by the way that dams along the river are operated. Flood control dams result in controlled discharges to the estuary rather than relatively short but massive discharge during high-flow periods. Dams operated to impound water for water supplies during low-flow periods may drastically alter the pattern of freshwater flow to the estuary, and although the annual discharge may remain the same, seasonal changes may have significant impact on the estuary and its biota.

Influence of Physical Characteristics on Use Attainability

"Segmentation" of an estuary can provide a useful framework for evaluating the influence of estuarine physical characteristics such as circulation, mixing, salinity, and geomorphology on use attainability. Segmentation is the compartmentalization of an estuary into subunits with homogeneous physical characteristics. In the absence of water pollution, physical characteristics of different regions of the estuary tend to govern the suitability for major water uses. Once the segment network is established, each segment can be subjected to a use attainability analysis. In addition, the segmentation process offers a useful management structure for monitoring conformance with water quality goals in future years.

The segmentation process is an evaluation tool that recognizes that an estuary is an interrelated ecosystem composed of chemically, physically, and biologically diverse areas. It assumes that an ecosystem as diverse as an estuary cannot be effectively managed as only one unit because different uses and associated water quality goals will be appropriate and feasible for different regions of the estuary. However, after developing a network based upon physical characteristics, sediment boundaries can be refined with available chemical and biological data to maximize the homogeneity of each segment.

A potential source of concern about the construction and utility of the segmentation scheme for use attainability evaluations is that the estuary is a fluid system with only a few obvious boundaries, such as the sea surface and the sediment-water interface. Fixed boundaries may seem unnatural to scientists, managers, and users, who are more likely to view the estuary as a continuum than as a system composed of separable parts. The best approach to dealing with such concerns is a segmentation scheme that stresses the dynamic nature of the estuary. The scheme should emphasize that the segment boundaries are operationally defined constructs to assist in understanding a changeable, intercommunicating system of channels, embayments, and tributaries.

To account for the dynamic nature of the estuary, it is recommended that estuarine circulation patterns be a prominent factor in delineating the segment network. Circulation patterns control the transport of and residence times for heat, salinity, phytoplankton, nutrients, sediment, and other pollutants throughout the estuary. Salinity should be another important factor in delineating the segment network. The variations in salinity concentrations from head of tide to the mouth typically produce a separation of biological communities based on salinity tolerances or preferences.

Chemical Parameters

The most critical chemical water quality indicators for aquatic use attainment in an estuary are dissolved oxygen, nutrients and chlorophyll-a, and toxicants. Dissolved oxygen (DO) is an important water quality indicator for all fisheries uses. In evaluating use attainability, assessments of DO impacts should consider the relative contributions of three different sources of oxygen demand:

- photosynthesis/respiration demand from phytoplankton;
- water column demand; and
- benthic oxygen demand.

If use impairment is occurring, assessments of the significance of each oxygen sink can be used to evaluate the feasibility of achieving sufficient pollution control to attain the designated use.

Chlorophyll-a is the most popular indicator of algal concentrations and nutrient overenrichment, which in turn can be related to diurnal DO depressions due to algal respiration. Typically, the control of phosphorus levels can limit algal growth near the head of the estuary, while the control of nitrogen levels can limit algal growth near the mouth of the estuary; however, these relationships are dependent upon factors such as nitrogen phosphorus ("N/P") ratios and light penetration potential, which can vary from one estuary to the next. Excessive phytoplankton concentrations, as indicated by chlorophyll-a levels, can cause adverse DO impacts such as:

- wide diurnal variations in surface DO due to daytime photosynthetic oxygen production and nighttime oxygen depletion by respiration; and
- depletion of bottom DO through the decomposition of dead algae.

Excessive chlorophyll-a levels also result in shading, which reduces light penetration for submerged aquatic vegetation (SAV). Consequently, the prevention of nutrient over-enrichment is probably the most important water quality requirement for a healthy SAV community.

The nutrients of greatest concern in the estuary are nitrogen and phosphorus. Their sources typically are discharges from sewage treatment plants and industries and runoff from urban and agricultural areas. Increased nutrient levels lead to phytoplankton blooms and a subsequent reduction in DO levels and light penetration, as discussed above.

Sewage treatment plants are typically the major source of nutrients, particularly phosphorus, to estuaries in urban areas. Agricultural land uses and urban land uses represent significant nonpoint sources of nutrients, particularly nitrogen. It is important to base control strategies on an understanding of the sources of each type of nutrient, both in the estuary and in its feeder streams.

Point sources of nutrients are typically much more amenable to control than nonpoint sources. Because phosphorus removal for municipal wastewater discharges is typically less expensive than nitrogen removal operations, the control of phosphorus discharges is often the method of choice for the prevention or reversal of use impairment in the upper estuary (i.e., tidal fresh zone). However, nutrient control in the upper reaches of the estuary may cause algal blooms in the lower reaches, e.g., control of phosphorus in the upper reaches may reduce the algal blooms there, but in doing so also increase the amount of nitrogen transported to the lower reaches where nitrogen is the limiting nutrient causing a bloom there. Tradeoffs between nutrient controls for the upper and lower estuary should be considered in evaluating measures for prevention of reversing use impairment.

Potential interferences from toxic substances, such as pesticides, herbicides, heavy metals, and chlorinated effluents, also need to be considered in a use attainability study. The presence of certain toxicants in excessive concentrations within bottom sediments of the water column may prevent the attainment of water uses (particularly fisheries propagation/harvesting and sea grass habitat uses) in estuary segments that satisfy water quality criteria for DO, chlorophyll-a/nutrient enrichment, and fecal coliform.

Biological Community Characteristics

The *Technical Support Manual, Volume II* (USEPA, 1984a) provides a discussion of the organisms typically found in estuaries in more detail than is appropriate for this Handbook. Therefore, this discussion will focus on more general characteristics of estuarine biota and their adaptations to accommodate a fluctuating environment.

Salinity, light penetration, and substrate composition are the most critical factors to the distribution and survival of plant and animal communities in an estuary. The estuarine environment is characterized by variations in circulation, salinity, temperature, and dissolved oxygen supply. Colonizing plants and animals must be able to withstand the fluctuating conditions in estuaries.

The depth to which attached plants may become established is limited by turbidity because plants require light for photosynthesis. Estuaries are typically turbid because of large quantities of detritus and silt contributed by surrounding marshes and rivers. Algal growth also may hinder light penetration. If too much light is withheld from the lower depths, animals cannot rely heavily on visual cues for habitat selection, feeding, or finding a mate.

Estuarine organisms are recruited from the sea, freshwater environments, and the land. The major environmental factors to which organisms must adjust are periodic submersion and desiccation as well as fluctuating salinity, temperature, and dissolved oxygen.

Several generalizations concerning the responses of estuarine organisms to salinity have been noted (Vernberg, 1983) and reflect a correlation of an organism's habitat to its tolerance:

- organisms living in estuaries subjected to wide salinity fluctuations can withstand a wider range of salinities than species that occur in high-salinity estuaries;

- intertidal zone animals tend to tolerate wider ranges of salinities than do subtidal and open-ocean organisms;
- low intertidal species are less tolerant of low salinities than are high intertidal species; and
- more sessile animals are likely to be more tolerant of fluctuating salinities than organisms that are highly mobile and capable of migrating during times of salinity stress.

Estuaries are generally characterized by low diversity of species but high productivity because they serve as the nursery or breeding grounds for some species. Methods to measure the biological health and diversity of estuaries are discussed in USEPA (1984a).

Techniques for Use Attainability Evaluations

In assessing use levels for aquatic life protection, determination of the present use and whether this corresponds to the designated use is evaluated in terms of biological measurements and indices. However, if the present use does not correspond to the designated use, physical and chemical factors are used to explain the lack of attainment and the highest level the system can achieve.

The physical and chemical evaluations may proceed on several levels depending on the level of detail required, amount of knowledge available about the system (and similar systems), and budget for the use attainability study. As a first step, the estuary is classified in terms of physical processes so that it can be compared with reference estuaries in terms of differences in water quality and biological communities, which can be related to man-made alteration (i.e., pollution discharges).

The second step is to perform desktop or simple computer model calculations to improve the understanding of spatial and temporal water quality conditions in the present system. These calculations include continuous point source and simple box model-type calculations. A more detailed discussion of the desktop and computer calculations is given in USEPA (1984a).

The third step is to perform detailed analyses through the use of more sophisticated computer models. These tools can be used to evaluate the system's response to removing individual point and nonpoint source discharges, so as to assist with assessments of the cause(s) of any use impairment.

2.9.7 Lake Systems

This section will focus on the factors that should be considered in performing use attainability analyses for lake systems. Lake systems are in most cases linked physically to rivers and streams and exhibit a transition from riverine habitat and conditions to lacustrine habitat and conditions. Therefore, the information presented in section 2.9.1 through 2.9.5 and the *Technical Support Manual, Volume I* (USEPA, 1983c) will to some extent apply to lake systems. EPA has provided guidance specific to lake systems in the *Technical Support Manual for Conducting Use Attainability Analyses, Volume III: Lake Systems* (USEPA, 1984b). This manual should be consulted by anyone performing a use attainability analysis for lake systems.

Aquatic life uses of a lake are defined in reference to the plant and animal life in a lake. However, the types and abundance of the biota are largely determined by the physical and chemical characteristics of the lake. Other contributing factors include the location, climatological conditions, and historical events affecting the lake.

Physical Parameters

The physical parameters that describe the size, shape, and flow regime of a lake represent the basic characteristics that affect physical, chemical, and biological processes. As part of a use attainability analysis, the physical parameters must be examined to understand non-water quality factors that affect the lake's aquatic life.

The origins of a lake determine its morphologic characteristics and strongly influence the physical, chemical, and biological conditions that will prevail. Therefore, grouping lakes formed by the same process often will allow comparison of similar lake systems. Measurement of the following morphological characteristics may be of importance to a water body survey:

- surface area;
- volume;
- inflow and outflow;
- mean depth;
- maximum depth;
- length;
- length of shoreline;
- depth-area relationships;
- depth-volume relationships; and
- bathymetry (submerged contours).

These physical parameters can in some cases be used to predict biological parameters. For example, mean depth has been used as an indicator of productivity. Shallow lakes tend to be more productive, and deep, steep-sided lakes tend to be less productive. These parameters may also be used to calculate other characteristics of the lake such as mass flow rate of a chemical, surface loading rate, and detention time.

Total lake volume and inflow and outflow rates are physical characteristics that indirectly affect the lake's aquatic community. Large inflows and outflows for lakes with small volumes produce low detention times or high flow-through rates. Aquatic life under these conditions may be different than when relatively small inflows and outflows occur for a large-volume lake where long detention times occur.

The shape factor (lake length divided by lake width) also may be correlated to chemical and biological characteristics. This factor has been used to predict parameters such as chlorophyll-a levels in lakes. For more detailed lake analysis, information describing the depth-area and depth-volume relationships and information describing the bathymetry may be required.

In addition to the physical parameters listed above, it is also important to obtain and analyze information concerning the lake's contributing watershed. Two major parameters of concern are the drainage area of the contributing watershed and the land uses of that watershed. Drainage area will aid in the analysis of inflow volumes to the lake due to surface runoff. The land use classification of the area around the lake can be used to predict flows and also nonpoint source pollutant loadings to the lake.

The physical parameters discussed above may be used to understand and analyze the various physical processes that occur in lakes. They can also be used directly in simplistic relationships that predict productivity to aid in aquatic use attainability analyses.

Physical Processes

Many complex and interrelated physical processes occur in lakes. These processes are highly dependent on the lake's physical parameters, location, and characteristics of the contributing watershed. Several of the major processes are discussed below.

Lake Currents

Water movement in a lake affects productivity and the biota because it influences the distribution of nutrients, microorganisms, and plankton. Lake currents are propagated by wind, inflow/outflow, and the Coriolis force. For small shallow lakes, particularly long and narrow lakes, inflow/outflow characteristics are most important, and the predominant current is a steady-state flow through the lake. For very large lakes, wind is the primary generator of currents, and except for local effects, inflow/outflow have a relatively minor effect on lake circulation. Coriolis effect, a deflecting force that is the function of the Earth's rotation, also plays a role in circulation in large lakes such as the Great Lakes.

Heat Budget

Temperature and its distribution within lakes and reservoirs affects not only the water quality within the lake but also the thermal regime and quality of a river system downstream of the lake. The thermal regime of a lake is a function of the heat balance around the body of water. Heat transfer modes into and out of the lake include heat transfer through the air-water interface, conduction through the mud-water interface, and inflow and outflow heat advection.

Heat transfer through the air-water interface is primarily responsible for typical annual temperature cycles. Heat is transferred across the air-water interface by three different processes: radiation exchange, evaporation, and conduction. The heat flux of the air-water interface is a function of location (latitude/longitude and elevation), season, time of day, and meteorological conditions (cloud cover, dew-point, temperature, barometric pressure, and wind).

Light Penetration

Transmission of light through the water column influences primary productivity (phytoplankton and macrophytes), distribution of organisms, and behavior of fish. The reduction of light through the water column of a lake is a function of scattering and absorption. Light transmission is affected by the water surface film, floatable and suspended particulates, turbidity, dense populations of algae and bacteria, and color.

An important parameter based on the transmission of light is the depth to which photosynthetic activity is possible. The minimum light intensity required for photosynthesis has been established to be about 1.0 percent of the incident surface light (Cole, 1979). The portion of the lake from the surface to the depth at which the 1.0 percent intensity occurs is referred to as the "euphotic zone."

Lake Stratification

Lakes in temperate and northern latitudes typically exhibit vertical density stratification during certain seasons of the year. Stratification in lakes is primarily due to temperature differences, although salinity and suspended solids concentrations may also affect density. Typically, three zones of thermal stratification are formed.

The upper layer of warmer, lower density water is termed the "epilimnion," and the lower, stagnant layer of colder, higher density water is termed the "hypolimnion." The transition zone between the epilimnion and the hypolimnion, referred to as the "metalimnion," is characterized by the maximum rate of temperature decline with depth (the thermocline). During stratification, the presence of the thermocline suppresses many of the mass transport phenomena that are otherwise responsible for the vertical transport of water quality constituents within a lake. The aquatic community present in a lake is highly dependent on the thermal structure.

With respect to internal flow structure, three distinct classes of lakes are defined:

- strongly stratified, deep lakes characterized by horizontal isotherms;
- weakly stratified lakes characterized by isotherms that are tilted along the longitudinal axis of the reservoir; and
- non-stratified, completely mixed lakes characterized by isotherms that are essentially vertical.

Retardation of mass transport between the hypolimnion and the epilimnion results in sharply differentiated water quality and biology between the lake strata. One of the most important differences between the layers is often dissolved oxygen. As this is depleted from the hypolimnion without being replenished, life functions of many organisms are impaired, and the biology and biologically mediated reactions fundamental to water quality are altered.

Vertical stratification of a lake with respect to nutrients can also occur. Dissolved nutrients are converted to particulate organic material through photosynthetic processes in the epilimnion in ecologically advanced lakes. This assimilation lowers the ambient nutrient concentrations in the epilimnion. When the algae die and sink to the bottom, nutrients are carried to the hypolimnion where they are released by decomposition.

Temperature also has a direct effect on biology of a lake because most biological processes (e.g., growth, respiration, reproduction, migration, mortality, and decay) are strongly influenced by ambient temperature.

Annual Circulation Pattern and Lake Classification

Lakes can be classified on the basis of their pattern of annual mixing. These classifications are described below.

(1) Amictic - Lakes that never circulate and are permanently covered with ice, primarily in the Antarctic and very high mountains.

(2) Holomictic - Lakes that mix from top to bottom as a result of wind-driven circulation. Several subcategories are defined:

- Oligomictic - Lakes characterized by circulation that is unusual, irregular, and short in duration; generally small to medium tropical lakes or very deep lakes.

- Monomictic - Lakes that undergo one regular circulation per year.

- Dimictic - Lakes that circulate twice a year, in spring and fall, one of the most common types of annual mixing in cool temperate regions such as central and eastern North America.

- Polymictic - Lakes that circulate frequently or continuously, cold lakes that are continually near or slightly above 4°C, or warm equatorial lakes where air temperature changes very little.

(3) Meromictic - Lakes that do not circulate throughout the entire water column. The lower water stratum is perennially stagnant.

Lake Sedimentation

Deposition of sediment received from the surrounding watershed is an important physical process in lakes. Because of the low water velocities through the lake or reservoir, sediments transported by inflowing waters tend to settle out.

Sediment accumulation rates are strongly dependent both on the physiographic characteristics of a specific watershed and on various characteristics of the lake. Prediction of sedimentation rates can be estimated in two basic ways:

- periodic sediment surveys on a lake; and
- estimation of watershed erosion and bed load.

Accumulation of sediment in lakes can, over many years, reduce the life of the water body by reducing the water storage capacity. Sediment flow into the lake also reduces light penetration, eliminates bottom habitat for many plants and

animals, and carries with it adsorbed chemicals and organic matter that settle to the bottom and can be harmful to the ecology of the lake. Where sediment accumulation is a major problem, proper watershed management including erosion and sediment control must be put into effect.

Chemical Characteristics

Freshwater chemistry is discussed in section 2.9.3 and in the *Technical Support Manual, Volume I* (USEPA, 1983c). Therefore, the discussion here will focus on chemical phenomena that are of particular importance to lakes. Nutrient cycling and eutrophication are the primary factors of concern in this discussion, but the effects of pH, dissolved oxygen, and redox potential on lake processes are also involved.

Water chemistry in a lake is closely related to the stages in the annual lake turnover. Once a thermocline has formed, the dissolved oxygen levels in the hypolimnion tend to decline. This occurs because the hypolimnion is isolated from surface waters by the thermocline and there is no mechanism for aeration.

The decay of organic matter and the respiration of fish and other organisms in the hypolimnion serve to deplete DO. Extreme depletion of DO may occur in ice- and snow-covered lakes in which light is insufficient for photosynthesis. If depletion of DO is great enough, fish kills may result. With the depletion of DO, reducing conditions prevail and many compounds that have accumulated in the sediment by precipitation are released to the surrounding water. Chemicals solubilized under such conditions include compounds of nitrogen, phosphorus, iron, manganese, and calcium. Phosphorus and nitrogen are of particular concern because of their role in the eutrophication process in lakes.

Nutrients released from the bottom sediments during stratified conditions are not available to phytoplankton in the epilimnion. However, during overturn periods, mixing of the layers distributes the nutrients throughout the water column. The high nutrient availability is short-lived because the soluble reduced forms are rapidly oxidized to insoluble forms that precipitate out and settle to the bottom. Phosphorus and nitrogen are also deposited through sorption to particles that settle to the bottom and as dead plant material that is added to the sediments.

Of the many raw materials required by aquatic plants (phytoplankton and macrophytes) for growth, carbon, nitrogen, and phosphorus are the most important. Carbon is available from carbon dioxide, which is in almost unlimited supply. Since growth is generally limited by the essential nutrient that is in lowest supply, either nitrogen or phosphorus is usually the limiting nutrient for growth of primary producers. If these nutrients are available in adequate supply, massive algal and macrophyte blooms may occur with severe consequences for the lake. Most commonly in lakes, phosphorus is the limiting nutrient for aquatic plant growth. In these situations, adequate control of phosphorus, particularly from anthropogenic sources, can control growth of aquatic vegetation. Phosphorus can in some cases, be removed from the water column by precipitation, as described in the *Technical Support Manual, Volume III* (USEPA, 1984b).

Eutrophication and Nutrient Cycling

The term "eutrophication" is used in two general ways: (1) eutrophication is defined as the process of nutrient enrichment in a water body; and (2) eutrophication is used to describe the effects of nutrient enrichment, that is, the uncontrolled growth of plants, particularly phytoplankton, in a lake or reservoir. The second use also encompasses changes in the composition of animal communities in the water body. Both uses are commonly found in the literature, and the distinction, if important, must be discerned from the context of use.

Eutrophication is often greatly accelerated by anthropogenic nutrient enrichment, which has been termed "cultural eutrophication." Nutrients are transported to lakes from external sources, and once in the lake, may be recycled internally. A consideration of attainable uses in a lake must include an understanding of the sources of nitrogen and phosphorus, the significance of internal cycling, especially of phosphorus, and the changes that might be anticipated if eutrophication could be controlled.

Significance of Chemical Phenomena to Use Attainability

The most critical water quality indicators for aquatic use attainment in a lake are DO, nutrients, chlorophyll-a, and toxicants. In evaluating use attainability, the relative importance of three forms of oxygen demand should be considered: respiratory demand of phytoplankton and macrophytes during non-photosynthetic periods, water column demand, and benthic demand. If use impairment is occurring, assessments of the significance of each oxygen sink can be useful in evaluating the feasibility of achieving sufficient pollution control, or in implementing the best internal nutrient management practices to attain a designated use.

Chlorophyll-a is a good indicator of algal concentrations and of nutrient overenrichment. Excessive phytoplankton concentrations, as indicated by high chlorophyll-a levels, can cause adverse DO impacts such as:

- wide diurnal variation in surface DO due to daytime photosynthesis and nighttime respiration, and

- depletion of bottom DO through the decomposition of dead algae.

As discussed previously, nitrogen and phosphorus are the nutrients of concern in most lake systems, particularly where anthropogenic sources result in increased nutrient loading. It is important to base control strategies on an understanding of the sources of each type of nutrient, both in the lake and in its feeder streams.

Also, the presence of toxics such as pesticides, herbicides, and heavy metals in sediments or the water column should by considered in evaluating uses. These pollutants may prevent the attainment of uses (particularly those related to fish propagation and maintenance in water bodies) that would otherwise be supported by the water quality criteria for DO and other parameters.

Biological Characteristics

A major concern for lake biology is the eutrophication due to anthropogenic sources of nutrients. The increased presence of nutrients may result in phytoplankton blooms that can, in turn, have adverse impacts on other components of the biological community. A general trend that results from eutrophication is an increase in numbers of organisms but a decrease in diversity of species, particularly among nonmotile species. The biological characteristics of lakes are discussed in more detail in the *Technical Support Manual, Volume III*.

Techniques for Use Attainability Evaluations

Techniques for use attainability evaluations of lakes are discussed in detail in the *Technical Support Manual, Volume III*. Several empirical (desktop) and simulation (computer-based mathematical) models that can be used to characterize and evaluate lakes for use attainability are presented in that document and will not be included here owing to the complexity of the subject.

CHAPTER 3

WATER QUALITY CRITERIA

(40 CFR 131.11)

Table of Contents

CHAPTER 3
WATER QUALITY CRITERIA

The term "water quality criteria" has two different definitions under the Clean Water Act (CWA). Under section 304(a), EPA publishes water quality criteria that consist of scientific information regarding concentrations of specific chemicals or levels of parameters in water that protect aquatic life and human health (see section 3.1 of this Handbook). The States may use these contents as the basis for developing enforceable water quality standards. Water quality criteria are also elements of State water quality standards adopted under section 303(c) of the CWA (see sections 3.2 through 3.6 of this Handbook). States are required to adopt water quality criteria that will protect the designated use(s) of a water body. These criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use.

3.1 EPA Section 304(a) Guidance

EPA and a predecessor agency have produced a series of scientific water quality criteria guidance documents. Early Federal efforts were the "Green Book" (FWPCA, 1968) and the "Red Book" (USEPA, 1976). EPA also sponsored a contract effort that resulted in the "Blue Book" (NAS/NAE, 1973). These early efforts were premised on the use of literature reviews and the collective scientific judgment of Agency and advisory panels. However, when faced with the need to develop criteria for human health as well as aquatic life, the Agency determined that new procedures were necessary. Continued reliance solely on existing scientific literature was deemed inadequate because essential information was not available for many pollutants. EPA scientists developed formal methodologies for establishing scientifically defensible criteria. These were subjected to review by the Agency's Science Advisory Board of outside experts and the public. This effort culminated on November 28, 1980, when the Agency published criteria development guidelines for aquatic life and for human health, along with criteria for 64 toxic pollutants (USEPA, 1980a,b). Since that initial publication, the aquatic life methodology was amended (Appendix H), and additional criteria were proposed for public comment and finalized as Agency criteria guidance. EPA summarized the available criteria information in the "*Gold Book*" (USEPA, 1986a), which is updated from time to time. However, the individual criteria documents (see Appendix I), as updated, are the official guidance documents.

EPA's criteria documents provide a comprehensive toxicological evaluation of each chemical. For toxic pollutants, the documents tabulate the relevant acute and chronic toxicity information for aquatic life and derive the criteria maximum concentrations (acute criteria) and criteria continuous concentrations (chronic criteria) that the Agency recommends to protect aquatic life resources. The methodologies for these processes are described in Appendices H and J and outlined in sections 3.1.2 and 3.1.3 of this Handbook.

3.1.1 State Use of EPA Criteria Documents

EPA's water quality criteria documents are available to assist States in:

- adopting water quality standards that include appropriate numeric water quality criteria;
- interpreting existing water quality standards that include narrative "no toxics in toxic amounts" criteria;

- making listing decisions under section 304(1) of the CWA;
- writing water quality-based NPDES permits and individual control strategies; and
- providing certification under section 401 of the CWA for any Federal permit or license (e.g., EPA-issued NPDES permits, CWA section 404 permits, or Federal Energy Regulatory Commission licenses).

In these situations, States have primary authority to determine the appropriate level to protect human health or welfare (in accordance with section 303(c)(2) of the CWA) for each water body. However, under the Clean Water Act, EPA must also review and approve State water quality standards; section 304(1) listing decisions and draft and final State-issued individual control strategies; and in States where EPA writes NPDES permits, EPA must develop appropriate water quality-based permit limitations. The States and EPA therefore have a strong interest in assuring that the decisions are legally defensible, are based on the best information available, and are subject to full and meaningful public comment and participation. It is very important that each decision be supported by an adequate record. Such a record is critical to meaningful comment, EPA's review of the State's decision, and any subsequent administrative or judicial review.

Any human health criterion for a toxicant is based on at least three interrelated considerations:

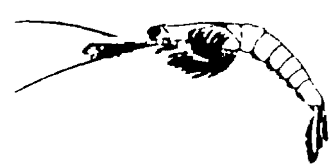
- cancer potency or systemic toxicity,
- exposure, and
- risk characterization.

States may make their own judgments on each of these factors within reasonable scientific bounds, but documentation to support their judgments, when different from EPA's recommendation, must be clear and in the public record. If a State relies on EPA's section 304(a) criteria document (or other EPA documents), the State may reference and rely on the data in these documents and need not create duplicative or new material for inclusion in their records. However, where site-specific issues arise or the State decides to adopt an approach to any one of these three factors that differs from the approach in EPA's criteria document, the State must explain its reasons in a manner sufficient for a reviewer to determine that the approach chosen is based on sound scientific rationale (40 CFR 131.11(b)).

3.1.2 Criteria for Aquatic Life Protection

The development of national numerical water quality criteria for the protection of aquatic organisms is a complex process that uses information from many areas of aquatic toxicology. (See Appendix H for a detailed discussion of this process.) After a decision is made that a national criterion is needed for a particular material, all available information concerning toxicity to, and bioaccumulation by, aquatic organisms is collected and reviewed for acceptability. If enough acceptable data for 48- to 96-hour toxicity tests on aquatic plants and animals are available, they are used to derive the acute criterion. If sufficient data on the ratio of acute to chronic toxicity concentrations are available, they are used to derive the chronic or long-term exposure criteria. If justified, one or both of the criteria may be related to other water quality characteristics, such as pH, temperature, or hardness. Separate criteria are developed for fresh and salt waters.

The Water Quality Standards Regulation allows States to develop numerical criteria or modify



EPA's recommended criteria to account for site-specific or other scientifically defensible factors. Guidance on modifying national criteria is found in sections 3.6 and 3.7. When a criterion must be developed for a chemical for which a national criterion has not been established, the regulatory authority should refer to the EPA guidelines (Appendix H).

Magnitude for Aquatic Life Criteria

Water quality criteria for aquatic life contain two expressions of allowable magnitude: a criterion maximum concentration (CMC) to protect against acute (short-term) effects; and a criterion continuous concentration (CCC) to protect against chronic (long-term) effects. EPA derives acute criteria from 48- to 96-hour tests of lethality or immobilization. EPA derives chronic criteria from longer term (often greater than 28-day) tests that measure survival, growth, or reproduction. Where appropriate, the calculated criteria may be lowered to be protective ofcomercially or recreationally important species.

Duration for Aquatic Life Criteria

The quality of an ambient water typically varies in response to variations of effluent quality, stream flow, and other factors. Organisms in the receiving water are not experiencing constant, steady exposure but rather are experiencing fluctuating exposures, including periods of high concentrations, which may have adverse effects. Thus, EPA's criteria indicate a time period over which exposure is to be averaged, as well as an upper limit on the average concentration, thereby limiting the duration of exposure to elevated concentrations. For acute criteria, EPA recommends an averaging period of 1 hour. That is, to protect against acute effects, the 1-hour average exposure should not exceed the CMC. For chronic criteria, EPA recommends an averaging period of 4 days. That is, the 4-day average exposure should not exceed the CCC.

Frequency for Aquatic Life Criteria

To predict or ascertain the attainment of criteria, it is necessary to specify the allowable frequency for exceeding the criteria. This is because it is statistically impossible to project that criteria will never be exceeded. As ecological communities are naturally subjected to a series of stresses, the allowable frequency of pollutant stress may be set at a value that does not significantly increase the frequency or severity of all stresses combined.

EPA recommends an average frequency for excursions of both acute and chronic criteria not to exceed once in 3 years. In all cases, the recommended frequency applies to actual ambient concentrations, and excludes the influence of measurement imprecision. EPA established its recommended frequency as part of its guidelines for deriving criteria (Appendix H). EPA selected the 3-year average frequency of criteria exceedence with the intent of providing for ecological recovery from a variety of severe stresses. This return interval is roughly equivalent to a 7Q10 design flow condition. Because of the nature of the ecological recovery studies available, the severity of criteria excursions could not be rigorously related to the resulting ecological impacts. Nevertheless, EPA derives its criteria intending that a single marginal criteria excursion (i.e., a slight excursion over a 1-hour period for acute or over a 4-day period for chronic) would require little or no time for recovery. If the frequency of marginal criteria excursions is not high, it can be shown that the frequency of severe stresses, requiring measurable recovery periods, would be extremely small. EPA thus expects the 3-year return interval to provide a very high degree of protection.

3.1.3 Criteria for Human Health Protection

This section reviews EPA's procedures used to develop assessments of human health effects in developing water quality criteria and reference ambient concentrations. A more complete human health effects discussion is included in the *Guidelines and Methodology Used in the*

Preparation of Health Effects Assessment Chapters of the Consent Decree Water Documents (Appendix J). The procedures contained in this document are used in the development and updating of EPA water quality criteria and may be used in updating State criteria and in developing State criteria for those pollutants lacking EPA human health criteria. The procedures may also be applied as site-specific interpretations of narrative standards and as a basis for permit limits under 40 CFR 122.44 (d)(1)(vi).

Magnitude and Duration

Water quality criteria for human health contain only a single expression of allowable magnitude; a criterion concentration generally to protect against long-term (chronic) human health effects. Currently, national policy and prevailing opinion in the expert community establish that the duration for human health criteria for carcinogens should be derived assuming lifetime exposure, taken to be a 70-year time period. The duration of exposure assumed in deriving criteria for noncarcinogens is more complicated owing to a wide variety of endpoints: some developmental (and thus age-specific and perhaps gender-specific), some lifetime, and some, such as organoleptic effects, not duration-related at all. Thus, appropriate durations depend on the individual noncarcinogenic pollutants and the endpoints or adverse effects being considered.

Human Exposure Considerations

A complete human exposure evaluation for toxic pollutants of concern for bioaccumulation would encompass not only estimates of exposures due to fish consumption but also exposure from background concentrations and other exposure routes, The more important of these include recreational and occupational contact, dietary intake from other than fish, intake from air inhalation, and drinking water consumption. For section 304(a) criteria development, EPA typically considers only exposures to a pollutant that occur through the ingestion of water and contaminated fish and shellfish. This is the exposure default assumption, although the human health guidelines provide for considering other sources where data are available (see 45 F.R. 79354). Thus the criteria are based on an assessment of risks related to the surface water exposure route only (57 F.R. 60862-3).

The consumption of contaminated fish tissue is of serious concern because the presence of even extremely low ambient concentrations of bioaccumulative pollutants (sublethal to aquatic life) in surface waters can result in residue concentrations in fish tissue that can pose a human health risk. Other exposure route information should be considered and incorporated in human exposure evaluations to the extent available.

Levels of actual human exposures from consuming contaminated fish vary depending upon a number of case-specific consumption factors. These factors include type of fish species consumed, type of fish tissue consumed, tissue lipid content, consumption rate and pattern, and food preparation practices. In addition, depending on the spatial variability in the fishery area, the behavior of the fish species, and the point of application of the criterion, the average exposure of fish may be only a small fraction of the expected exposure at the point of application of the criterion. If an effluent attracts fish, the average exposure might be greater than the expected exposure.

With shellfish, such as oysters, snails, and mussels, whole-body tissue consumption commonly occurs, whereas with fish, muscle tissue and roe are most commonly eaten. This difference in the types of tissues consumed has implications for the amount of available bioaccumulative contaminants likely to be ingested. Whole-body shellfish consumption presumably means ingestion of the entire burden of bioaccumulative contaminants. However, with most fish, selective cleaning and removal of internal organs, and sometimes body fat as well, from edible tissues, may result in removal of much of the lipid material in which bioaccumulative contaminants tend to concentrate.

Fish Consumption Values

EPA's human health criteria have assumed a human body weight of 70 kg and the consumption of 6.5 g of fish and shellfish per day. Based on data collected in 1973-74, the national per capita consumption of freshwater and estuarine fish was estimated to average 6.5 g/day. Per capita consumption of all seafood (including marine species) was estimated to average 14.3 g/day. The 95th percentile for consumption of all seafood by individuals over a period of 1 month was estimated to be 42 g/day. The mean lipid content of fish and shellfish tissue consumed in this study was estimated to be 3.0 percent (USEPA, 1980c).

Currently, four levels of fish and shellfish consumption are provided in EPA guidance (USEPA, 1991a):

- 6.5 g/day to represent an estimate of average consumption of fish and shellfish from estuarine and freshwaters by the entire U.S. population. This consumption level is based on the average of both consumers and nonconsumers of.

- 20 g/day to represent an estimate of the average consumption of fish and shellfish from marine, estuarine, and freshwaters by the U.S. population. This average consumption level also includes both consumers and nonconsumers of.

- 165 g/day to represent consumption of fish and shellfish from marine, estuarine, and freshwaters by the 99.9th percentile of the U.S. population consuming the most fish or seafood.

- 180 g/day to represent a "reasonable worst case" based on the assumption that some individuals would consume fishand shellfish at a rate equal to the combined consumption of red meat, poultry, fish, and shellfish in the United States.

EPA is currently updating the national estuarine and freshwater fish and shellfish consumption default values and will provide a range of recommended national consumption values. This range will include:

- mean values appropriate to the population at large; and

- values appropriate for those individuals who consume a relatively large proportion of fish and shellfish in their diets (maximally exposed individuals).

Many States use EPA's 6.5 g/day consumption value. However, some States use the above-mentioned 20 g/day value and, for saltwaters, 37 g/day. In general, EPA recommends that the consumption values used in deriving criteria from the formulas in this chapter reflect the most current, relevant, and/or site-specific information available.

Bioaccumulation Considerations

The ratio of the contaminant concentrations in fish tissue versus that in water is termed either the bioconcentration factor (BCF) or the bioaccumulation factor (BAF). Bioconcentration is defined as involving contaminant uptake from water only (not from food). The bioaccumulation factor (BAF) is defined similarly to the BCF except that it includes contaminant uptake from both water and food. Under laboratory conditions, measurements of tissue/water partitioning are generally considered to involve uptake from water only. On the other hand, both processes are likely to apply in the field since the entire food chain is exposed.

The BAF/BCF ratio ranges from 1 to 100, with the highest ratios applying to organisms in higher trophic levels, and to chemicals with logarithm of the octanol-water partitioning coefficient (log P) close to 6.5.

Bioaccumulation considerations are integrated into the criteria equations by using food chain multipliers (FMs) in conjunction with the BCF. The bioaccumulation and bioconcentration factors for a chemical are related as follows:

$$BAF = FM \times BCF$$

By incorporating the FM and BCF terms into the criteria equations, bioaccumulation can be addressed.

In Table 3-1, FM values derived from the work of Thomann (1987, 1989) are listed according to log P value and trophic level of the organism. For chemicals with log P values greater than about 7, there is additional uncertainty regarding the degree of bioaccumulation, but generally, trophic level effects appear to decrease due to slow transport kinetics of these chemicals in fish, the growth rate of the fish, and the chemical's relatively low bioavailability. Trophic level 4 organisms are typically the most desirable species for sport fishing and, therefore, FMs for trophic level 4 should generally be used in the equations for calculating criteria. In those very rare situations where only lower trophic level organisms are found, e.g., possibly oyster beds, an FM for a lower trophic level might be considered.

Measured BAFs (especially for those chemicals with log P values above 6.5) reported in the literature should be used when available. To use experimentally measured BAFs in calculating the criterion, the (FM x BCF) term is replaced by the BAF in the equations in the following section. Relatively few BAFs have been measured accurately and reported, and their application to sites other than the specific ecosystem where they were developed is problematic and subject to uncertainty. The option is also available to develop BAFs experimentally, but this will be extremely resource intensive if done on a site-specific basis with all the necessary experimental and quality controls.

	Trophic Levels		
Log P	2	3	4
3.5	1.0	1.0	1.0
3.6	1.0	1.0	1.0
3.7	1.0	1.0	1.0
3.8	1.0	1.0	1.0
3.9	1.0	1.0	1.0
4.0	1.1	1.0	1.0
4.1	1.1	1.1	1.1
4.2	1.1	1.1	1.1
4.3	1.1	1.1	1.1
4.4	1.2	1.1	1.1
4.5	1.2	1.2	1.2
4.6	1.2	1.3	1.3
4.7	1.3	1.4	1.4
4.8	1.4	1.5	1.6
4.9	1.5	1.8	2.0
5.0	1.6	2.1	2.6
5.1	1.7	2.5	3.2
5.2	1.9	3.0	4.3
5.3	2.2	3.7	5.8
5.4	2.4	4.6	8.0
5.5	2.8	5.9	11
5.6	3.3	7.5	16
5.7	3.9	9.8	23
5.8	4.6	13	33
5.9	5.6	17	47
6.0	6.8	21	67
6.1	8.2	25	75
6.2	10	29	84
6.3	13	34	92
6.4	15	39	98
6.5	19	45	100
≥6.5	19.2*	45*	100*

* These recommended FMs are conservative estimates; FMs for log P values greater than 6.5 may range from the values given to as low as 0.1 for contaminants with very low bioavailability.

Table 3-1. Estimated Food Chain Multipliers (FMs)

Updating Human Health Criteria Using IRIS

EPA recommends that States use the most current risk information in the process of updating human health criteria. The Integrated Risk Information System (IRIS) (Barns and Dourson, 1988; Appendix N) is an electronic data base of the USEPA that provides chemical-specific risk information on the relationship between chemical exposure and estimated human health effects. Risk assessment information contained in IRIS, except as specifically noted, has been reviewed and agreed upon by an interdisciplinary group of scientists representing various Program Offices within the Agency and represent an Agency-wide consensus. Risk assessment information and values are updated on a monthly basis and are approved for Agency-wide use. IRIS is intended to make risk assessment information readily available to those individuals who must perform risk assessments and also to increase consistency among risk assessment/risk management decisions.

IRIS contains two types of quantitative risks values: the oral Reference Dose (RfD) and the carcinogenic potency estimate or slope factor. The RfD (formerly known as the acceptable daily intake or ADI) is the human health hazard assessment for noncarcinogenic (target organ) effects. The carcinogenic potency estimate (formerly known as q_1*) represents the upper bound cancer-causing potential resulting from lifetime exposure to a substance. The RfD or the oral carcinogenic potency estimate is used in the derivation of EPA human health criteria.

EPA periodically updates risk assessment information, including RfDs, cancer potency estimates, and related information on contaminant effects, and reports the current information on IRIS. Since IRIS contains the Agency's most recent quantitative risk assessment values, current IRIS values should be used by States in updating or developing new human health criteria. This means that the 1980 human health criteria should be updated with the latest IRIS values. The procedure for deriving an updated human health water quality criterion would require inserting the current Rfd or carcinogenic potency estimate on IRIS into the equations in Exhibit 3.1 or 3.2, as appropriate.

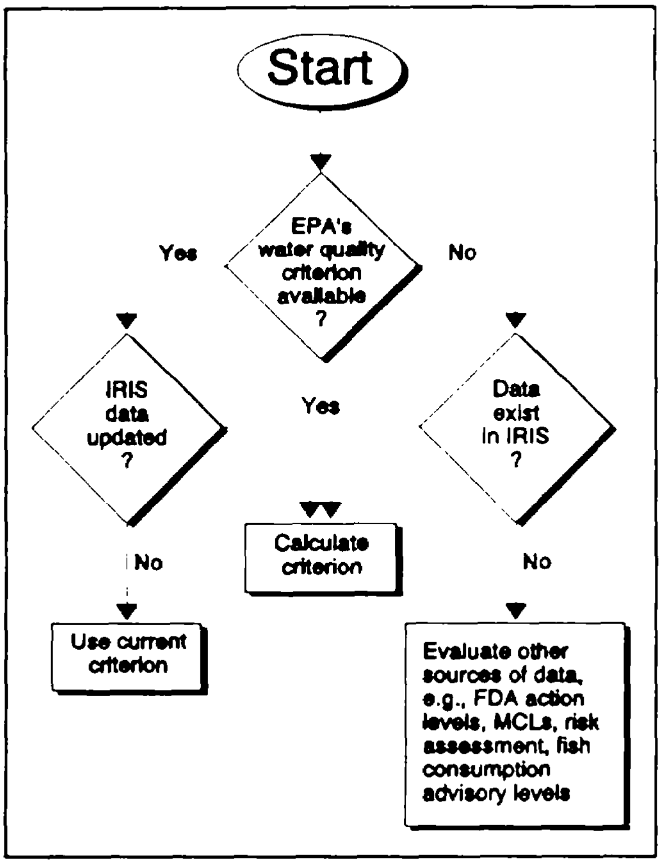


Figure 3-1. Procedure for determining an updated criterion using IRIS data.

Figure 3-1 shows the procedure for determining an updated criterion using IRIS data. If a chemical has both carcinogenic and non-carcinogenic effects, i.e., both a cancer potency estimate and a RfD, both criteria should be calculated. The most stringent criterion applies.

Calculating Criteria for Non-carcinogens

The RfD is an estimate of the daily exposure to the human population that is likely to be without appreciable risk of causing deleterious effects during a lifetime. The RfD is expressed in units of mg toxicant per kg human body weight per day.

RfDs are derived from the "no-observed-adverse-effect level" (NOAEL) or the "lowest-observed-adverse-effect level" (LOAEL) identified from chronic or subchronic human epidemiology studies or animal exposure studies. (Note: "LOAEL" and "NOAEL" refer to animal and human toxicology and are therefore distinct from the aquatic toxicity terms "no-observed-effect concentration" (NOEC) and "lowest-observed-effect concentration" (LOEC).) Uncertainty factors are then applied to the NOAEL or LOAEL to account for uncertainties in the data associated with variability among individuals, extrapolation from nonhuman test species to humans, data on other than long-term exposures, and the use of a LOAEL (USEPA, 1988a). An additional uncertainty factor may be applied to account for significant weakness or gaps in the database.

The RfD is a threshold below which systemic toxic effects are unlikely to occur. While exposures above the RfD increase the probability of adverse effects, they do not produce a certainty of adverse effects. Similarly, while exposure at or below the RfD reduces the probability, it does not guarantee the absence of effects in all persons. The RfDs contained in IRIS are values that represent EPA's consensus (and have uncertainty spanning perhaps an order of magnitude). This means an RfD of 1.0 mg/kg/day could range from 0.3 to 3.0 mg/kg/day.

For noncarcinogenic effects, an updated criterion can be derived using the equation in Exhibit 3-1.

If the receiving water body is not used as a drinking water source, the factor WI can be deleted. Where dietary and/or inhalation exposure values are unknown, these factors may be deleted from the above calculation.

Calculating Criteria for Carcinogens

Any human health criterion for a carcinogen is based on at least three interrelated considerations: cancer potency, exposure, and risk characterization. When developing State criteria, States may make their own judgments on each of these factors within reasonable scientific bounds, but documentation to support their judgments must be clear and in the public record.

Maximum protection of human health from the potential effects of exposure to carcinogens through the consumption of contaminated fish and/or other aquatic life would require a criterion of zero. The zero level is based upon the assumption of non-threshold effects (i.e., no safe level exists below which any increase in exposure does not result in an increased risk of cancer) for carcinogens. However, because a publicly acceptable policy for safety does not require the absence of all risk, a numerical estimate of pollutant concentration (in μg/l) which corresponds to a given level of risk for a population of a specified size is selected instead. A cancer risk level is defined as the number of new cancers that may result in a population of specified size due to an increase in exposure (e.g., 10^{-6} risk level = 1 additional cancer in a population of 1 million). Cancer risk is calculated by multiplying the experimentally derived cancer potency estimate by the concentration of the chemical in the fish and the average daily human consumption of contaminated fish. The risk for a specified population (e.g., 1 million people or 10^{-6}) is then calculated by dividing the risk level by the specific cancer risk. EPA's ambient water quality criteria documents provide risk levels ranging from 10^{-5} to 10^{-7} as examples.

The cancer potency estimate, or slope factor (formerly known as the q_1*), is derived using animal studies. High-dose exposures are extrapolated to low-dose concentrations and adjusted to a lifetime exposure period through the use of a linearized multistage model. The model calculates the upper 95 percent confidence limit of the slope of a straight line which the model postulates to occur at low doses. When based on human (epidemiological) data, the slope factor is based on the observed increase in cancer risk and is not extrapolated. For deriving criteria for carcinogens, the oral cancer potency estimates or slope factors from IRIS are used.

It is important to note that cancer potency factors may overestimate or underestimate the actual risk. Such potency estimates are subject to great uncertainty because of two primary factors:

$$C\ (mg/l) = \frac{(RfD \times WT) - (DT + IN) \times WT}{WI + [FC \times L \times FM \times BCF]}$$

where:

C	=	updated water quality criterion (mg/l)
RfD	=	oral reference dose (mg toxicant/kg human body weight/day)
WT	=	weight of an average human adult (70 kg)
DT	=	dietary exposure (other than fish) (mg toxicant/kg body human weight/day)
IN	=	inhalation exposure (mg toxicant/kg body human weight/day)
WI	=	average human adult water intake (2 l/day)
FC	=	daily fish consumption (kg fish/day)
L	=	ratio of lipid fraction of fish tissue consumed to 3%
FM	=	food chain multiplier (from Table 3-1)
BCF	=	bioconcentration factor (mg toxicant/kg fish divided by mg toxicant/L water) for fish with 3% lipid content

Exhibit 3-1. Equation for Deriving Human Health Criteria Based on Noncarcinogenic Effects

- adequacy of the cancer data base (i.e., human vs. animal data); and
- limited information regarding the mechanism of cancer causation.

Risk levels of 10^{-5}, 10^{-6}, and 10^{-7} are often used by States as minimal risk levels in interpreting their standards. EPA considers risks to be additive, i.e., the risk from individual chemicals is not necessarily the overall risk from exposure to water. For example, an individual risk level of 10^{-6} may yield a higher overall risk level if multiple carcinogenic chemicals are present.

For carcinogenic effects, the criterion can be determined by using the equation in Exhibit 3-2. If the receiving water body is not designated as a drinking water source, the factor WI can be deleted.

Deriving Quantitative Risk Assessments in the Absence of IRIS Values

The RfDs or cancer potency estimates comprise the existing dose-response factors for developing criteria. When IRIS data are unavailable, quantitative risk level information may be developed according to a State's own procedures. Some States have established their own procedures whereby dose-response factors can be developed based upon extrapolation of acute and/or chronic animal data to concentrations of exposure protective of fish consumption by

$$C\ (mg/l) = \frac{(RL \times WT)}{q_1^* \left[WI + FC \times L \times (FM \times BCF)\right]}$$

where:

C	=	updated water quality criterion (mg/l)
RL	=	risk level (10^{-x}) where x is usually in the range of 4 to 6
WT	=	weight of an average human adult (70 kg)
q_1^*	=	carcinogenic potency factor (kg day/mg)
WI	=	average human adult water intake (2 l/day)
FC	=	daily fish consumption (kg fish/day)
L	=	ratio of lipid fraction of fish tissue consumed to 3% assumed by EPA
FM	=	food chain multiplier (from Table 3-1)
BCF	=	bioconcentration factor (mg toxicant/kg fish divided by mg toxicant/L water) for fish with 3% lipid content

Exhibit 3-2. Equation for Deriving Human Health Criteria Based on Carcinogenic Effects

humans.

3.2 Relationship of Section 304(a) Criteria to State Designated Uses

The section 304(a)(1) criteria published by EPA from time to time can be used to support the designated uses found in State standards. The following sections briefly discuss the relationship between certain criteria and individual use classifications. Additional information on this subject also can be found in the "Green Book" (FWPCA, 1968); the "Blue Book" (NAS/NAE, 1973); the "Red Book" USEPA, 1976); the EPA *Water Quality Criteria Documents* (see Appendix I); the"Gold Book" (USEPA, 1986a); and future EPA section 304(a)(1) water quality criteria publications.

Where a water body is designated for more than one use, criteria necessary to protect the most sensitive use must be applied. The following four sections discuss the major types of use categories.

3.2.1 Recreation

Recreational uses of water include activities such as swimming, wading, boating, and fishing. Often insufficient data exist on the human health effects of physical and chemical pollutants, including most toxics, to make a determination of criteria for recreational uses. However, as a general guideline, recreational waters that contain chemicals in concentrations toxic or otherwise harmful to man if ingested, or irritating to the skin or mucous membranes of the human body upon brief immersion, should be avoided. The section 304(a)(1) human health effects criteria based on direct human drinking water intake and fish consumption might provide useful guidance in these circumstances. Also, section 304(a)(1) criteria based on human health effects may be used to support this designated use where fishing is included in the State definition of "recreation." In this latter situation, only the portion of the criterion based on fish consumption should be used. Section 304(a)(1) criteria to protect recreational uses are also available for certain physical, microbiological, and narrative "free from" aesthetic criteria.

Research regarding bacteriological indicators has resulted in EPA recommending that States use *Escherichia coli* or enterococci as indicators of recreational water quality (USEPA, 1986b) rather than fecal coliform because of the better correlation with gastroenteritis in swimmers.

The "Green Book" and "Blue Book" provide additional information on protecting recreational uses such as pH criteria to prevent eye irritation and microbiological criteria based on aesthetic considerations.

3.2.2 Aquatic Life

The section 304(a)(1) criteria for aquatic life should be used directly to support this designated use. If subcategories of this use are adopted (e.g., to differentiate between coldwater and warmwater fisheries), then appropriate criteria should be set to reflect the varying needs of such subcategories.

3.2.3 Agricultural and Industrial Uses

The "Green Book" (FWPCA, 1968) and "Blue Book" (NAS/NAE, 1973) provide some information on protecting agricultural and industrial uses. Section 304(a)(1) criteria for protecting these uses have not been specifically developed for numerous parameters pertaining to these uses, including most toxics. Where criteria have not been specifically developed for these uses, the criteria developed for human health and aquatic life are usually sufficiently stringent to protect these uses. States may also establish criteria specifically designed to protect these uses.

3.2.4 Public Water Supply

The drinking water exposure component of the section 304(a)(1) criteria based on human health effects can apply directly to this use classification. The criteria also may be appropriately modified depending upon whether the specific water supply system falls within the auspices of the Safe Drinking Water Act's (SDWA) regulatory control and the type and level of treatment imposed upon the supply before delivery to the consumer. The SDWA controls the presence of contaminants in finished ("at-the-tap") drinking water.

A brief description of relevant sections of the SDWA is necessary to explain how the Act will work in conjunction with section 304(a)(1) criteria in protecting human health from the effects of toxics due to consumption of water. Pursuant to section 1412 of the SDWA, EPA has promulgated "National Primary Drinking Water Standards" for certain radionuclide, microbiological, organic, and inorganic substances. These standards establish maximum contaminant levels (MCLs), which specify the maximum permissible level of a contaminant in water that may be delivered to a user of a public water system now defined as serving a minimum of 25 people. MCLs are established based on consideration of a range of factors including not only the health effects of the contaminants but also treatment capability, monitoring availability, and costs. Under section 1401(1)(D)(i) of the SDWA, EPA is also allowed to establish the minimum quality criteria for water that may be taken into a public water supply system.

Section 304(a)(1) criteria provide estimates of pollutant concentrations protective of human health, but do not consider treatment technology, costs, and other feasibility factors. The section

304(a)(1) criteria also include fish bioaccumulation and consumption factors in addition to direct human drinking water intake. These numbers were not developed to serve as "at-the-tap" drinking water standards, and they have no regulatory significance under the SDWA. Drinking water standards are established based on considerations, including technological and economic feasibility, not relevant to section 304(a)(1) criteria. Section 304(a)(1) criteria are more analogous to the maximum contaminant level goals (MCLGs) (previously known as RMCLs) under section 1412(b)(1)(B) of the SDWA in which, based upon a report from the National Academy of Sciences, the Administrator should set target levels for contaminants in drinking water at which "no known or anticipated adverse effects occur and which allow an adequate margin of safety." MCLGs do not take treatment, cost, and other feasibility factors into consideration. Section 304(a)(1) criteria are, in concept, related to the health-based goals specified in the MCLGs.

MCLs of the SDWA, where they exist, control toxic chemicals in finished drinking water. However, because of variations in treatment, ambient water criteria may be used by the States as a supplement to SDWA regulations. When setting water quality criteria for public water supplies, States have the option of applying MCLs, section 304(a)(1) human health effects criteria, modified section 304(a)(1) criteria, or controls more stringent than these three to protect against the effects of contaminants by ingestion from drinking water.

For treated drinking water supplies serving 25 people or greater, States must control contaminants down to levels at least as stringent as MCLs (where they exist for the pollutants of concern) in the finished drinking water. However, States also have the options to control toxics in the ambient water by choosing section 304(a)(1) criteria, adjusted section 304(a)(1) criteria resulting from the reduction of the direct drinking water exposure component in the criteria calculation to the extent that the treatment process reduces the level of pollutants, or a more stringent contaminant level than the former three options.

3.3 State Criteria Requirements

Section 131.11(a)(1) of the Regulation requires States to adopt water quality criteria to protect the designated use(s). The State criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use(s). For waters with multiple use designations, the criteria must support the most sensitive use.

In section 131.11, States are encouraged to adopt both numeric and narrative criteria. Aquatic life criteria should protect against both short-term (acute) and long-term (chronic) effects. Numeric criteria are particularly important where the cause of toxicity is known or for protection against pollutants with potential human health impacts or bioaccumulation potential. Numeric water quality criteria may also be the best way to address nonpoint source pollution problems. Narrative criteria can be the basis for limiting toxicity in waste discharges where a specific pollutant can be identified as causing or contributing to the toxicity but where there are no numeric criteria in the State standards. Narrative criteria also can be used where toxicity cannot be traced to a particular pollutant.

Section 131.11(a)(2) requires States to develop implementation procedures which explain how the State will ensure that narrative toxics criteria are met.

To more fully protect aquatic habitats, it is EPA's policy that States fully integrate chemical-specific, whole-effluent, and biological assessment approaches in State water quality programs (see Appendix R). Specifically, each of these three methods can provide a valid assessment of <u>non-attainment</u> of designated aquatic life uses but can rarely demonstrate use <u>attainment</u> separately. Therefore, EPA supports a policy of independent application of these three water quality assessment approaches. Independent application means that the validity of the results of any one of the approaches does not depend on confirmation by one or both of the other methods. This policy is based on the unique attributes, limitations, and program applications of each of the three approaches. Each method alone can provide valid and independently sufficient evidence of non-attainment of water quality standards, irrespective of any evidence, or lack thereof, derived from the other two approaches. The failure of one method to confirm impacts identified by another method does not negate the results of the initial assessment.

It is also EPA's policy that States should designate aquatic life uses that appropriately address biological integrity and adopt biological criteria necessary to protect those uses (see section 3.5.3 and Appendices C, K, and R).

3.4 Criteria for Toxicants

Applicable requirements for State adoption of water quality criteria for toxicants vary depending upon the toxicant. The reason for this is that the 1983 Water Quality Standards Regulation (Appendix A) and the Water Quality Act of 1987 which amended the Clean Water Act (Public Law 100-4) include more specific requirements for the particular toxicants listed pursuant to CWA section 307(a). For regulatory purposes, EPA has translated the 65 compounds and families of compounds listed pursuant to section 307(a) into 126 more specific substances, which EPA refers to as "priority toxic pollutants." The 126 priority toxic pollutants are listed in the WQS regulation and in Appendix P of this Handbook. Because of the more specific requirements for priority toxic pollutants, it is convenient to organize the requirements applicable to State adoption of criteria for toxicants into three categories:

- requirements applicable to priority toxic pollutants that have been the subject of CWA section 304(a)(1) criteria guidance (see section 3.4.1);
- requirements applicable to priority toxic pollutants that have not been the subject of CWA section 304(a)(1) criteria guidance (see section 3.4.1); and
- requirements applicable to all other toxicants (e.g., non-conventional pollutants like ammonia and chlorine) (see section 3.4.2).

3.4.1 Priority Toxic Pollutant Criteria

The criteria requirements applicable to priority toxic pollutants (i.e., the first two categories above) are specified in CWA section 303(c)(2)(B). Section 303(c)(2)(B), as added by the Water Quality Act of 1987, provides that:

> Whenever a State reviews water quality standards pursuant to paragraph (1) of this subsection, or revises or adopts new standards pursuant to this paragraph, such State shall adopt criteria for all toxic pollutants listed pursuant to section 307(a)(1) of this Act for which criteria have been published under section 304(a), the discharge or presence of which in the affected waters could reasonably be expected to interfere with those designated uses adopted by the State, as necessary to support such designated uses. Such criteria shall be specific numerical criteria for such toxic pollutants. Where such numerical criteria are not available, whenever a State reviews water quality standards pursuant to paragraph (1), or revises or adopts new standards pursuant to this paragraph, such State shall adopt criteria based on biological monitoring or assessment methods consistent with information published pursuant to section 304(a)(8). Nothing in this section shall be construed to limit or delay the use of effluent limitations or other permit conditions based on or involving biological monitoring or assessment

methods or previously adopted numerical criteria.

EPA, in devising guidance for section 303(c)(2)(B), attempted to provide States with the maximum flexibility that complied with the express statutory language but also with the overriding congressional objective: prompt adoption and implementation of numeric toxics criteria. EPA believed that flexibility was important so that each State could comply with section 303(c)(2)(B) and to the extent possible, accommodate its existing water quality standards regulatory approach.

General Requirements

To carry out the requirements of section 303(c)(2)(B), whenever a State revises its water quality standards, it must review all available information and data to first determine whether the discharge or the presence of a toxic pollutant is interfering with or is likely to interfere with the attainment of the designated uses of any water body segment.

If the data indicate that it is reasonable to expect the toxic pollutant to interfere with the use, or it actually is interfering with the use, then the State must adopt a numeric limit for the specific pollutant. If a State is unsure whether a toxic pollutant is interfering with, or is likely to interfere with, the designated use and therefore is unsure that control of the pollutant is necessary to support the designated use, the State should undertake to develop sufficient information upon which to make such a determination. Presence of facilities that manufacture or use the section 307(a) toxic pollutants or other information indicating that such pollutants are discharged or will be discharged strongly suggests that such pollutants could be interfering with attaining designated uses. If a State expects the pollutant not to interfere with the designated use, then section 303(1)(2)(B) does not require a numeric standard for that pollutant.

Section 303(c)(2)(B) addresses only pollutants listed as "toxic" pursuant to section 307(a) of the Act, which are codified at 40 CFR 131.36(b). The section 307(a) list contains 65 compounds and families of compounds, which potentially include thousands of specific compounds. The Agency has interpreted that list to include 126 "priority" toxic pollutants for regulatory purposes. Reference in this guidance to toxic pollutants or section 307(a) toxic pollutants refers to the 126 priority toxic pollutants unless otherwise noted. Both the list of priority toxic pollutants and recommended criteria levels are subject to change.

The national criteria recommendations published by EPA under section 304(a) (see section 3.1, above) of the Act include values for both acute and chronic aquatic life protection; only chronic criteria recommendations have been established to

protect human health. To comply with the statute, a State needs to adopt aquatic life and human health criteria where necessary to support the appropriate designated uses. Criteria for the protection of human health are needed for water bodies designated for public water supply. When fish ingestion is considered an important activity, then the human health-related water quality criteria recommendation developed under section 304(a) of the CWA should be used; that is, the portion of the criteria recommendation based on fish consumption. For those pollutants designated as carcinogens, the recommendation for a human health criterion is generally more stringent than the aquatic life criterion for the same pollutant. In contrast, the aquatic life criteria recommendations for noncarcinogens are generally more stringent than the human health recommendations. When a State adopts a human health criterion for a carcinogen, the State needs to select a risk level. EPA has estimated risk levels of 10^{-5}, 10^{-6}, and 10^{-7} in its criteria documents under one set of exposure assumptions. However, the State is not limited to choosing among the risk levels published in the section 304(a) criteria documents, nor is the State limited to the base case exposure assumptions; it must choose the risk level for its conditions and explain its rationale.

EPA generally regulates pollutants treated as carcinogens in the range of 10^{-6} to 10^{-4} to protect average exposed individuals and more highly exposed populations. However, if a State selects a criterion that represents an upper bound risk level less protective than 1 in 100,000 (e.g., 10^{-5}), the State needs to have substantial support in the record for this level. This support focuses on two distinct issues. First, the record must include documentation that the decision maker considered the public interest of the State in selecting the risk level, including documentation of public participation in the decision making process as required by the Water Quality Standards Regulation at 40 CFR 131.20(b). Second, the record must include an analysis showing that the risk level selected, when combined with other risk assessment variables, is a balanced and reasonable estimate of actual risk posed, based on the best and most representative information available. The importance of the estimated actual risk increases as the degree of conservatism in the selected risk level diminishes. EPA carefully evaluates all assumptions used by a State if the State chose to alter any one of the standard EPA assumption values (57 F.R. 60864, December 22, 1993).

EPA does not intend to propose changes to the current requirements regarding the bases on which a State can adopt numeric criteria (40 CFR 131.11(b)(1)). Under EPA's regulation, in addition to basing numeric criteria on EPA's section 304(a) criteria documents, States may also base numeric criteria on site-specific determinations or other scientifically defensible methods.

EPA expects each State to comply with the new statutory requirements in any section 303(c) water quality standards review initiated after enactment of the Water Quality Act of 1987. The structure of section 303(c) is to require States to review their water quality standards at least once each 3 year period. Section 303(c)(2)(B) instructs States to include reviews for toxics criteria whenever they initiate a triennial review. Therefore, even if a State has complied with section 303(c)(2)(B), the State must review its standards each triennium to ensure that section 303(c)(2)(B) requirements continue to be met, considering that EPA may have published additional section 304(a) criteria documents and that the State will have new information on existing water quality and on pollution sources.

It should be noted that nothing in the Act or in the Water Quality Standards Regulation restricts the right of a State to adopt numeric criteria for any pollutant not listed pursuant to section 307(a)(1), and that such criteria may be expressed as concentration limits for an individual pollutant or for a toxicity parameter itself as measured by whole-effluent toxicity testing. However, neither numeric toxic criteria nor whole-effluent toxicity should be used as a surrogate for, or to supersede the other.

State Options

States may meet the requirements of CWA section 303(c)(2)(B) by choosing one of three scientifically and technically sound options (or some combination thereof):

(1) Adopt statewide numeric criteria in State water quality standards for all section 307(a) toxic pollutants for which EPA has developed criteria guidance, regardless of whether the pollutants are known to be present;

(2) Adopt specific numeric criteria in State water quality standards for section 307(a) toxic pollutants as necessary to support designated uses where such pollutants are discharged or are present in the affected waters and could reasonably be expected to interfere with designated uses;

(3) Adopt a "translator procedure" to be applied to a narrative water quality standard provision that prohibits toxicity in receiving waters. Such a procedure is to be used by the State in calculating derived numeric criteria, which shall be used for all purposes under section 303(c) of the CWA. At a minimum, such criteria need to be developed for section 307(a) toxic pollutants, as necessary to support designated uses, where these pollutants are discharged or present in the affected waters and could reasonably be expected to interfere with designated uses.

Option 1 is consistent with State authority to establish water quality standards. Option 2 most directly reflects the CWA requirements and is the option recommended by EPA. Option 3, while meeting the requirements of the CWA, is best suited to supplement numeric criteria from option 1 or 2. The three options are discussed in more detail below.

OPTION 1

Adopt statewide numeric criteria in State water quality standards for all section 307(a) toxic pollutants for which EPA has developed criteria guidance, regardless of whether the pollutants are known to be present.

Pro:

- simple, straightforward implementation
- ensures that States will satisfy statute
- makes maximum uses of EPA recommendations
- gets specific numbers into State water quality standards fast, at first

Con:

- some priority toxic pollutants may not be discharged in State
- may cause unnecessary monitoring by States
- might result in "paper standards"

Option 1 is within a State's legal authority under the CWA to adopt broad water quality standards. This option is the most comprehensive approach to satisfy the statutory requirements because it would include all of the priority toxic pollutants for which EPA has prepared section 304(a) criteria guidance for either or both aquatic life protection and human health protection. In addition to a simple adoption of EPA's section 304(a) guidance as standards, a State must select a risk level for those toxic pollutants which are carcinogens (i.e., that cause or may cause cancer in humans).

Many States find this option attractive because it ensures comprehensive coverage of the priority toxic pollutants with scientifically defensible criteria without the need to conduct a resource-intensive evaluation of the particular segments and pollutants requiring criteria. This option also would not be more costly to dischargers than other options because permit limits would be based only on the regulation of the particular toxic pollutants in their discharges and not on the total listing in the water quality standards. Thus, actual permit limits should be the same under any of the options.

The State may also exercise its authority to use one or more of the techniques for adjusting water quality standards:

- establish or revise designated stream uses based on use attainability analyses (see section 2.9);
- develop site-specific criteria; or
- allow short-term variances (see section 5.3) when appropriate.

All three of these techniques may apply to standards developed under any of the three options discussed in this guidance. It is likely that States electing to use option 1 will rely more on variances because the other two options are implemented with more site-specific data being available. It should be noted, however, that permits issued pursuant to such water quality variances still must comply with any applicable antidegradation and antibacksliding requirements.

OPTION 2

Adopt specific numeric criteria in State water quality standards for section 307(a) toxic pollutants as necessary to support designated uses where such pollutants are discharged or are present in the affected waters and could reasonably be expected to interfere with designated uses.

Pro:

- directly reflects statutory requirement
- standards based on demonstrated need to control problem pollutants
- State can use EPA's section 304(a) national criteria recommendations or other scientifically acceptable alternative, including site-specific criteria
- State can consider current or potential toxic pollutant problems
- State can go beyond section 307(a) toxics list, as desired

Con:

- may be difficult and time consuming to determine if, and which, pollutants are interfering with the designated use
- adoption of standards can require lengthy debates on correct criteria limit to be included in standards
- successful State toxic control programs based on narrative criteria may be halted or slowed as the State applies its limited resources to developing numeric standards
- difficult to update criteria once adopted as part of standards
- to be absolutely technically defensible, may need site-specific criteria in many situations, leading to a large workload for regulatory agency

EPA recommends that a State use this option to meet the statutory requirement. It directly reflects all the Act's requirements and is flexible, resulting in adoption of numeric water quality standards as needed. To assure that the State is capable of dealing with new problems as they arise, EPA also recommends that States adopt a translator procedure the same as, or similar to, that described in option 3, but applicable to all chemicals causing toxicity and not just priority pollutants as is the case for option 3.

Beginning in 1988, EPA provided States with candidate lists of priority toxic pollutants and water bodies in support of CWA section 304(l) implementation. These lists were developed because States were required to evaluate existing and readily available water-related data to comply with section 304(l), 40 CFR 130.10(d). A similar "strawman" analysis of priority pollutants potentially requiring adoption of numeric criteria under section 303(c)(2)(B) was furnished to most States in September or October of 1990 for their use in ongoing and subsequent triennial reviews. The primary differences between the "strawman" analysis and the section 304(l) candidate lists were that the "strawman" analysis (1) organized the results by chemical rather than by water body, (2) included data for certain STORET monitoring stations that were not used in constructing the candidate lists, (3) included data from the Toxics Release Inventory database, and (4) did not include a number of data sources used in preparing the candidate lists (e.g., those, such as fish kill information, that did not provide chemical-specific information).

EPA intends for States, at a minimum, to use the information gathered in support of section 304(l) requirements as a starting point for identifying (1) water segments that will need new and/or revised water quality standards for section 307(a) toxic pollutants, and (2) which priority toxic pollutants require adoption of numeric criteria. In the longer term, EPA expects similar determinations to occur during each triennial review of water quality standards as required by section 303(c).

In identifying the need for numeric criteria, EPA is encouraging States to use information and data such as:

- presence or potential construction of facilities that manufacture or use priority toxic pollutants;
- ambient water monitoring data, including those for sediment and aquatic life (e.g., fish tissue data);
- NPDES permit applications and permittee self-monitoring reports;
- effluent guideline development documents, many of which contain section 307(a)(1) priority pollutant scans;
- pesticide and herbicide application information and other records of pesticide or herbicide inventories;
- public water supply source monitoring data noting pollutants with Maximum Contaminant Levels (MCLs); and
- any other relevant information on toxic pollutants collected by Federal, State, interstate agencies, academic groups, or scientific organizations.

States are also expected to take into account newer information as it became available, such as information in annual reports from the Toxic Chemical Release Inventory requirements of the Emergency Planning and Community Right-To-Know Act of 1986 (Title III, Public Law 99-499).

Where the State's review indicates a reasonable expectation of a problem from the discharge or presence of toxic pollutants, the State should identify the pollutant(s) and the relevant segment(s). In making these determinations, States should use their own EPA-approved criteria or existing EPA water quality criteria for purposes of segment identification. After the review, the State may use other means to establish the final criterion as it revises its standards.

As with option 1, a State using option 2 must follow all its legal and administrative requirements for adoption of water quality standards. Since the resulting numeric criteria are part of a State's water quality standards, they are required to be submitted by the State to EPA for review and either approval or disapproval.

EPA believes this option offers the State optimum flexibility. For section 307(a) toxic pollutants adversely affecting designated uses, numeric criteria are available for permitting purposes. For other situations, the State has the option of defining site-specific criteria.

OPTION 3

Adopt a procedure to be applied to the narrative water quality standard provision that prohibits toxicity in receiving waters. Such a procedure would be used by a State in calculating derived numeric criteria to be used for all purposes of water quality criteria under section 303(c) of the CWA. At a minimum such criteria need to be derived for section 307(a) toxic pollutants where the discharge or presence of such pollutants in the affected waters could reasonably be expected to interfere with designated uses, as necessary to support such designated uses.

Pro:

- allows a State flexibility to control priority toxic pollutants
- reduces time and cost required to adopt specific numeric criteria as water quality standards regulations
- allows immediate use of latest scientific information available at the time a State needs to develop derived numeric criteria
- revisions and additions to derived numeric criteria can be made without need to revise State law
- State can deal more easily with a situation where it did not establish water quality standards for the section 307(a) toxic pollutants during the most recent triennial review
- State can address problems from non-section 307(a) toxic pollutants

Con:

- EPA is currently on notice that a derived numeric criterion may invite legal challenge
- once the necessary procedures are adopted to enhance legal defensibility (e.g., appropriate scientific methods and public participation and review), actual savings in time and costs may be less than expected
- public participation in development of derived numeric criteria may be limited when such criteria are not addressed in a hearing on water quality standards

EPA believes that adoption of a narrative standard along with a translator mechanism as part of a State's water quality standard satisfies the substantive requirements of the statute. These criteria are subject to all the State's legal and administrative requirements for adoption of standards plus review and either approval or disapproval by EPA, and result in the development of derived numeric criteria for specific section 307(a) toxic pollutants. They are also subject to an opportunity for public participation. Nevertheless, EPA believes the most appropriate use of option 3 is as a supplement to either option 1 or 2. Thus, a State would have formally adopted numeric criteria for toxic pollutants that occur frequently; that have general applicability statewide for inclusion in NPDES permits, total maximum daily loads, and waste load allocations; and that also would have a sound and predictable method to develop additional numeric criteria as needed. This combination of options provides a complete regulatory scheme.

Although the approach in option 3 is similar to that currently allowed in the Water Quality Standards Regulation (40 CFR 131.11(a)(2)), this guidance discusses several administrative and scientific requirements that EPA believes are necessary to comply with section 303(c)(2)(B).

(1) The Option 3 Procedure Must Be Used To Calculate Derived Numeric Water Quality Criteria

States must adopt a specific procedure to be applied to a narrative water quality criterion. To satisfy section 303(c)(2)(B), this procedure shall be used by the State in calculating derived numeric criteria, which shall be used for all purposes under section 303(c) of the CWA. Such criteria need to be developed for section 307(a) toxic pollutants as necessary to support designated uses, where these pollutants are discharged or are present in the affected waters and could reasonably be expected to interfere with the designated uses.

To assure protection from short-term exposures, the State procedure should ensure development of derived numeric water quality criteria based on valid acute aquatic toxicity tests that are lethal to half the affected organisms (LC50) for the species representative of or similar to those found in the State. In addition, the State procedure should ensure development of derived numeric water quality criteria for protection from chronic exposure by using an appropriate safety factor applicable to this acute limit. If there are saltwater components to the State's aquatic resources, the State should establish appropriate derived numeric criteria for saltwater in addition to those for freshwater.

The State's documentation of the tests should include a detailed discussion of its quality control and quality assurance procedures. The State should also include a description (or reference existing technical agreements with EPA) of the procedure it will use to calculate derived acute and chronic numeric criteria from the test data, and how these derived criteria will be used as the basis for deriving appropriate TMDLs, WLAs, and NPDES permit limits.

As discussed above, the procedure for calculating derived numeric criteria needs to protect aquatic life from both acute and chronic exposure to specific chemicals. Chronic aquatic life criteria are to be met at the edge of the mixing zone. The acute criteria are to be met (1) at the end-of-pipe if mixing is not rapid and complete and a high rate diffuser is not present; or (2) after mixing if mixing is rapid and complete or a high rate diffuser is present. (See EPA's *Technical Support Document for Water Quality-based Toxics Control*, USEPA 1991a.)

EPA has not established a national policy specifying the point of application in the receiving water to be used with human health criteria. However, EPA has approved State standards that apply human health criteria for fish consumption at the mixing zone boundary and/or apply the criteria for drinking water consumption, at a minimum, at the point of use. EPA has also proposed more stringent requirements for the application of human health criteria for highly bioaccumulative pollutants in the *Water Quality guidance for the Great Lakes System* (50 F.R. 20931, 21035, April 16, 1993) including elimination of mixing zones.

In addition, the State should also include an indication of potential bioconcentration or bioaccumulation by providing for:

- laboratory tests that measure the steady-state bioconcentration rate achieved by a susceptible organism; and/or

- field data in which ambient concentrations and tissue loads are measured to give an appropriate factor.

In developing a procedure to be used in calculating derived numeric criteria for the protection of aquatic life, the State should consider the potential impact that bioconcentration has on aquatic and terrestrial food chains.

The State should also use the derived bioconcentration factor and food chain multiplier to calculate chronically protective numeric criteria for humans that consume aquatic organisms. In calculating this derived numeric criterion, the State should indicate data requirements to be met when dealing with either threshold (toxic) or non-threshold (carcinogenic) compounds. The State should describe the species and the minimum number of tests, which may generally be met by a single mammalian chronic test if it is of good quality and if the weight of evidence indicates that the results are reasonable. The State should provide the method to calculate a derived numeric criterion from the appropriate test result.

Both the threshold and non-threshold criteria for protecting human health should contain exposure assumptions, and the State procedure should be used to calculate derived numeric criteria that address the consumption of water, consumption of fish, and combined consumption of both water and fish. The State should provide the assumptions regarding the amount of fish and the quantity of water consumed per person per day, as well as the rationale used to select the assumptions. It needs to include the number of tests, the species necessary to establish a dose-response relationship, and the procedure to be used to calculate the derived numeric criteria. For non-threshold contaminants, the State should specify the model used to extrapolate to low dose and the risk level. It should also address incidental exposure from other water sources (e.g., swimming). When calculating derived numeric criteria for multiple exposure to pollutants, the State should consider additive effects, especially for carcinogenic substances, and should factor in the contribution to the daily intake of toxicants from other sources (e.g., food, air) when data are available.

(2) The State Must Demonstrate That the Procedure Results in Derived Numeric Criteria Are Protective

The State needs to demonstrate that its procedures for developing criteria, including translator methods, yield fully protective criteria for human health and for aquatic life. EPA's review process will proceed according to EPA's regulation of 40 CFR 131.11, which requires that criteria be based on sound scientific rationale and be protective of all designated uses. EPA will use the expertise and experience it has gained in developing section 304(a) criteria for toxic pollutants by application of its own translator method (USEPA, 1980b; USEPA, 1985b).

Once EPA has approved the State's procedure, the Agency's review of derived numeric criteria, for example, for pollutants other than section 307(a) toxic pollutants resulting from the State's procedure, will focus on the adequacy of the data base rather than the calculation method. EPA also encourages States to apply such a procedure to calculate derived numeric criteria to be used as the basis for deriving permit limitations for nonconventional pollutants that also cause toxicity.

(3) The State Must Provide Full Opportunity for Public Participation in Adoption of the Procedure

The Water Quality Standards Regulation requires States to hold public hearings to review and revise water quality standards in accordance with provisions of State law and EPA's Public Participation Regulation (40 CFR 25). Where a State plans to adopt a procedure to be applied to the narrative criterion, it must provide full opportunity for public participation in the development and adoption of the procedure as part of the State's water quality standards.

While it is not necessary for the State to adopt each derived numeric criterion into its water quality standards and submit it to EPA for review and approval, EPA is very concerned that all affected parties have adequate opportunity to participate in the development of a derived

numeric criterion even though it is not being adopted directly as a water quality standard.

A State can satisfy the need to provide an opportunity for public participation in the development of derived numeric criteria in several ways, including:

- a specific hearing on the derived numeric criterion;

- the opportunity for a public hearing on an NPDES permits as long as public notice is given that a criterion for a toxic pollutant as part of the permit issuance is being contemplated; or

- a hearing coincidental with any other hearing as long as it is made clear that development of a specific criterion is also being undertaken.

For example, as States develop their lists and individual control strategies (ICSs) under section 304(1), they may seek full public participation. NPDES regulations also specify public participation requirements related to State permit issuance. Finally, States have public participation requirements associated with Water Quality Management Plan updates. States may take advantage of any of these public participation requirements to fulfill the requirement for public review of any resulting derived numeric criteria. In such cases, the State must give prior notice that development of such criteria is under consideration.

(4) The Procedure Must Be Formally Adopted and Mandatory

Where a State elects to supplement its narrative criterion with an accompanying implementing procedure, it must formally adopt such a procedure as a part of its water quality standards. The procedure must be used by the State to calculate derived numeric criteria that will be used as the basis for all standards' purposes, including the following: developing TMDLs, WLAs, and limits in NPDES permits; determining whether water use designations are being met; and identifying potential nonpoint source pollution problems.

(5) The Procedure Must Be Approved by EPA as Part of the State's Water Quality Standards Regulation

To be consistent with the requirements of the Act, the State's procedure to be applied to the narrative criterion must be submitted to EPA for review and approval, and will become a part of the State's water quality standards. (See 40 CFR 131.21 for further discussion.) This requirement may be satisfied by a reference in the standards to the procedure, which may be contained in another document, which has legal effect and is binding on the State, and all the requirements for public review, State implementation, and EPA review and approval are satisfied.

Criteria Based on Biological Monitoring

For priority toxic pollutants for which EPA has not issued section 304(a)(1) criteria guidance, CWA section 303(c)(2)(B) requires States to adopt criteria based on biological monitoring or assessment methods. The phrase "biological monitoring or assessment methods" includes:

- whole-effluent toxicity control methods;

- biological criteria methods; or

- other methods based on biological monitoring or assessment.

The phrase "biological monitoring or assessment methods" in its broadest sense also includes criteria developed through translator procedures. This broad interpretation of that phrase is consistent with EPA's policy of applying chemical-specific, biological, and whole-effluent toxicity methods independently in an integrated toxics control program. It is also consistent with the intent of Congress to expand State standards programs beyond chemical-specific approaches.

States should also consider developing protocols to derive and adopt numeric criteria for priority toxic pollutants (or other pollutants) where EPA has not issued section 304(a) criteria guidance. The State should consider available laboratory toxicity test data that may be sufficient to support derivation of chemical-specific criteria. Existing data need not be as comprehensive as that required to meet EPA's 1985 guidelines in order for a State to use its own protocols to derive criteria. EPA has described such protocols in the proposed *Water Quality Guidance for the Great Lakes System* (58 F.R. 20892, at 21016, April 16, 1993.) This is particularly important where other components of a State's narrative criterion implementation procedure (e.g., WET controls or biological criteria) may not ensure full protection of designated uses. For some pollutants, a combination of chemical-specific and other approaches is necessary (e.g., pollutants where bioaccumulation in fish tissue or water consumption by humans is a primary concern).

Biologically based monitoring or assessment methods serve as the basis for control where no specific numeric criteria exist or where calculation or application of pollutant-by-pollutant criteria appears infeasible. Also, these methods may serve as a supplemental measurement of attainment of water quality standards in addition to numeric and narrative criteria. The requirement for both numeric criteria and biologically based methods demonstrates that section 303(c)(2)(B) contemplates that States develop a comprehensive toxics control program regardless of the status of EPA's section 304(a) criteria.

The whole-effluent toxicity (WET) testing procedure is the principal biological monitoring guidance developed by EPA to date. The purpose of the WET procedure is to control point source dischargers of toxic pollutants. The procedure is particularly useful for monitoring and controlling the toxicity of complex effluents that may not be well controlled through chemical-specific numeric criteria. As such, biologically based effluent testing procedures are a necessary component of a State's toxics control program under section 303(c)(2)(B) and a principal means for implementing a State's narrative "free from toxics" standard.

Guidance documents EPA considers to serve the purpose of section 304(a)(8) include the *Technical Support Document for Water Quality-based Toxics Control* (USEPA, 1991a; *Guidelines for Deriving National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (Appendix H); *Guidelines and Methodology Used in the Preparation of Health Effect Assessment Chapters of the Consent Decree Water Criteria Documents* (Appendix J); *Methods for Measuring Acute Toxicity of Effluents to Freshwater and Marine Organisms* (USEPA, 1991d); *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* (USEPA, 1991e); and *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms* (USEPA, 1991f).

3.4.2 Criteria for Nonconventional Pollutants

Criteria requirements applicable to toxicants that are not priority toxic pollutants (e.g., ammonia and chlorine), are specified in the 1983 Water Quality Standards Regulation (see 40 CFR 131.11). Under these requirements, States must adopt criteria based on sound scientific rationale that cover sufficient parameters to protect designated uses. Both numeric and narrative criteria (discussed in sections 3.5.1 and 3.5.2, below) may be applied to meet these requirements.

3.5 Forms of Criteria

States are required to adopt water quality criteria, based on sound scientific rationale, that contain sufficient parameters or constituents to protect the designated use. EPA believes that an effective State water quality standards program should include both parameter-specific (e.g., ambient numeric criteria) and narrative approaches.

3.5.1 Numeric Criteria

Numeric criteria are required where necessary to protect designated uses. Numeric criteria to protect aquatic life should be developed to address both short-term (acute) and long-term (chronic) effects. Saltwater species, as well as freshwater species, must be adequately protected. Adoption of numeric criteria is particularly important for toxicants known to be impairing surface waters and for toxicants with potential human health impacts (e.g., those with high bioaccumulation potential). Human health should be protected from exposure resulting from consumption of water and fish or other aquatic life (e.g., mussels, crayfish). Numeric water quality criteria also are useful in addressing nonpoint source pollution problems.

In evaluating whether chemical-specific numeric criteria for toxicants that are not priority toxic pollutants are required, States should consider whether other approaches (such as whole-effluent toxicity criteria or biological controls) will ensure full protection of designated uses. As mentioned above, a combination of independent approaches may be required in some cases to support the designated uses and comply with the requirements of the Water Quality Standards Regulation (e.g., pollutants where bioaccumulation in fish tissue or water consumption by humans is a primary concern).

3.5.2 Narrative Criteria

To supplement numeric criteria for toxicants, all States have also adopted narrative criteria for toxicants. Such narrative criteria are statements that describe the desired water quality goal, such as the following:

> All waters, including those within mixing zones, shall be free from substances attributable to wastewater discharges or other pollutant sources that:
>
> (1) Settle to form objectional deposits;
>
> (2) Float as debris, scum, oil, or other matter forming nuisances;
>
> (3) Produce objectionable color, odor, taste, or turbidity;
>
> (4) Cause injury to, or are toxic to, or produce adverse physiological responses in humans, animals, or plants; or
>
> (5) Produce undesirable or nuisance aquatic life (54 F.R. 28627, July 6, 1989).

EPA considers that the narrative criteria apply to all designated uses at all flows and are necessary to meet the statutory requirements of section 303(c)(2)(A) of the CWA.

Narrative toxic criteria (No. 4, above) can be the basis for establishing chemical-specific limits for waste discharges where a specific pollutant can be identified as causing or contributing to the toxicity and the State has not adopted chemical-specific numeric criteria. Narrative toxic criteria are cited as a basis for establishing whole-effluent toxicity controls in EPA permitting regulations at 40 CFR 122.44(d)(1)(v).

To ensure that narrative criteria for toxicants are attained, the Water Quality Standards Regulation requires States to develop implementation procedures (see 40 CFR 131.11(a)(2)). Such implementation procedures (Exhibit 3-3) should address all mechanisms to be used by the State to ensure that narrative criteria are attained. Because implementation of chemical-specific numeric criteria is a key component of State toxics control programs, narrative criteria implementation procedures must describe or reference the State's procedures to implement such chemical-specific numeric criteria (e.g., procedures for establishing chemical-specific permit limits under the NPDES permitting

State implementation procedures for narrative toxics criteria should describe the following:

- Specific, scientifically defensible methods by which the State will implement its narrative toxics standard for all toxicants, including:

  - methods for chemical-specific criteria, including methods for applying chemical-specific criteria in permits, developing or modifying chemical-specific criteria via a "translator procedure" (defined and discussed below), and calculating site-specific criteria based on local water chemistry or biology);

  - methods for developing and implementing whole-effluent toxicity criteria and/or controls; and

  - methods for developing and implementing biological criteria.

- How these methods will be integrated in the State's toxics control program (i.e., how the State will proceed when the specified methods produce conflicting or inconsistent results).

- Application criteria and information needed to apply numerical criteria, for example:

  - methods the State will use to identify those pollutants to be regulated in a specific discharge;

  - an incremental cancer risk level for carcinogens;

  - methods for identifying compliance thresholds in permits where calculated limits are below detection;

  - methods for selecting appropriate hardness, pH, and temperature variables for criteria expressed as functions;

  - methods or policies controlling the size and in-zone quality of mixing zones;

  - design flows to be used in translating chemical-specific numeric criteria for aquatic life and human health into permit limits; and

  - other methods and information needed to apply standards on a case-by-case basis.

Exhibit 3-3. Components of a State Implementation Procedure for Narrative Toxics Criteria

program). Implementation procedures must also address State programs to control whole-effluent toxicity (WET) and may address programs to implement biological criteria, where such programs have been developed by the State. Implementation procedures therefore serve as umbrella documents that describe how the State's various toxics control programs are integrated to ensure adequate protection for aquatic life and human health and attainment of the narrative toxics criterion. In essence, the procedure should apply the "independent application" principle, which provides for independent evaluations of attainment of a designated use based on chemical-specific, whole-effluent toxicity, and biological criteria methods (see section 3.5.3 and Appendices C, K, and R).

EPA encourages, and may ultimately require, State implementation procedures to provide for implementation of biological criteria. However, the regulatory basis for requiring whole-effluent toxicity (WET) controls is clear. EPA regulations at 40 CFR 122.44(d)(1)(v) require NPDES permits to contain WET limits where a permittee has been shown to cause, have the reasonable potential to cause, or contribute to an in-stream excursion of a narrative criterion. Implementation of chemical-specific controls is also required by EPA regulations at 40 CFR 122.44(d)(1). State implementation procedures should, at a minimum, specify or reference methods to be used in implementing chemical-specific and whole-effluent toxicity-based controls, explain how these methods are integrated, and specify needed application criteria.

In addition to EPA's regulation at 40 CFR 131, EPA has regulations at 40 CFR 122.44 that cover the National Surface Water Toxics Control Program. These regulations are intrinsically linked to the requirements to achieve water quality standards, and specifically address the control of pollutants both with and without numeric criteria. For example, section 122.44(d)(1)(vi) provides the permitting authority with several options for establishing effluent limits when a State does not have a chemical-specific numeric criterion for a pollutant present in an effluent at a concentration that causes or contributes to a violation of the State's narrative criteria.

3.5.3 Biological Criteria

The Clean Water Act of 1972 directs EPA to develop programs that will evaluate, restore, and maintain the chemical, physical, and biological integrity of the Nation's waters. In response to this directive, States and EPA have implemented chemically based water quality programs that address significant water pollution problems. However, over the past 20 years, it has become apparent that these programs alone cannot identify and address all surface water pollution problems. To help create a more comprehensive program, EPA is setting a priority for the development of biological criteria as part of State water quality standards. This effort will help States and EPA (1) achieve the biological integrity objective of the CWA set forth in section 101, and (2) comply with the statutory requirements under sections 303 and 304 of the Act (see Appendices C and K).

Regulatory Bases for Biocriteria

The primary statutory basis for EPA's policy that States should develop biocriteria is found in sections 101(a) and 303(c)(2)(B) of the Clean Water Act. Section 101(a) of the CWA gives the general goal of biological criteria. It establishes as the objective of the Act the restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters. To meet this objective, water quality criteria should address biological integrity. Section 101(a) includes the interim water quality goal for the protection and propagation of fish, shellfish, and wildlife.

Section 304(a) of the Act provides the legal basis for the development of informational criteria, including biological criteria. Specific directives for the development of regulatory biocriteria can be found in section 303(c), which requires EPA to develop criteria based on biological assessment methods when numerical criteria are not established.

Section 304(a) directs EPA to develop and publish water quality criteria and information on methods for measuring water quality and establishing water quality criteria for toxic pollutants on bases other than pollutant-by-pollutant, including biological monitoring and assessment methods that assess:

- the effects of pollutants on aquatic community components (". . . plankton, fish, shellfish, wildlife, plant life . . .") and community attributes (". . . biological community diversity, productivity, and stability . . .") in any body of water; and

- factors necessary " . . . to restore and maintain the chemical, physical, and biological integrity of all navigable waters . . ." for " . . . the protection of shellfish, fish, and wildlife for classes and categories of receiving waters . . . ."

Once biocriteria are formally adopted into State standards, biocriteria and aquatic life use designations serve as direct, legal endpoints for determining aquatic life use attainment/non-attainment. CWA section 303(c)(2)(B) provides that when numeric criteria are not available, States shall adopt criteria for toxics based on biological monitoring or assessment methods; biocriteria can be used to meet this requirement.

Development and Implementation of Biocriteria

Biocriteria are numerical values or narrative expressions that describe the expected reference biological integrity of aquatic communities inhabiting waters of a designated aquatic life use. In the most desirable scenario, these would be waters that are either in pristine condition or minimally impaired. However, in some areas these conditions no longer exist and may not be attainable. In these situations, the reference biological communities represent the best attainable conditions. In either case, the reference conditions then become the basis for developing biocriteria for major surface water types (streams, rivers, lakes, wetlands, estuaries, or marine waters).

Biological criteria support designated aquatic life use classifications for application in State standards (see chapter 2). Each State develops its own designated use classification system based on the generic uses cited in the Act (e.g., protection and propagation of fish, shellfish, and wildlife). Designated uses are intentionally general. However, States may develop subcategories within use designations to refine and clarify the use class. Clarification of the use class is particularly helpful when a variety of surface waters with distinct characteristics fit within the same use class, or do not fit well into any category.

For example, subcategories of aquatic life uses may be on the basis of attainable habitat (e.g., coldwater versus warmwater stream systems as represented by distinctive trout or bass fish communities, respectively). Special uses may also be designated to protect particularly unique, sensitive, or valuable aquatic species, communities, or habitats.

Resident biota integrate multiple impacts over time and can detect impairment from known and unknown causes. Biological criteria can be used to verify improvement in water quality in response to regulatory and other improvement efforts and to detect new or continuing degradation of waters. Biological criteria also provide a framework for developing improved best management practices and management measures for nonpoint source impacts. Numeric biological criteria can provide effective monitoring criteria for more definitive evaluation of the health of an aquatic ecosystem.

The assessment of the biological integrity of a water body should include measures of the structure and function of the aquatic community within a specified habitat. Expert knowledge of the system is required for the selection of appropriate biological components and measurement indices. The development and implementation of biological criteria requires:

- selection of surface waters to use in developing reference conditions for each designated use;

- measurement of the structure and function of aquatic communities in reference surface waters to establish biological criteria;

- measurement of the physical habitat and other environmental characteristics of the water resource; and

- establishment of a protocol to compare the biological criteria to biota in comparable test waters to determine whether impairment has occurred.

These elements serve as an interactive network that is particularly important during early development of biological criteria where rapid accumulation of information is effective for refining both designated uses and developing biological criteria values and the supporting biological monitoring and assessment techniques.

3.5.4 Sediment Criteria

While ambient water quality criteria are playing an important role in assuring a healthy aquatic environment, they alone have not been sufficient to ensure appropriate levels of environmental protection. Sediment contamination, which can involve deposition of toxicants over long periods of time, is responsible for water quality impacts in some areas.

EPA has authority to pursue the development of sediment criteria in streams, lakes and other waters of the United States under sections 104 and 304(a)(1) and (2) of the CWA as follows:

- section 104(n)(1) authorizes the Administrator to establish national programs that study the effects of pollution, including sedimentation, in estuaries on aquatic life;

- section 304(a)(1) directs the Administrator to develop and publish criteria for water quality, including information on the factors affecting rates of organic and inorganic sedimentation for varying types of receiving waters;

- section 304(a)(2) directs the Administrator to develop and publish information on, among other issues, "the factors necessary for the protection and propagation of shellfish, fish, and wildlife for classes and categories of receiving waters. . . ."

To the extent that sediment criteria could be developed that address the concerns of the section 404(b)(1) Guidelines for discharges of dredged or fill material under the CWA or the Marine Protection, Research, and Sanctuaries Act, they could also be incorporated into those regulations.

EPA's current sediment criteria development effort, as described below, focuses on criteria for the protection of aquatic life. EPA anticipates potential future expansion of this effort to include sediment criteria for the protection of human health.

Chemical Approach to Sediment Criteria Development

Over the past several years, sediment criteria development activities have centered on evaluating and developing the Equilibrium Partitioning Approach for generating sediment criteria. The Equilibrium Partitioning Approach focuses on predicting the chemical interaction between sediments and contaminants. Developing an understanding of the principal factors that influence the sediment/contaminant interactions will allow predictions to be made regarding the level of contaminant concentration that benthic and other organisms may be exposed to. Chronic water quality criteria, or possibly other toxicological endpoints, can then be used to predict potential biological effects. In addition to the development of sediment criteria, EPA is also working to develop a standardized sediment toxicity test that could be used with or independently of sediment criteria to assess chronic effects in fresh and marine waters.

Equilibrium Partitioning (EqP) Sediment Quality Criteria (SQC) are the U.S. Environmental Protection Agency's best recommendation of the concentration of a substance in sediment that will not unacceptably affect benthic organisms or their uses.

Methodologies for deriving effects-based SQC vary for different classes of compounds. For non-ionic organic chemicals, the methodology requires normalization to organic carbon. A methodology for deriving effects-based sediment criteria for metal contaminants is under development and is expected to require normalization to acid volatile sulfide. EqP SQC values can be derived for varying degrees of uncertainty and levels of protection, thus permitting use for ecosystem protection and remedial programs.

Application of Sediment Criteria

SQC would provide a basis for making more informed decisions on the environmental impacts of contaminated sediments. Existing sediment assessment methodologies are limited in their ability to identify chemicals of concern, responsible parties, degree of contamination, and zones of impact. To make the most informed decisions, EPA believes that a comprehensive approach using SQC and biological test methods is preferred.

Sediment criteria will be particularly valuable in site-monitoring applications where sediment contaminant concentrations are gradually approaching a criterion over time or as a preventive tool to ensure that point and nonpoint sources of contamination are controlled and that uncontaminated sediments remain uncontaminated. Also comparison of field measurements to sediment criteria will be a reliable method for providing early warning of a potential problem. An early warning would provide an opportunity to take corrective action before adverse impacts occur. For the reasons mentioned above, it has been identified that SQC are essential to resolving key contaminated sediment and source control issues in the Great Lakes.

Specific Applications

Specific applications of sediment criteria are under development. The primary use of EqP-based sediment criteria will be to assess risks associated with contaminants in sediments. The various offices and programs concerned with contaminated sediment have different regulatory mandates and, thus, have different needs and areas for potential application of sediment criteria. Because each regulatory need is different, EqP-based sediment quality criteria designed specifically to meet the needs of one office or program may have to be implemented in different ways to meet the needs of another office or program.

One mode of application of EqP-based numerical sediment quality criteria would be in a tiered approach. In such an application, when contaminants in sediments exceed the sediment quality criteria the sediments would be considered as causing unacceptable impacts. Further testing may or may not be required depending on site-specific conditions and the degree in which a criterion has been violated. (In locations where contamination significantly exceeds a criterion, no additional testing would be required. Where sediment contaminant levels are close to a criterion, additional testing might be necessary.) Contaminants in a sediment at concentrations less than the sediment criterion would not be of concern. However, in some cases the sediment could not be considered safe because it might contain other contaminants above safe levels for which no sediment criteria exist. In addition, the synergistic, antagonistic, or additive effects of several contaminants in the sediments may be of concern.

Additional testing in other tiers of an evaluation approach, such astoxicity tests, could be required to determine if the sediment is safe. It is likely that such testing would incorporate site-specific considerations. Examples of specific applications of sediment criteria after they are developed include the following:

- Establish permit limits for point sources to ensure that uncontaminated sediments remain uncontaminated or sediments already contaminated have an opportunity to cleanse themselves. Of course, this would occur only after criteria and the means to tie point sources to sediment contamination are developed.

- Establish target levels for nonpoint sources of sediment contamination.

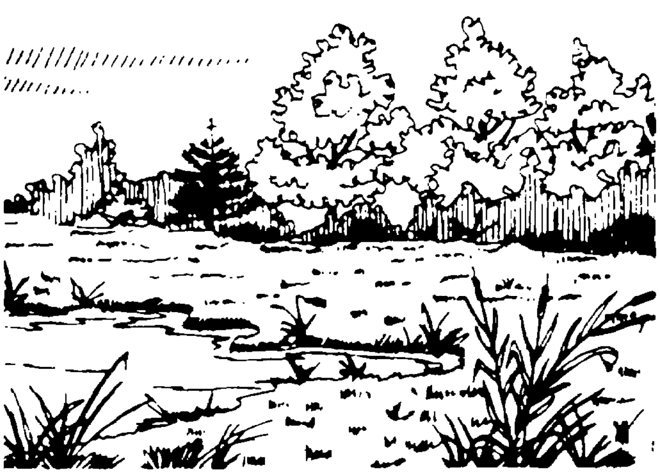
- For remediation activities, SQC would be valuable in identifying:

  - need for remediation,

  - spatial extent of remediation area,

  - benefits derived from remediation activities,

  - responsible parties,



  - impacts of depositing contaminated sediments in water environments, and

  - success of remediation activities.

In tiered testing sediment evaluation processes, sediment criteria and biological testing procedures work very well together.

Sediment Criteria Status

Science Advisory Board Review

The Science Advisory Board has completed a second review of the EqP approach to deriving sediment quality criteria for non-ionic contaminants. The November 1992 report (USEPA, 1992c) endorses the EqP approach to deriving criteria as ". . . sufficiently valid to be used in the regulatory process if the uncertainty associated with the method is considered, described, and incorporated," and that "EPA should . . . establish criteria on the basis of present knowledge within the bounds of uncertainty. . . ."

The Science Advisory Board also identified the need for ". . . a better understanding of the uncertainty around the assumptions inherent in the approach, including assumptions of equilibrium, bioavailability, and kinetics, all critical to the application of the EqP."

Sediment Criteria Documents and Application Guidance

EPA efforts at producing sediment criteria documents are being directed first toward phenanthrene, fluoranthene, dieldrin, acenaphthene, and endrin. Efforts are also being directed towards producing a guidance document on the derivation and interpretation of sediment quality criteria. The criteria documents were announced in the *Federal Register* in January 1994; the public comment period ended June 1994. Final documents and implementation guidance should be available in early 1996.

Methodology for Developing Sediment Criteria for Metal Contaminants

EPA is proceeding to develop a methodology for calculating sediment criteria for benthic toxicity to metal contaminants, with key work focused on identifying and understanding the role of acid volatile sulfides (AVS), and other binding factors, in controlling the bioavailability of metal contaminants. A variety of field and laboratory verification studies are under way to add additional support to the methodology. Standard AVS sampling and analytical procedures are under development. Presentation of the metals methodology to the SAB for review is anticipated for Fall 1994.

Biological Approach to Sediment Criteria Development

Under the Contaminated Sediment Management Strategy, EPA programs have committed to using consistent biological methods to determine if sediments are contaminated. In the water program, these biological methods will be used as a complement to the sediment-chemical criteria under development. The biological methods consist of both toxicity and bioaccumulation tests. Freshwater and saltwater benthic species, selected to represent the sensitive range of species' responses to toxicity, are used in toxicity tests to measure sediment toxicity. Insensitive freshwater and saltwater benthic species that form the base of the food chain are used in toxicity tests to measure the bioaccumulation potential of sediment. In FY 1994, acute toxicity tests and bioaccumulation tests selected by all the Agency programs should be standardized and available for use. Training for States and EPA Regions on these methods is expected to begin in FY1995.

In the next few years, research will be conducted to develop standardized chronic toxicity tests for sediment as well as toxicity identification evaluation (TIE) methods. The TIE approach will be used to identify the specific chemicals in a sediment causing acute or chronic toxicity in the test organisms. Under the Contaminated Sediment Management Strategy, EPA's programs have also agreed to incorporate these chronic toxicity and TIE methods into their sediment testing when they are available.

3.5.5 Wildlife Criteria

Terrestrial and avian species are useful as sentinels for the health of the ecosystem as a whole. In many cases, damage to wildlife indicates that the ecosystem itself is damaged. Many wildlife species that are heavily dependent on the aquatic food web reflect the health of aquatic systems. In the case of toxic chemicals, terminal predators such as otter, mink, gulls, terns, eagles, ospreys, and turtles are useful as integrative indicators of the status or health of the ecosystem.

Statutory and Regulatory Authority

Section 101(a)(2) of the CWA sets, as an interim goal of,

> . . . wherever attainable . . . water quality which provides for the protection and propagation of fish, shellfish, and <u>wildlife</u> . . . (emphasis added).

Section 304(a)(1) of the Act also requires EPA to:

> . . . develop and publish . . . criteria for water quality accurately reflecting . . . the kind and extent of all identifiable effects on health and welfare including . . . wildlife.

The Water Quality Standards Regulation reflect the statutory goals and requirements by requiring States to adopt, where attainable, the CWA section 101(a)(2) goal uses of protection and propagation of fish, shellfish, and wildlife (40 CFR 131.10), and to adopt water quality criteria sufficient to protect the designated use (40 CFR 131.11).

Wildlife Protection in Current Aquatic Criteria

Current water quality criteria methodology is designed to protect fish, benthic invertebrates, and zooplankton; however, there is a provision in the current aquatic life criteria guidelines (Appendix H) that is intended to protect wildlife that consume aquatic organisms from the bioaccumulative potential of a compound. The final residue value can be based on either the FDA Action Level or a wildlife feeding study. However, if maximum permissible tissue concentration is not available from a wildlife feeding study, a final residue value cannot be derived and the criteria quantification procedure continues without further consideration of wildlife impacts. Historically, wildlife have been considered only after detrimental effects on wildlife populations have been observed in the environment (this occurred with relationship to DDT, selenium, and PCBs).

Wildlife Criteria Development

EPA's national wildlife criteria effort began following release of a 1987 Government Accounting Office study entitled *Wildlife Management - National Refuge Contamination Is Difficult To Confirm and Clean Up* (GAO, 1987). After waterfowl deformities observed at Kesterson Wildlife Refuge were linked to selenium contamination in the water, Congress requested this study and recommended that "the Administrator of EPA, in close coordination with the Secretary of the Interior, develop water quality criteria for protecting wildlife and their refuge habitat."

In November of 1988, EPA's Environmental Research Laboratory in Corvallis sponsored a workshop entitled *Water Quality Criteria To Protect Wildlife Resources*, (USEPA, 1989g) which was co-chaired by EPA and the Fish and Wildlife Service (FWS). The workshop brought together 26 professionals from a variety of institutions, including EPA, FWS, State governments, academia, and consultants who had expertise in wildlife toxicity, aquatic toxicity, ecology, environmental risk assessment, and conservation. Efforts at he workshop focused on evaluating the need for, and developing a strategy for production of wildlife criteria. Two recommendations came out of that workshop:

(1) The process by which ambient water quality criteria are established should be modified to consider effects on wildlife; and

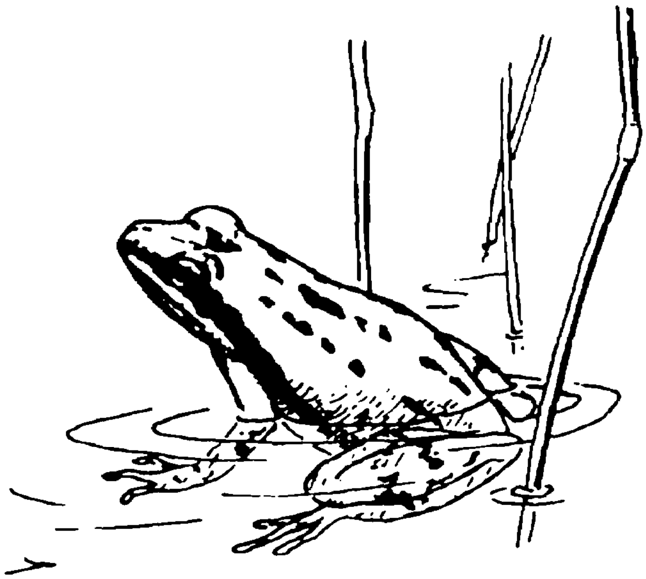
(2) chemicals should be prioritized based on their potential to adversely impact wildlife species.

Based on the workshop recommendations, screening level wildlife criteria (SLWC) were calculated for priority pollutants and chemicals of concern submitted by the FWS to gauge the extent of the problem by:

(1) evaluating whether existing water quality criteria for aquatic life are protective of wildlife, and

(2) prioritizing chemicals for their potential to adversely impact wildlife species.

There were 82 chemicals for which EPA had the necessary toxicity information as well as ambient water quality criteria, advisories, or lowest-observed-adverse-effect levels (LOAELs) to compare with the SLWC values. As would be expected, the majority of chemicals had SLWC larger than existing water quality criteria, advisories, or LOAELs for aquatic life. However, the screen identified classes of compounds for which current ambient water quality criteria may not be adequately protective of wildlife: chlorinated alkanes, benzenes, phenols, metals, DDT, and dioxins. Many of these compounds are produced in very large amounts and have a variety of uses (e.g., solvents, flame retardants, organic syntheses of fungicides and herbicides, and manufacture of plastics and textiles. The manufacture and use of



these materials produce waste byproduct). Also, 5 of the 21 are among the top 25 pollutants identified at Superfund sites in 1985 (3 metals, 2 organics).

Following this initial effort, EPA held a national meeting in April 1992[1] to constructively discuss and evaluate proposed methodologies for deriving wildlife criteria to build consensus among the scientific community as to the most defensible scientifically approach(es) to be pursued by EPA in developing useful and effective wildlife criteria.

The conclusions of this national meeting were as follows:

- wildlife criteria should have a tissue-residue component when appropriate;
- peer-review of wildlife criteria and data sets should be used in their derivation;
- wildlife criteria should incorporate methods to establish site-specific wildlife criteria;
- additional amphibian and reptile toxicity data are needed;
- further development of inter-species toxicological sensitivity factors are needed; and
- criteria methods should measure biomarkers in conjunction with other studies.

On April 16, 1993, EPA proposed wildlife criteria in the *Water Quality Guidance for the Great Lakes System* (58 F.R. 20802). The proposed wildlife criteria are based on the current EPA noncancer human health criteria approach. In this proposal, in addition to requesting comments on the proposed Great Lakes criteria and methods, EPA also requested comments on possible modifications of the proposed Great Lakes approach for consideration in the development of national wildlife criteria.

3.5.6 Numeric Criteria for Wetlands

Extension of the EPA national 304(a) numeric aquatic life criteria to wetlands is recommended as part of a program to develop standards and criteria for wetlands. Appendices D and E provide an overview of the need for standards and criteria for wetlands. The 304(a) numeric aquatic life criteria are designed to be protective of aquatic life for surface waters and are generally applicable to most wetland types. Appendix E provides a possible approach, based on the site-specific guidelines, for detecting wetland types that might not be protected by direct application of national 304(a) criteria. The evaluation can be simple and inexpensive for those wetland types for which sufficient water chemistry and species assemblage data are available, but will be less useful for wetland types for which these data are not readily available. In Appendix E, the site-specific approach is described and recommended for wetlands for which modification of the 304(a) numeric criteria are considered necessary. The results of this type of evaluation, combined with information on local or regional environmental threats, can be used to prioritize wetland types (and individual criteria) for further site-specific evaluations and/or additional data collection. Close coordination among regulatory agencies, wetland scientists, and criteria experts will be required.

3.6 Policy on Aquatic Life Criteria for Metals

It is the policy of the Office of Water that the use of dissolved metal to set and measure compliance with water quality standards is the recommended approach, because dissolved metal more closely approximates the bioavailable fraction of metal in the water column than does total recoverable metal. This conclusion regarding metals bioavailability is supported by a majority of the scientific community within and outside EPA. One reason is that a primary mechanism for water column toxicity is adsorption at the gill surface which requires metals to be in the dissolved form.

Until the scientific uncertainties are better resolved, a range of different risk management decisions can be justified by a State. EPA recommends that State water quality standards be based on dissolved metal--a conversion factor must be used in order to express the EPA criteria articulated as total recoverable as dissolved. (See the paragraph below for technical details on developing dissolved criteria.) EPA will also approve a State risk management decision to adopt standards based on total recoverable metal, if those standards are otherwise approvable as a matter of law. (*Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria* USEPA, 1993f)

3.6.1 Background

The implementation of metals criteria is complex due to the site-specific nature of metals toxicity. This issue covers a number of areas including the expression of aquatic life criteria; total maximum daily loads (TMDLs), permits, effluent monitoring, and compliance; and ambient monitoring. The following Sections, based on the policy memorandum referenced above, provide additional guidance in each of these areas. Included in this Handbook as Appendix J are three guidance documents issued along with the Office of Water policy memorandum with additional technical details. They are: *Guidance Document on Expression of Aquatic Life Criteria as Dissolved Criteria* (Attachment #2), *Guidance Document on Dynamic Modeling and Translators* (Attachment #3), and *Guidance Document on Monitoring* (Attachment #4). These will be supplemented as additional information becomes available.

Since metals toxicity is significantly affected by site-specific factors, it presents a number of programmatic challenges. Factors that must be considered in the management of metals in the aquatic environment include: toxicity specific to effluent chemistry; toxicity specific to ambient water chemistry; different patterns of toxicity for different metals; evolution of the state of the science of metals toxicity, fate, and transport; resource limitations for monitoring, analysis, implementation, and research functions; concerns regarding some of the analytical data currently on record due to possible sampling and analytical contamination; and lack of standardized protocols for clean and ultraclean metals analysis. The States have the key role in the risk management process of balancing these factors in the management of water programs. The site-specific nature of this issue could be perceived as requiring a permit-by-permit approach to implementation. However, EPA believes that this guidance can be effectively implemented on a broader level, across any waters with roughly the same physical and chemical characteristics, and recommends that States work with the EPA with that perspective in mind.

3.6.2 Expression of Aquatic Life Criteria

Dissolved vs. Total Recoverable Metal

A major issue is whether, and how, to use dissolved metal concentrations ("dissolved metal") or total recoverable metal concentrations ("total recoverable metal") in setting State water quality standards. In the past, States have used both approaches when applying the same EPA Section 304(a) criteria guidance. Some older criteria documents may have facilitated these different approaches to interpretation of the criteria because the documents were somewhat equivocal with regards to analytical methods. The May 1992 interim guidance continued the policy that either approach was acceptable.

The position that the dissolved metals approach is more accurate has been questioned because it neglects the possible toxicity of particulate metal. It is true that some studies have indicated that particulate metals appear to contribute to the toxicity of metals, perhaps because of factors such as desorption of metals at the gill surface, but these same studies indicate the toxicity of particulate metal is substantially less than that of dissolved metal.

Furthermore, any error incurred from excluding the contribution of particulate metal will generally be compensated by other factors which make criteria conservative. For example, metals in toxicity tests are added as simple salts to relatively clean water. Due to the likely presence of a significant concentration of metals binding agents in many discharges and ambient waters, metals in toxicity tests would generally be expected to be more bioavailable than metals in discharges or in ambient waters.

If total recoverable metal is used for the purpose of specifying water quality standards, the lower bioavailability of particulate metal and lower bioavailability of sorbed metals as they are discharged may result in an overly conservative water quality standard. The use of dissolved metal in water quality standards gives a more accurate result in the water column. However, total recoverable measurements in ambient water have value, in that exceedences of criteria on a total recoverable basis are an indication that metal loadings could be a stress to the ecosystem, particularly in locations other than the water column (*e.g.*, in the sediments).

The reasons for the potential consideration of total recoverable measurements include risk management considerations not covered by evaluation of water column toxicity alone. The ambient water quality criteria are neither designed nor intended to protect sediments, or to prevent effects in the food webs containing sediment dwelling organisms. A risk manager, however, may consider sediments and food chain effects and may decide to take a conservative approach for metals, considering that metals are very persistent chemicals. This conservative approach could include the use of total recoverable metal in water quality standards. However, since consideration of sediment impacts is not incorporated into the criteria methodology, the degree of conservatism inherent in the total recoverable approach is unknown. The uncertainty of metal impacts in sediments stem from the lack of sediment criteria and an imprecise understanding of the fate and transport of metals. EPA will continue to pursue research and other activities to close these knowledge gaps.

Dissolved Criteria

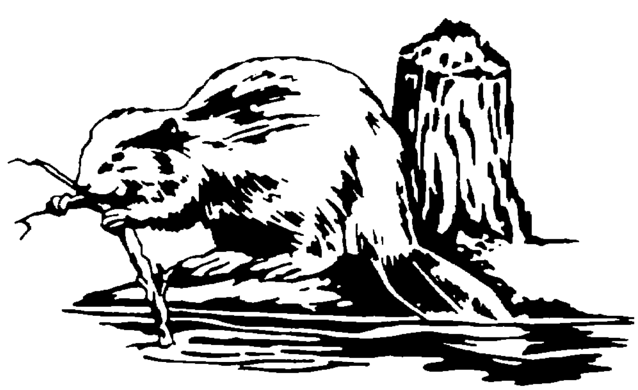
In the toxicity tests used to develop EPA metals criteria for aquatic life, some fraction of the metal is dissolved while some fraction is bound to particulate matter. The present criteria were developed using total recoverable metal measurements or measures expected to give equivalent results in toxicity tests, and are articulated as total recoverable. Therefore, in order to express the EPA criteria as dissolved, a total recoverable to dissolved conversion factor must be used. Attachment #2 in Appendix J provides guidance for calculating EPA dissolved criteria from the published total recoverable criteria. The data expressed as percentage metal dissolved are presented as recommended values and ranges. However, the choice within ranges is a State risk management decision. EPA has recently supplemented the data for copper and is proceeding to further supplement the data for copper and other metals. As testing is completed, EPA will make this information available and this is expected to reduce the magnitude of the ranges for some of the conversion factors provided. EPA also strongly encourages the application of dissolved criteria across a watershed or waterbody, as technically sound and the best use of resources.

Site-Specific Criteria Modifications

While the above methods will correct some site-specific factors affecting metals toxicity, further refinements are possible. EPA has issued guidance for three site-specific criteria development methodologies: recalculation procedure, water-effect ratio (WER) procedure (called the indicator species procedure in previous guidance) and resident species procedure. (See Section 3.7 of this Chapter.)

In the National Toxics Rule (57 FR 60848, December 22, 1992), EPA recommended the WER as an optional method for site-specific criteria development for certain metals. EPA committed in the NTR preamble to provide additional guidance on determining the WERs. The *Interim Guidance on the Determination and Use of Water-Effect Ratios for Metals* was issued by EPA on February 22, 1994 and is intended to fulfill that commitment. This interim guidance supersedes all guidance concerning water-effect ratios and the recalculation procedure previously issued by EPA. This guidance is included as Appendix L to this Handbook.

In order to meet current needs, but allow for changes suggested by protocol users, EPA issued the guidance as "interim." EPA will accept WERs developed using this guidance, as well as by using other scientifically defensible protocols.



3.6.3 Total Maximum Daily Loads (TMDLs) and National Pollutant Discharge Elimination System (NPDES) Permits

Dynamic Water Quality Modeling

Although not specifically part of the reassessment of water quality criteria for metals, dynamic or probabilistic models are another useful tool for implementing water quality criteria, especially for those criteria protecting aquatic life. These models provide another way to incorporate site-specific data. The *Technical Support Document for Water Quality-based Toxics Control* (TSD) (USEPA, 1991a) describes dynamic, as well as static (steady-state) models. Dynamic models make the best use of the specified magnitude, duration, and frequency of water quality criteria and, therefore, provide a more accurate representation of the probability that a water quality standard exceedence will occur. In contrast, steady-state models frequently apply a number of simplifying, worst case assumptions which makes them less complex but also less accurate than dynamic models.

Dynamic models have received increased attention over the last few years as a result of the widespread belief that steady-state modeling is over-conservative due to environmentally conservative dilution assumptions. This belief has led to the misconception that dynamic models will always lead to less stringent regulatory controls (e.g., NPDES effluent limits) than steady-state models, which is not true in every application of dynamic models. EPA considers dynamic models to be a more accurate approach to implementing water quality criteria and continues to recommend their use. Dynamic modeling does require a commitment of resources to develop appropriate data. (See Appendix J, Attachment #3 and the USEPA, 1991a for details on the use of dynamic models.)

Dissolved-Total Metal Translators

Expressing ambient water quality criteria for metals as the dissolved form of a metal poses a need to be able to translate from dissolved metal to total recoverable metal for TMDLs and NPDES permits. TMDLs for metals must be able to calculate: (1) dissolved metal in order to ascertain attainment of water quality standards, and (2) total recoverable metal in order to achieve mass balance necessary for permitting purposes.

EPA's NPDES regulations require that limits of metals in permits be stated as total recoverable in most cases (see 40 CFR §122.45(c)) except when an effluent guideline specifies the limitation in another form of the metal, the approved analytical methods measure only dissolved metal, or the permit writer expresses a metals limit in another form (e.g., dissolved, valent specific, or total) when required to carry out provisions of the Clean Water Act. This is because the chemical conditions in ambient waters frequently differ substantially from those in the effluent, and there is no assurance that effluent particulate metal would not dissolve after discharge. The NPDES rule does not require that State water quality standards be expressed as total recoverable; rather, the rule requires permit writers to translate between different metal forms in the calculation of the permit limit so that a total recoverable limit can be established. Both the TMDL and NPDES uses of water quality criteria require the ability to translate between dissolved metal and total recoverable metal. Appendix J, Attachment #3 provides guidance on this translation.

3.6.4 Guidance on Monitoring

Use of Clean Sampling and Analytical Techniques

In assessing waterbodies to determine the potential for toxicity problems due to metals, the quality of the data used is an important issue. Metals data are used to determine attainment status for water quality standards, discern trends in water quality, estimate background loads for TMDLs, calibrate fate and transport models, estimate effluent concentrations (including effluent variability), assess permit compliance, and conduct research. The quality of trace level metal data, especially below 1 ppb, may be compromised due to contamination of samples during collection, preparation, storage, and analysis. Depending on the level of metal present, the use of "clean" and "ultraclean" techniques for sampling and analysis may be critical to accurate data for implementation of aquatic life criteria for metals.

The significance of the sampling and analysis contamination problem increases as the ambient and effluent metal concentration decreases and, therefore, problems are more likely in ambient measurements. "Clean" techniques refer to those requirements (or practices for sample collection and handling) necessary to produce reliable analytical data in the part per billion (ppb) range. "Ultraclean" techniques refer to those requirements or practices necessary to produce reliable analytical data in the part per trillion (ppt) range. Because typical concentrations of metals in surface waters and effluents vary from one metal to another, the effect of contamination on the quality of metals monitoring data varies appreciably.

EPA plans to develop protocols on the use of clean and ultra-clean techniques and is coordinating with the United States Geological Survey (USGS) on this project, because USGS has been doing work on these techniques for some time, especially the sampling procedures. Draft protocols for clean techniques were presented at the Norfolk, VA analytical methods conference in the Spring of 1994 and final protocols are expected to be available in early 1995. The development of comparable protocols for ultra-clean techniques is underway and are expected to be available in late 1995. In developing these protocols, we will consider the costs of these techniques and will give guidance as to the situations where their use is necessary. Appendix L, pp. 98-108 provide some general guidance on the use of clean analytical techniques. We recommend that this guidance be used by States and Regions as an interim step, while the clean and ultra-clean protocols are being developed.

Use of Historical Data

The concerns about metals sampling and analysis discussed above raise corresponding concerns about the validity of historical data. Data on effluent and ambient metal concentrations are collected by a variety of organizations including Federal agencies (e.g., EPA, USGS), State pollution control agencies and health departments, local government agencies, municipalities, industrial dischargers, researchers, and others. The data are collected for a variety of purposes as discussed above.

Concern about the reliability of the sample collection and analysis procedures is greatest where they have been used to monitor very low level metal concentrations. Specifically, studies have shown data sets with contamination problems during sample collection and laboratory analysis, that have resulted in inaccurate measurements. For example, in developing a TMDL for New York Harbor, some historical ambient data showed extensive metals problems in the harbor, while other historical ambient data showed only limited metals problems. Careful resampling and analysis in 1992/1993 showed the latter view was correct. The key to producing accurate data is appropriate quality assurance (QA) and quality control (QC) procedures. EPA believes that most historical data for metals, collected and analyzed with appropriate QA and QC at levels of 1 ppb or higher, are reliable. The data used in development of EPA criteria are also considered reliable, both because they meet the above test and because the toxicity test solutions are created by adding known amounts of metals.

With respect to effluent monitoring reported by an NPDES permittee, the permittee is responsible for collecting and reporting quality data on a Discharge Monitoring Report (DMR). Permitting authorities should continue to consider the information reported to be true, accurate, and complete as certified by the permittee. Where the permittee becomes aware of new information specific to the effluent discharge that questions the quality of previously submitted DMR data, the permittee must promptly submit that information to the permitting authority. The permitting authority will consider all information submitted by the permittee in determining appropriate enforcement responses to monitoring/reporting and effluent violations. (See Appendix J, Attachment #4 for additional details.)

3.7 Site-Specific Aquatic Life Criteria

The purpose of this section is to provide guidance for the development of site-specific water quality criteria which reflect local environmental conditions. Site-specific criteria are allowed by regulation and are subject to EPA review and approval. The Federal water quality standards regulation at section 131.11(b)(1)(ii) provides States with the opportunity to adopt water quality criteria that are "...modified to reflect site-specific conditions." Site-specific criteria, as with all water quality criteria, must be based on a sound scientific rationale in order to protect the designated use. Existing guidance and practice are that EPA will approve site-specific criteria developed using appropriate procedures.

A site-specific criterion is intended to come closer than the national criterion to providing the intended level of protection to the aquatic life at the site, usually by taking into account the biological and/or chemical conditions (i.e., the species composition and/or water quality characteristics) at the site. The fact that the U.S. EPA has made these procedures available should not be interpreted as implying that the agency advocates that states derive site-specific criteria before setting state standards. Also, derivation of a site-specific criterion does not change the intended level of protection of the aquatic life at the site.

3.7.1 History of Site-Specific Criteria Guidance

National water quality criteria for aquatic life may be under- or over-protective if:

(1) the species at the site are more or less sensitive than those included in the national criteria data set (*e.g.*, the national criteria data set contains data for trout, salmon, penaeid shrimp, and other aquatic species that have been shown to be especially sensitive to some materials), or

(2) physical and/or chemical characteristics of the site alter the biological availability and/or toxicity of the chemical (*e.g.*, alkalinity, hardness, pH, suspended solids and salinity influence the concentration(s) of the toxic form(s) of some heavy metals, ammonia and other chemicals).

Therefore, it is appropriate that site-specific procedures address each of these conditions separately as well as the combination of the two. In the early 1980's, EPA recognized that laboratory-derived water quality criteria might not accurately reflect site-specific conditions and, in response, created three procedures to derive site-specific criteria. This Handbook contains the details of these procedures, referenced below.

1. The Recalculation Procedure is intended to take into account relevant differences between the sensitivities of the aquatic organisms in the national dataset and the sensitivities of organisms that occur at the site (see Appendix L, pp. 90-97).

2. The Water-Effect Ratio Procedure (called the Indicator Species Procedure in USEPA, 1983a; 1984f) provided for the use of a water-effect ratio (WER) that is intended to take into account relevant differences between the toxicities of the chemical in laboratory dilution water and in site water (see Appendix L).

3. The Resident Species Procedure intended to take into account both kinds of differences simultaneously (see Section 3.7.6).

These procedures were first published in the 1983 *Water Quality Standards Handbook* (USEPA, 1983a) and expanded upon in the *Guidelines for Deriving Numerical Aquatic Site-Specific Water Quality Criteria by Modifying National Criteria* (USEPA, 1984f). Interest has increased in recent years as states have devoted more attention to chemical-specific water quality criteria for aquatic life. In addition, interest in water-effect ratios increased when they were integrated into some of the aquatic life criteria for metals that were promulgated for several states in the National Toxics Rule (57 FR 60848, December 22, 1992). The *Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Criteria for Metals* (USEPA, 1993f) (see Section 3.6 of this Handbook) provided further guidance on site-specific criteria for metals by recommending the use of dissolved metals for setting and measuring compliance with water quality standards.

The early guidance concerning WERs (USEPA, 1983a; 1984f) contained few details and needed revision, especially to take into account newer guidance concerning metals. To meet this need, EPA issued *Interim Guidance on the Determination and Use of Water-Effect Ratios for Metals* in 1994 (Appendix L). Metals are specifically addressed in Appendix L because of the National Toxics Rule and because of current interest in aquatic life criteria for metals; although most of this guidance also applies to other pollutants, some obviously applies only to metals. Appendix L supersedes all guidance concerning water-effect ratios and the Indicator Species Procedure given in Chapter 4 of the *Water Quality Standards Handbook* (USEPA, 1983a) and in *Guidelines for Deriving Numerical Aquatic Site-Specific Water Quality Criteria by Modifying National Criteria* (USEPA, 1984f). Appendix L (p. 90-98) also supersedes the guidance in these earlier documents for the Recalculation Procedure for performing site-specific criteria modifications. The Resident Species Procedure remains essentially unchanged since 1983 (except for changes in the averaging periods to conform to the 1985 aquatic life criteria guidelines (USEPA, 1985b) and is presented in Section 3.7.6, below.

The previous guidance concerning site-specific procedures did not allow the Recalculation Procedure and the WER procedure to be used together in the derivation of a site-specific aquatic life criterion; the only way to take into account both species composition and water quality characteristics in the determination of a site-specific criterion was to use the Resident Species Procedure. A specific change contained Appendix L is that, except in jurisdictions that are subject to the National Toxics Rule, the Recalculation Procedure and the WER Procedure may now be used together provided that the recalculation procedure is performed first. Both the Recalculation Procedure and the WER Procedure are based directly on the guidelines for deriving national aquatic life criteria (USEPA 1985) and, when the two are used together, use of the Recalculation Procedure must be performed first because the Recalculation Procedure has specific implications concerning the determination of the WER.

3.7.2 Preparing to Calculate Site-Specific Criteria

Adopting site-specific criteria in water quality standards is a State option--not a requirement. Moreover, EPA is not advocating that States use site-specific criteria development procedures for setting all aquatic life criteria as opposed to using the National Section 304(a) criteria recommendations. Site-specific criteria are not needed in all situations. When a State considers the possibility of developing site-specific criteria, it is essential to involve the appropriate EPA Regional office at the start of the project.

This early planning is also essential if it appears that data generation and testing may be conducted by a party other than the State or EPA. The State and EPA need to apply the procedures judiciously and must consider the complexity of the problem and the extent of knowledge available concerning the fate and effect of the pollutant under consideration. If site-specific criteria are developed without early EPA involvement in the planning and design of the task, the State may expect EPA to take additional time to closely scrutinize the results before granting any approval to the formally adopted standards.

The following sequence of decisions need to be made before any of the procedures are initiated:

- verify that site-specific criteria are actually needed (*e.g.*, that the use of clean sampling and/or analytical techniques, especially for metals, do not result in attainment of standards.)
- Define the site boundaries.
- Determine from the national criterion document and other sources if physical and/or chemical characteristics are known to affect the biological availability and/or toxicity of a material of interest.
- If data in the national criterion document and/or from other sources indicate that the range of sensitivity of the selected resident species to the material of interest is different from the range for the species in the national criterion document, and variation in physical and/or chemical characteristics of the site water is not expected to be a factor, use the *Recalculation Procedure* (Section 3.7.4).

- If data in the national criterion document and/or from other sources indicate that physical and/or chemical characteristics of the site water may affect the biological availability and/or toxicity of the material of interest, and the selected resident species range of sensitivity is similar to that for the species in the national criterion document, use the *Water-Effect Ratio Procedure* (Section 3.7.5).

- If data in the national criterion document and/or from other sources indicated that physical and/or chemical characteristics of the site water may affect the biological availability and/or toxicity of the material of interest, and the selected resident species range of sensitivity is different from that for the species in the national criterion document, and if both these differences are to be taken into account, use the *Recalculation Procedure in conjunction with the Water-Effect Ratio Procedure* or use the *Resident Species Procedure* (Section 3.7.6).

3.7.3 Definition of a Site

Since the rationales for site-specific criteria are usually based on potential differences in species sensitivity, physical and chemical characteristics of the water, or a combination of the two, the concept of site must be consistent with this rationale.

In the general context of site-specific criteria, a "site" may be a state, region, watershed, waterbody, or segment of a waterbody. The site-specific criterion is to be derived to provide adequate protection for the entire site, however the site is defined.

If water quality effects on toxicity are not a consideration, the site can be as large as a generally consistent biogeographic zone permits. For example, large portions of the Chesapeake Bay, Lake Michigan, or the Ohio River may be considered as one site if their respective aquatic communities do not vary substantially. However, when a site-specific criterion is derived using the Recalculation Procedure, all species that "occur at the site" need to be taken into account when deciding what species, if any, are to be deleted from the dataset. Unique populations or less sensitive uses within sites may justify a designation as a distinct site.

If the species of a site are toxicologically comparable to those in the national criteria data set for a material of interest, and physical and/or chemical water characteristics are the only factors supporting modification of the national criteria, then the site can be defined on the basis of expected changes in the material's biological availability and/or toxicity due to physical and chemical variability of the site water. However, when a site-specific criterion is derived using a WER, the WER is to be adequately protective of the entire site. If, for example, a site-specific criterion is being derived for an estuary, WERs could be determined using samples of the surface water obtained from various sampling stations, which, to avoid confusion, should not be called "sites". If all the WERs were sufficiently similar, one site-specific criterion could be derived to apply to the whole estuary. If the WERs were sufficiently different, either the lowest WER could be used to derive a site-specific criterion for the whole estuary, or the data might indicate that the estuary should be divided into two or more sites, each with its own criterion.

3.7.4 The Recalculation Procedure

The Recalculation Procedure is intended to cause a site-specific criterion to appropriately differ from a national aquatic life criterion if justified by demonstrated pertinent toxicological differences between the aquatic species that occur at the site and those that were used in the derivation of the national criterion. There are at least three reasons why such differences might exist between the two sets of species.

- First, the national dataset contains aquatic species that are sensitive to many pollutants, but these and comparably sensitive species might not occur at the site.

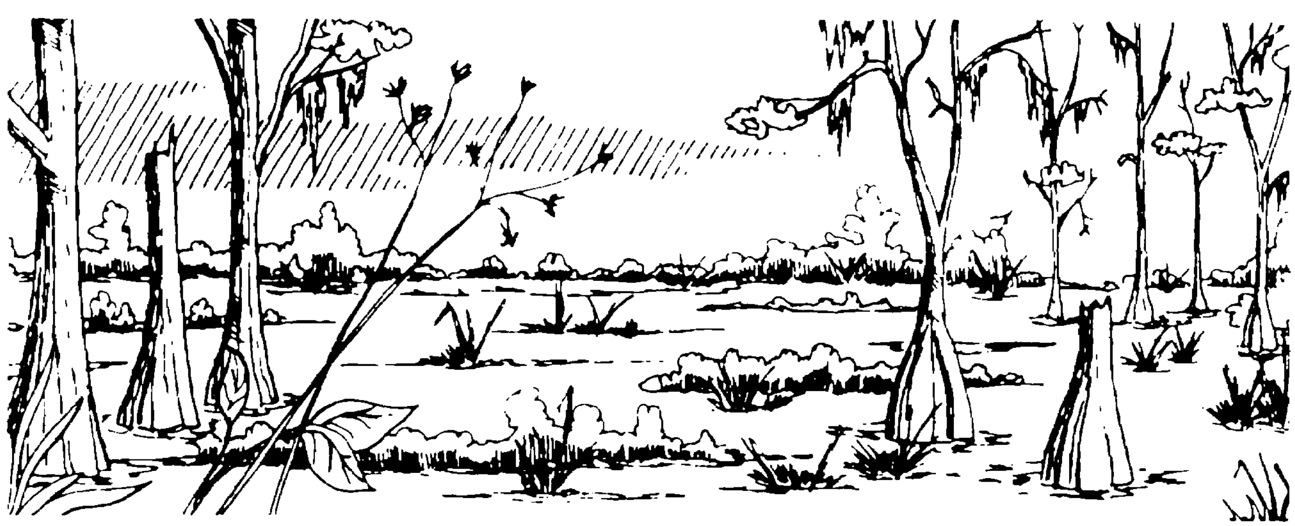
- Second, a species that is critical at the site might be sensitive to the pollutant and require a lower criterion. (A critical species is a species that is commercially or recreationally important at the site, a species that exists at the site and is listed as threatened or endangered under section 4 of the Endangered Species Act, or a species for which there is evidence that the loss of the species from the site is likely to cause an unacceptable impact on a commercially or recreationally important species, a threatened or endangered species, the abundances of a variety of other species, or the structure or function of the community.)

- Third, the species that occur at the site might represent a narrower mix of species than those in the national dataset due to a limited range of natural environmental conditions.

The procedure presented in Appendix L, pp. 90-98 is structured so that corrections and additions can be made to the national dataset without the deletion process being used to take into account taxa that do not occur at the site; in effect, this procedure makes it possible to update the national aquatic life criterion. All corrections and additions that have been approved by EPA are required, whereas use of the deletion process is optional. The deletion process may not be used to remove species from the criterion calculation that are not currently present at a site due to degraded conditions.

The Recalculation Procedure is more likely to result in lowering a criterion if the net result of addition and deletion is to decrease the number of genera in the dataset, whereas the procedure is more likely to result in raising a criterion if the net result of addition and deletion is to increase the number of genera in the dataset.

For the lipid soluble chemicals whose national Final Residue Values are based on Food and Drug Administration (FDA) action levels, adjustments in those values based on the percent lipid content of resident aquatic species is appropriate for the derivation of site-specific Final Residue Values. For lipid-soluble materials, the national Final Residue Value is based on an average 11 percent lipid content for edible portions for the freshwater chinook salmon and lake trout and an average of 10 percent lipids for the edible portion for saltwater Atlantic herring. Resident species of concern may have higher (e.g., Lake Superior siscowet, a race of lake trout) or lower (e.g., many sport fish) percent lipid content than used for the national Final Residue Value.



For some lipid-soluble materials such as polychlorinated biphenyls (PCB) and DDT, the national Final Residue Value is based on wildlife consumers of fish and aquatic invertebrate species rather than an FDA action level because the former provides a more stringent residue level. See the National Guidelines (USEPA, 1985b) for details.

For the lipid-soluble materials whose national Final Residue Values are based on wildlife effects, the limiting wildlife species (mink for PCB and brown pelican for DDT) are considered acceptable surrogates for resident avian and mammalian species (e.g., herons, gulls, terns, otter, etc.) Conservatism is appropriate for those two chemicals, and no less restrictive modification of the national Final Residue Value is appropriate. The site-specific Final Residue Value would be the same as the national value.

3.7.5 The Water-Effect Ratio (WER) Procedure

The guidance on the Water-Effect Ratio Procedure presented in Appendix L is intended to produce WERs that may be used to derive site-specific aquatic life criteria from most national and state aquatic life criteria that were derived from laboratory toxicity data.

As indicated in Appendix L, the determination of a water-effect ratio may require substantial resources. A discharger should consider cost-effective, preliminary measures described in this Appendix L (e.g., use of "clean" sampling and chemical analytical techniques especially for metals, or in non-NTR States, a recalculated criterion) to determine if an indicator species site-specific criterion is really needed. In many instances, use of these other measures may eliminate the need for deriving water-effect ratios. The methods described in the 1994 interim guidance (Appendix L) should be sufficient to develop site-specific criteria that resolve concerns of dischargers when there appears to be no instream toxicity but, where (a) a discharge appears to exceed existing or proposed water quality-based permit limits, or (b) an instream concentration appears to exceed an existing or proposed water quality criterion.

<u>WERs obtained using the methods described in Appendix L should only be used to adjust aquatic life criteria that were derived using laboratory toxicity tests.</u> WERs determined using the methods described herein cannot be used to adjust the residue-based mercury Criterion Continuous Concentration (CCC) or the field-based selenium freshwater criterion.

Except in jurisdictions that are subject to the NTR, the WERs may also be used with site-specific aquatic life criteria that are derived using the Recalculation Procedure described in Appendix L (p.90).

Water-Effect Ratios in the Derivation of Site-Specific Criteria

A central question concerning WERs is whether their use by a State results in a site-specific criterion subject to EPA review and approval under Section 303(c) of the Clean Water Act?

Derivation of a water-effect ratio by a State is a site-specific criterion adjustment subject to EPA review and approval/disapproval under Section 303(c). There are two options by which this review can be accomplished.

Option 1:

A State may derive and submit each individual water-effect ratio determination to EPA for review and approval. This would be accomplished through the normal review and revision process used by a State.

Option 2:

A State can amend its water quality standards to provide a formal procedure which includes derivation of water-effect ratios, appropriate definition of sites, and enforceable monitoring provisions to assure that designated uses are protected. Both this procedure and the resulting criteria would be subject to full public participation requirements. EPA would review and approve/disapprove this protocol as a revised standard as part of the State's triennial review/revision. After adoption of the procedure, public review of a site-specific criterion could be accomplished in conjunction with the public review required for permit issuance. For public information, EPA recommends that once a year the State publish a list of site-specific criteria.

An exception to this policy applies to the waters of the jurisdictions included in the National Toxics Rule. The EPA review is not required for the jurisdictions included in the National Toxics Rule where EPA established the procedure for the State for application to the criteria promulgated. The National Toxics Rule was a formal rulemaking process (with notice and comment) in which EPA pre-authorized the use of a correctly applied water-effect ratio. That same process has not yet taken place in States not included in the National Toxics Rule.

However, the National Toxics Rule does not affect State authority to establish scientifically defensible procedures to determine Federally authorized WERs, to certify those WERs in NPDES permit proceedings, or to deny their application based on the State's risk management analysis.

As described in Section 131.36(b)(iii) of the water quality standards regulation (the official regulatory reference to the National Toxics Rule), the water-effect ratio is a site-specific calculation. As indicated on page 60866 of the preamble to the National Toxics Rule, the rule was constructed as a rebuttable presumption. The water-effect ratio is assigned a value of 1.0 until a different water-effect ratio is derived from suitable tests representative of conditions in the affected waterbody. It is the responsibility of the State to determine whether to rebut the assumed value of 1.0 in the National Toxics Rule and apply another value of the water-effect ratio in order to establish a site-specific criterion. The site-specific criterion is then used to develop appropriate NPDES permit limits. The rule thus provides a State with the flexibility to derive an appropriate site-specific criterion for specific waterbodies.

As a point of emphasis, although a water-effect ratio affects permit limits for individual dischargers, it is the State in all cases that determines if derivation of a site-specific criterion based on the water-effect ratio is allowed and it is the State that ensures that the calculations and data analysis are done completely and correctly.

3.7.6 The Resident Species Procedure

The resident Species Procedure for the derivation of a site-specific criterion accounts for differences in resident species sensitivity and differences in biological availability and/or toxicity of a material due to variability in physical and chemical characteristics of a site water. Derivation of the site-specific criterion maximum concentration (CMC) and site-specific criterion continuous concentration (CCC) are accomplished after the complete acute toxicity minimum data set requirements have been met by conducting tests with resident species in site water. Chronic tests may also be necessary. This procedure is designed to compensate concurrently for any real differences between the sensitivity range of species represented in the national data set and for site water which may markedly affect the biological availability and/or toxicity of the material of interest.

Certain families of organisms have been specified in the National Guidelines acute toxicity minimum data set (e.g., Salmonidae in fresh water and Penaeidae or Mysidae in salt water); if this or any other requirement cannot be met because the family or other group (e.g., insect or benthic crustacean) in fresh water is not represented by resident species, select a substitute(s) from a sensitive family represented by one or more resident species and meet the 8 family minimum data set requirement. If all the families at the site have been tested and the minimum data set requirements have not been met, use the most sensitive resident family mean acute value as the site-specific Final Acute Value.

To derive the criterion maximum concentration divide the site-specific Final Acute Value by two. The site-specific Final Chronic Value can be obtained as described in the Appendix L. The lower of the site-specific Final Chronic Value (as described in the recalculation procedure - Appendix L, p. 90) and the recalculated site-specific Final Residue Value becomes the site-specific criterion continuous concentration unless plant or other data (including data obtained from the site-specific tests) indicates a lower value is appropriate. If a problem is identified, judgment should be used in establishing the site-specific criterion.

The frequency of testing (e.g., the need for seasonal testing) will be related to the variability of the physical and chemical characteristics of site water as it is expected to affect the biological availability and/or toxicity of the material of interest. As the variability increases, the frequency of testing will increase. Many of the limitations discussed for the previous two procedures would also apply to this procedure.

Endnotes

1. Proceedings in production.

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CHAPTER 4

ANTIDEGRADATION

(40 CFR 131.12)

Table of Contents

CHAPTER 4
ANTIDEGRADATION

This chapter provides guidance on the antidegradation component of water quality standards, its application in conjunction with the other parts of the water quality standards regulation, and its implementation by the States. Antidegradation implementation by the States is based on a set of procedures to be followed when evaluating activities that may impact the quality of the waters of the United States. Antidegradation implementation is an integral component of a comprehensive approach to protecting and enhancing water quality.

4.1 History of Antidegradation

The first antidegradation policy statement was released on February 8, 1968, by the Secretary of the U.S. Department of the Interior. It was included in EPA's first Water Quality Standards Regulation (40 CFR 130.17, 40 F.R. 55340-41, November 28, 1975), and was slightly refined and re-promulgated as part of the current program regulation published on November 8, 1983 (48 F.R. 51400, 40 CFR 131.12). Antidegradation requirements and methods for implementing those requirements are minimum conditions to be included in a State's water quality standards. Antidegradation was originally based on the spirit, intent, and goals of the Act, especially the clause ". . . restore and maintain the chemical, physical and biological integrity of the Nation's waters" (101(a)) and the provision of 303(a) that made water quality standards under prior law the "starting point" for CWA water quality requirements. Antidegradation was explicitly incorporated in the CWA through:

- a 1987 amendment codified in section 303(d)(4)(B) requiring satisfaction of antidegradation requirements before making certain changes in NPDES permits; and
- the 1990 Great Lakes Critical Programs Act codified in CWA section 118(c)(2) requiring EPA to publish Great Lakes water quality guidance including antidegradation policies and implementation procedures.

4.2 Summary of the Antidegradation Policy

Section 131.12(a)(1), or "Tier 1," protecting "existing uses," provides the absolute floor of water quality in all waters of the United States. This paragraph applies a minimum level of protection to all waters.

Section 131.12(a)(2), or "Tier 2," applies to waters whose quality exceeds that necessary to protect the section 101(a)(2) goals of the Act. In this case, water quality may not be lowered to less than the level necessary to fully protect the "fishable/swimmable" uses and other existing uses and may be lowered even to those levels only after following all the provisions described in section 131.12(a)(2).

Section 131.12(a)(3), or "Tier 3," applies to Outstanding National Resource Waters (ONRW) where the ordinary use classifications and supporting criteria may not be sufficient or appropriate. As described in the preamble to the Water Quality Standards Regulation, "States may allow some limited activities which result in temporary and short-term changes in water quality," but such changes in water quality should not impact existing uses or alter the essential character or special use that makes the water an ONRW.

The requirement for potential water quality impairment associated with thermal discharges contained in section 131.12 (a)(4) of the regulation is intended to coordinate the requirements and procedures of the antidegradation policy with those established in the Act for setting thermal discharge limitations. Regulations implementing section 316 may be found at 40 CFR 124.66. The statutory scheme and legislative history indicate that limitations developed under section 316 take precedence over other requirements of the Act.

As the States began to focus more attention on implementing their antidegradation policies, an additional concept was developed by the States, which EPA has accepted even though not directly mentioned in previous EPA guidance or in the regulation. This concept, commonly known as "Tier 2½," is an application of the antidegradation policy that has implementation requirements that are more stringent than for "Tier 2" (high-quality waters), but somewhat less stringent than the prohibition against any lowering of water quality in "Tier 3" (ONRWs). EPA accepts this additional tier in State antidegradation policies because it is clearly a more stringent application of the Tier 2 provisions of the antidegradation policy and, therefore, permissible under section 510 of the CWA.

The supporting rationale that led to the development of the Tier 2½ concept was a concern by the States that the Tier 3 ONRW provision was so stringent that its application would likely prevent States from taking actions in the future that were consistent with important social and economic development on, or upstream of, ONRWs. This concern is a major reason that relatively few water bodies are designated as ONRWs. The Tier 2½ approach allows States to provide a very high level of water quality protection without precluding unforeseen future economic and social development considerations.

4.3 State Antidegradation Requirements

Each State must develop, adopt, and retain a statewide antidegradation policy regarding water quality standards and establish procedures for its implementation through the water quality management process. The State antidegradation policy and implementation procedures must be consistent with the components detailed in 40 CFR 131.12. If not included in the standards regulation of a State, the policy must be specifically referenced in the water quality standards so that the functional relationship between the policy and the standards is clear. Regardless of the location of the policy, it must meet all applicable requirements. States may adopt antidegradation statements more protective than the Federal requirement. The antidegradation implementation procedures specify how the State will determine on a case-by-case basis whether, and to what extent, water quality may be lowered.

State antidegradation polices and implementation procedures are subject to review by the Regional Administrator. EPA has clear authority to review and approve or disapprove and promulgate an antidegradation policy for a State. EPA's review of the implementation procedures is limited to ensuring that procedures are included that describe how the State will implement the required elements of the antidegradation review. EPA may disapprove and federally promulgate all or part of an implementation process for antidegradation if, in the judgment of the Administrator, the State's process (or certain provisions thereof) can be implemented in such a way as to circumvent the intent and purpose of the antidegradation policy. EPA encourages submittal of any amendments to the statement and implementing procedures to the Regional Administrator for pre-adoption review so that the State may take EPA comments into account prior to final action.

If a State's antidegradation policy does not meet the Federal regulatory requirements, either through State action to revise its policy or through revised Federal requirements, the State would be given the opportunity to make its policy consistent with the regulation. If this is not done, EPA has the authority to promulgate the policy for the State pursuant to section 303(c)(4) of the Clean Water Act (see section 6.3, this Handbook).

4.4 Protection of Existing Uses - 40 CFR 131.12(a)(1)

This section requires the protection of existing uses and the level of water quality to protect those uses. An "existing use" can be established by demonstrating that:

- fishing, swimming, or other uses have actually occurred since November 28, 1975; or

- that the water quality is suitable to allow the use to be attained—unless there are physical problems, such as substrate or flow, that prevent the use from being attained.

An example of the latter is an area where shellfish are propagating and surviving in a biologically suitable habitat and are available and suitable for harvesting although, to date, no one has attempted to harvest them. Such facts clearly establish that shellfish harvesting is an "existing" use, not one dependent on improvements in water quality. To argue otherwise would be to say that the only time an aquatic protection use "exists" is if someone succeeds in catching fish.

Full protection of the existing use requires protection of the entire water body with a few limited exceptions such as certain physical modifications that may so alter a water body that species composition cannot be maintained (see section 4.4.3, this Handbook), and mixing zones (see section 4.4.4, this Handbook). For example, an activity that lowers water quality such that a buffer zone must be established within a previous shellfish harvesting area is inconsistent with the antidegradation policy.

Section 131.12(a)(1) provides the absolute floor of water quality in all waters of the United States. This paragraph applies a minimum level of protection to all waters. However, it is most pertinent to waters having beneficial uses that are less than the section 101(a)(2) goals of the Act. If it can be proven, in that situation, that water quality exceeds that necessary to fully protect the existing use(s) and exceeds water quality standards but is not of sufficient quality to cause a better use to be achieved, then that water quality may be lowered to the level required to fully protect the existing use as long as existing water quality standards and downstream water quality standards are not affected. If this does not involve a change in standards, no public hearing would be required under section 303(c). However, public participation would still be provided in connection with the issuance of a NPDES permit or amendment of a section 208 plan or section 319 program. If, however, analysis indicates that the higher water quality does result in a better use, even if not up to the section 101(a)(2) goals, then the water quality standards must be upgraded to reflect the uses presently being attained (131.10(i)).

If a planned activity will foreseeably lower water quality to the extent that it no longer is sufficient to protect and maintain the existing

uses in that water body, such an activity is inconsistent with EPA's antidegradation policy, which requires that existing uses are to be maintained. In such a circumstance, the planned activity must be avoided or adequate mitigation or preventive measures must be taken to ensure that the existing uses and the water quality to protect them will be maintained.

Section 4.4.1, this Handbook, discusses the determination and protection of recreational "existing" uses, and section 4.4.2, this Handbook, discusses aquatic life protection "existing" uses (of course, many other types of existing uses may occur in a water body).

4.4.1 Recreational Uses

Recreational uses traditionally are divided into primary contact and secondary contact recreation (e.g., swimming vs. boating; that is, recreation "in" or "on" the water.) However, these two broad uses can logically be subdivided into a variety of subcategories (e.g., wading, sailing, power boating, rafting). The water quality standards regulation does not establish a level of specificity that each State must apply in determining what recreational "uses" exist. However, the following principles apply.

- The State selects the level of specificity it desires for identifying recreational existing uses (that is, whether to treat secondary contact recreation as a single use or to define subcategories of secondary recreation). The State has two limitations:

    - the State must be at least as specific as the uses listed in sections 101(a) and 303(c) of the Clean Water Act; and

    - the State must be at least as specific as the written description of the designated use classifications adopted by the State.

- If the State designated use classification system is very specific in describing subcategories of a use, then such specifically defined uses, if they exist, must be protected fully under antidegradation. A State with a broadly written use classification system may, as a matter of policy, interpret its classifications more specifically for determining existing uses—as long as it is done consistently. A State may also redefine its use classification system, subject to the constraints in 40 CFR 131.10, to more adequately reflect existing uses.

- If the use classification system in a State is defined in broad terms such as primary contact recreation, secondary contact recreation, or boating, then it is a State determination whether to allow changes in the type of primary or secondary contact recreation or boating activity that would occur on a specific water body as long as the basic use classification is met. For example, if a State defines a use simply as "boating," it is the State's decision whether to allow something to occur that would change the type of boating from canoeing to power boating as long as the resulting water quality allows the "boating" use to be met. (The public record used originally to establish the use may provide a clearer indication of the use intended to be attained and protected by the State.)

The rationale is that the required water quality will allow a boating use to continue and that use meets the goal of the Act. Water quality is the key. This interpretation may allow a State to change activities within a specific use category but it does not create a mechanism to remove use classifications; this latter action is governed solely by the provisions of the standards regulation (CWA section 131.10(g)).

One situation where EPA might conceivably be called upon to decide what constitutes an existing use is where EPA is writing an NPDES permit. EPA has the responsibility under CWA section 301(b)(1)(C) to determine what is needed to protect existing uses under the State's antidegradation requirement, and accordingly may define "existing uses" or interpret the State's definition to write that permit if the State has not done so. Of course, EPA's determination would be subject to State section 401 certification in such a case.

4.4.2 Aquatic Life/Wildlife Uses

No activity is allowable under the antidegradation policy which would partially or completely eliminate any existing use whether or not that use is designated in a State's water quality standards. The aquatic protection use is a broad category requiring further explanation. Non-aberrational resident species must be protected, even if not prevalent in number or importance. Water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species. Any lowering of water quality below this full level of protection is not allowed.

A State may develop subcategories of aquatic protection uses but cannot choose different levels of protection for like uses. The fact that sport or commercial fish are not present does not mean that the water may not be supporting an aquatic life protection function. An existing aquatic community composed entirely of invertebrates and plants, such as may be found in a pristine alpine tributary stream, should still be protected whether or not such a stream supports a fishery.

Even though the shorthand expression "fishable/swimmable" is often used, the actual objective of the Act is to "restore and maintain the chemical, physical, and biological integrity of our Nation's waters" (section 101(a)). The term "aquatic life" would more accurately reflect the protection of the aquatic community that was intended in section 101(a)(2) of the Act.

Section 131.12(a)(1) states, "Existing instream water uses and level of water quality necessary to protect the existing uses shall be maintained and protected." For example, while sustaining a small coldwater fish population, a stream does not support an existing use of a "coldwater fishery." The existing stream temperatures are unsuitable for a thriving coldwater fishery. The small marginal population is an artifact and should not be employed to mandate a more stringent use (true coldwater fishery) where natural conditions are not suitable for that use.

A use attainability analysis or other scientific assessment should be used to determine whether the aquatic life population is in fact an artifact or is a stable population requiring water quality protection. Where species appear in areas not normally expected, some adaptation may have occurred and site-specific criteria may be appropriately developed. Should the coldwater fish population consist of a threatened or endangered species, it may require protection under the Endangered Species Act. Otherwise, the stream need only be protected as a warmwater fishery.

4.4.3 Existing Uses and Physical Modifications

A literal interpretation of 40 CFR 131.12(a)(1) could prevent certain physical modifications to a water body that are clearly allowed by the Clean Water Act, such as wetland fill operations permitted under section 404 of the Clean Water Act. EPA interprets section 131.12(a)(l) of the antidegradation policy to be satisfied with regard to fills in wetlands if the discharge did not result in "significant degradation" to the aquatic ecosystem as defined under section 230.10(c) of the section 404(b)(l) Guidelines.

The section 404(b)(1) Guidelines state that the following effects contribute to significant degradation, either individually or collectively:

> . . . significant adverse effects on (1) human health or welfare, including effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites (e.g., wetlands); (2) on the life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, or spread of pollutants or their byproducts beyond the site through biological, physical, or chemical process; (3) on ecosystem diversity, productivity, and stability, including loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy; or (4) on recreational, aesthetic, and economic values.

These Guidelines may be used by States to determine "significant degradation" for wetland fills. Of course, the States are free to adopt stricter requirements for wetland fills in their own antidegradation polices, just as they may adopt any other requirement more stringent than Federal law requires. For additional information on the linkage between water quality standards and the section 404 program, see Appendix D.

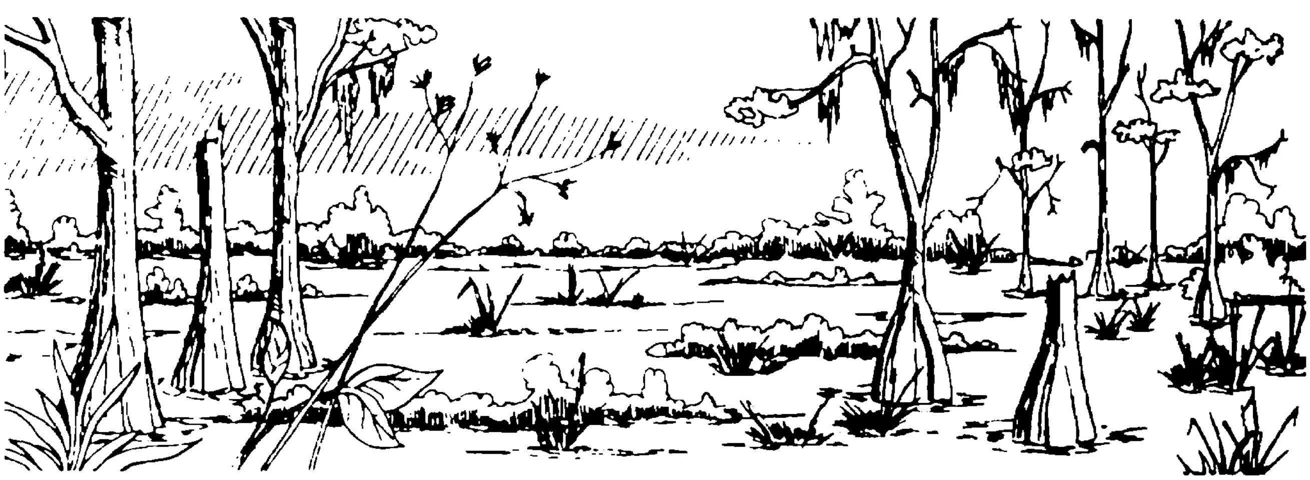
If any wetlands were found to have better water quality than "fishable/swimmable," the State would be allowed to lower water quality to the no significant degradation level as long as the requirements of section 131.12(a)(2) were followed. As for the ONRW provision of antidegradation (131.12(a)(3)), there is no difference in the way it applies to wetlands and other water bodies.

4.4.4 Existing Uses and Mixing Zones

Mixing zones are another instance when the entire extent of the water body is not required to be given full existing use protection. The area within a properly designated mixing zone (see section 5.1) may have altered benthic habitat and a subsequent alteration of the portions of the aquatic community. Any effect on the existing use must be limited to the area of the regulatory mixing zone.

4.5 Protection of Water Quality in High-Quality Waters - 40 CFR 131.12(a)(2)

This section provides general program guidance in the development of procedures for the maintenance and protection of water quality where the quality of the water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water. Water quality in "high-quality waters" must be maintained and protected as prescribed in section 131.12(a)(2) of the WQS regulation.



High-quality waters are those whose quality exceeds that necessary to protect the section 101(a)(2) goals of the Act, regardless of use designation. All parameters do not need to be better quality than the State's ambient criteria for the water to be deemed a "high-quality water." EPA believes that it is best to apply antidegradation on a parameter-by-parameter basis. Otherwise, there is potential for a large number of waters not to receive antidegradation protection, which is important to attaining the goals of the Clean Water Act to restore and maintain the integrity of the Nation's waters. However, if a State has an official interpretation that differs from this interpretation, EPA will evaluate the State interpretation for conformance with the statutory and regulatory intent of the antidegradation policy. EPA has accepted approaches that do not use a strict pollutant-by-pollutant basis (USEPA, 1989c).

In "high-quality waters," under 131.12(a)(2), before any lowering of water quality occurs, there must be an antidegradation review consisting of:

- a finding that it is necessary to accommodate important economical or social development in the area in which the waters are located (this phrase is intended to convey a general concept regarding what level of social and economic development could be used to justify a change in high-quality waters);
- full satisfaction of all intergovernmental coordination and public participation provisions (the intent here is to ensure that no activity that will cause water quality to decline in existing high-quality waters is undertaken without adequate public review and intergovernmental coordination); and
- assurance that the highest statutory and regulatory requirements for point sources, including new source performance standards, and best management practices for nonpoint source pollutant controls are achieved (this requirement ensures that the limited provision for lowering water quality of high-quality waters down to "fishable/swimmable" levels will not be used to undercut the Clean Water Act requirements for point source and nonpoint source pollution control; furthermore, by ensuring compliance with such statutory and regulatory controls, there is less chance that a lowering of water quality will be sought to accommodate new economic and social development).

In addition, water quality may not be lowered to less than the level necessary to fully protect the "fishable/swimmable" uses and other existing uses. This provision is intended to provide relief only in a few extraordinary circumstances where the economic and social need for the activity clearly outweighs the benefit of maintaining water quality above that required for "fishable/swimmable" water, and both cannot be achieved. The burden of demonstration on the individual proposing such activity will be very high. In any case, moreover, the existing use must be maintained and the activity shall not preclude the maintenance of a "fishable/swimmable" level of water quality protection.

The antidegradation review requirements of this provision of the antidegradation policy are triggered by any action that would result in the lowering of water quality in a high-quality water. Such activities as new discharges or expansion of existing facilities would presumably lower water quality and would not be permissible unless the State conducts a review consistent with the previous paragraph. In addition, no permit may be issued, without an antidegradation review, to a discharger to high-quality waters with effluent limits greater than actual current loadings if such loadings will cause a lowering of water quality (USEPA, 1989c).

Antidegradation is not a "no growth" rule and was never designed or intended to be such. It is a policy that allows public decisions to be made on important environmental actions. Where the State intends to provide for development, it may decide under this section, after satisfying the requirements for intergovernmental coordination and public participation, that some lowering of water quality in "high-quality waters" is necessary to accommodate important economic or social development. Any such lower water quality must protect existing uses fully, and the State must assure that the highest statutory and regulatory requirement for all new and existing point sources and all cost-effective and reasonable BMPs for nonpoint source control are being achieved on the water body.

Section 131.12(a)(2) does not REQUIRE a State to establish BMPs for nonpoint sources where such BMP requirements do not exist. We interpret Section 131.12(a)(2) as REQUIRING States to adopt an antidegradation policy that includes a provision that will assure that all cost-effective and reasonable BMPs established under State authority are implemented for nonpoint sources before the State authorizes degradation of high quality waters by point sources (see USEPA, 1994a.)

Section 131.12(a)(2) does not mandate that States establish controls on nonpoint sources. The Act leaves it to the States to determine what, if any, controls on nonpoint sources are needed to provide for attainment of State water quality standards (See CWA Section 319.) States may adopt enforceable requirements, or voluntary programs to address nonpoint source pollution. Section 40 CFR 131.12(a)(2) does not require that States adopt or implement best management practices for nonpoint sources prior to allowing point source degradation of a high quality water. However, States that have adopted nonpoint source controls must assure that such controls are properly implemented before authorization is granted to allow point source degradation of water quality.

The rationale behind the antidegradation regulatory statement regarding achievement of statutory requirements for point sources and all cost effective and reasonable BMPs for nonpoint sources is to assure that, in high quality waters, where there are existing point or nonpoint source control compliance problems, proposed new or expanded point sources are not allowed to contribute additional pollutants that could result in degradation. Where such compliance problems exist, it would be inconsistent with the philosophy of the antidegradation policy to authorize the discharge of additional pollutants in the absence of adequate assurance that any existing compliance problems will be resolved.

EPA's regulation also requires maintenance of high quality waters except where the State finds that degradation is "necessary to accommodate important economic and social development in the area in which the waters are located." (40 CFR Part 131.12(a) (Emphasis added)). We believe this phrase should be interpreted to prohibit point source degradation as unnecessary to accommodate important economic and social development if it could be partially or completely prevented through implementation of existing State-required BMPs.

EPA believes that its antidegradation policy should be interpreted on a pollutant-by-pollutant and waterbody-by-waterbody basis. For example, degradation of a high quality waterbody by a proposed new BOD source prior to implementation of required BMPs on the same waterbody that are related to BOD loading should not be allowed. However, degradation by the new point source of BOD should not be barred solely on the basis that BMPs unrelated to BOD loadings, or which relate to other waterbodies, have not been implemented.

We recommend that States explain in their antidegradation polices or procedures how, and to what extent, the State will require implementation of otherwise non-enforceable (voluntary) BMPs before allowing point source degradation of high quality waters. EPA understands this recommendation exceeds the Federal requirements discussed in this guidance. For example, nonpoint source management plans being developed under section 319 of the Clean Water Act are likely to identify potential problems and certain voluntary means to correct those problems. The State should consider how these provisions will be implemented in conjunction with the water quality standards program.

4.6 Applicability of Water Quality Standards to Nonpoint Sources Versus Enforceability of Controls

The requirement in Section 131.21(a)(2) to implement existing nonpoint source controls before allowing degradation of a high quality water, is a subset of the broader issue of the applicability of water quality standards versus the enforceability of controls designed to implement standards. A discussion of the broader issue is included here with the intent of further clarifying the nonpoint source antidegradation question. In the following discussion, the central message is that water quality standards apply broadly and it is inappropriate to exempt whole classes of activities from standards and thereby invalidate that broader, intended purpose of adopted State water quality standards.

Water quality standards serve the dual function of establishing water quality goals for a specific waterbody and providing the basis for regulatory controls. Water quality standards apply to both point and nonpoint sources. There is a direct Federal implementation mechanism to regulate point sources of pollution but no parallel Federal regulatory process for nonpoint sources. Under State law, however, States can and do adopt mandatory nonpoint source controls.

State water quality standards play the central role in a State's water quality management program, which identifies the overall mechanism States use to integrate the various Clean Water Act water quality control elements into a coherent management framework. This includes, for example: (1) setting and revising water quality standards for all surface waterbodies, (2) monitoring water quality to provide information upon which water quality-based decisions will be made, progress evaluated, and success measured, (3) preparing a water quality inventory report under section 305(b) which documents the status of the States's water quality, (4) developing a water quality management plan which lists the standards, and prescribes the regulatory and construction activities necessary to meet the standards, (5) calculating total maximum daily loads and wasteload allocations for point sources of pollution and load allocations for nonpoint sources of pollution in the implementation of standards,(6) implementing the section 319 management plan which outlines the State's control strategy for nonpoint sources of pollution, and (7) developing permits under Section 402.

Water quality standards describe the desired condition of the aquatic environment, and, as such, reflect any activity that affects water quality. Water quality standards have broad application and use in evaluating potential impacts of water quality from a broad range of causes and sources and are not limited to evaluation of effects caused by the discharge of pollutants from point sources. In this regard, States should have in place methods by which the State can determine whether or not their standards have been achieved (including uses, criteria, and implementation of an antidegradation policy). Evaluating attainment of standards is basic to successful application of a State's water quality standards program. In the broad application of standards, these evaluations are not limited to those activities which are directly controlled through a mandatory process. Rather, these evaluations are an important component of a State's water quality management program regardless of whether or not an enforcement procedure is in place for the activity under review.

Water quality standards are implemented through State or EPA-issued water quality-based permits and through State nonpoint source control programs. Water quality standards are implemented through enforceable NPDES permits for point sources and through the installation and maintenance of BMPs for nonpoint sources. Water quality standards usually are not considered self-enforcing except where they are established as enforceable under State law. Application of water quality standards in the overall context of a water quality management program, however, is not limited to activities for which there are enforceable implementation mechanisms.

In simple terms, applicability and enforceability are two distinctly separate functions in the water quality standards program. Water quality standards are applicable to all waters and in all situations, regardless of activity or source of degradation. Implementation of those standards may not be possible in all circumstances; in such cases, the use attainability analysis may be employed. In describing the desired condition of the environment, standards establish a benchmark against which all activities which might affect that desired condition are, at a minimum, evaluated. Standards serve as the basis for water quality monitoring and there is value in identifying the source and cause of a exceedance even if, at present, those sources of impact are not regulated otherwise controlled.

It is acceptable for a State to specify particular classes of activities for which no control requirements have been established in State law. It is not acceptable, however, to specify that standards do not apply to particular classes of activities (e.g. for purposes of monitoring and assessment). To do so would abrogate one of the primary functions of water quality standards.

4.7 Outstanding National Resource Waters (ONRW) - 40 CFR 131.12(a)(3)

Outstanding National Resource Waters (ONRWs) are provided the highest level of protection under the antidegradation policy. The policy provides for protection of water quality in high-quality waters that constitute an ONRW by prohibiting the lowering of water quality. ONRWs are often regarded as highest quality waters of the United States: That is clearly the thrust of 131.12(a)(3). However, ONRW designation also offers special protection for waters of "exceptional ecological significance." These are water bodies that are important, unique, or sensitive ecologically, but whose water quality, as measured by the traditional parameters such as dissolved oxygen or pH, may not be particularly high or whose characteristics cannot be adequately described by these parameters (such as wetlands).

The regulation requires water quality to be maintained and protected in ONRWs. EPA interprets this provision to mean no new or increased discharges to ONRWs and no new or increased discharge to tributaries to ONRWs that would result in lower water quality in the ONRWs. The only exception to this prohibition, as discussed in the preamble to the Water Quality Standards Regulation (48 F.R. 51402), permits States to allow some limited activities that result in temporary and short-term changes in the water quality of ONRW. Such activities must not permanently degrade water quality or result in water quality lower than that necessary to protect the existing uses in the ONRW. It is difficult to give an exact definition of "temporary" and "short-term" because of the variety of activities that might be considered. However, in rather broad terms, EPA's view of temporary is weeks and months, not years. The intent of EPA's provision clearly is to limit water quality degradation to the shortest possible time. If a construction activity is involved, for example, temporary is defined as the length of time necessary to construct the facility and make it operational. During any period of time when, after opportunity for public participation in the decision, the State allows temporary degradation, all practical means of minimizing such degradation shall be implemented. Examples of situations in which flexibility is appropriate are listed in Exhibit 4-1.

4.8 Antidegradation Application and Implementation

Any one or a combination of several activities may trigger the antidegradation policy analysis. Such activities include a scheduled water quality standards review, the establishment of new or revised load allocations, waste load allocations, total maximum daily loads, issuance of NPDES permits, and the demonstration of need for

Example 1 ***A national park wishes to replace a defective septic tank-drainfield system in a campground. The campground is located immediately adjacent to a small stream with the ONRW use designation.***

Under the regulation, the construction could occur if best management practices were scrupulously followed to minimize any disturbance of water quality or aquatic habitat.

Example 2 ***Same situation except the campground is served by a small sewage treatment plant already discharging to the ONRW. It is desired to enlarge the treatment system and provide higher levels of treatment.***

Under the regulation, this water-quality-enhancing action would be permitted if there was only temporary increase in sediment and, perhaps, in organic loading, which would occur during the actual construction phase.

Example 3 ***A National forest with a mature, second growth of trees which are suitable for harvesting, with associated road repair and re-stabilization. Streams in the area are designated as ONRW and support trout fishing.***

The regulation intends that best management practices for timber harvesting be followed and might include preventive measures more stringent than for similar logging in less environmentally sensitive areas. Of course, if the lands were being considered for designation as wilderness areas or other similar designations, EPA's regulation should not be construed as encouraging or condoning timbering operations. The regulation allows only temporary and short-term water quality degradation while maintaining existing uses or new uses consistent with the purpose of the management of the ONRW area.

Other examples of these types of activities include maintenance and/or repair of existing boat ramps or boat docks, restoration of existing sea walls, repair of existing stormwater pipes, and replacement or repair of existing bridges.

Exhibit 4-1. Examples of Allowable Temporary Lowering of Water Quality in Outstanding National Resource Waters

advanced treatment or request by private or public agencies or individuals for a special study of the water body.

Nonpoint source activities are not exempt from the provisions of the antidegradation policy. The language of section 131.12 (a)(2) of the regulation: "Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control . . . " reflects statutory provisions of the Clean Water Act. While it is true that the Act does not establish a federally enforceable program for nonpoint sources, it clearly intends that the BMPs developed and approved under sections 205(j), 208, 303(e), and 319 be aggressively implemented by the States.

4.8.1 Antidegradation, Load Allocation, Waste Load Allocation, Total Maximum Daily Load, and Permits

In developing or revising a load allocation (LA), waste load allocation (WLA), or total maximum daily load (TMDL) to reflect new information or to provide for seasonal variation, the antidegradation policy, as an integral part of the State water quality standards, must be applied as discussed in this section.

The TMDL/WLA/LA process distributes the allowable pollutant loadings to a water body. Such allocations also consider the contribution to pollutant loadings from nonpoint sources. This process must reflect applicable State water quality standards including the antidegradation policy. No waste load allocation can be developed or NPDES permit issued that would result in standards being violated. With respect to antidegradation, that means existing uses must be protected, water quality may not be lowered in ONRWs, and in the case of waters whose quality exceeds that necessary for the section 101(a)(2) goals of the Act, an activity cannot result in a lowering of water quality unless the applicable public participation, intergovernmental review, and baseline control requirements of the antidegradation policy have been met. Once the LA, WLA, or TMDL revision is completed, the resulting permits must incorporate discharge limitations based on this revision.

When a pollutant discharge ceases for any reason, the waste load allocations for the other dischargers in the area may be adjusted to reflect the additional loading available consistent with the antidegradation policy under two circumstances:

- In "high-quality waters" where after the full satisfaction of all public participation and intergovernmental review requirements, such adjustments are considered necessary to accommodate important economic or social development, and the "threshold" level requirements (required point and nonpoint source controls) are met.
- In less than "high-quality waters," when the expected improvement in water quality (from the ceased discharge) would not cause a better use to be achieved.

The adjusted loads still must meet water quality standards, and the new waste load allocations must be at least as stringent as technology-based limitations. Of course, all applicable requirements of the section 402 NPDES permit regulations would have to be satisfied before a permittee could increase its discharge.

If a permit is being renewed, reissued or modified to include less stringent limitations based on the revised LA/WLA/TMDL, the same antidegradation analysis applied during the LA/WLA/TMDL stage would apply during the permitting stage. It would be reasonable to allow the showing made during the LA/WLA/TMDL stage to satisfy the antidegradation showing at the permit stage. Any restrictions to less stringent limits based on antibacksliding would also apply.

If a State issues an NPDES permit that violates the required antidegradation policy, it would be subject to a discretionary EPA veto under section

402(d) or to a citizen challenge. In addition to actions on permits, any waste load allocations and total maximum daily loads violating the antidegradation policy are subject to EPA disapproval and EPA promulgation of a new waste load allocation/total maximum daily load under section 303(d) of the Act. If a significant pattern of violation was evident, EPA could constrain the award of grants or possibly revoke any Federal permitting capability that had been delegated to the State. Where EPA issues an NPDES permit, EPA will, consistent with its NPDES regulations, add any additional or more stringent effluent limitations required to ensure compliance with the State antidegradation policy incorporated into the State water quality standards. If a State fails to require compliance with its antidegradation policy through section 401 certification related to permits issued by other Federal agencies (e.g., a Corps of Engineers section 404 permit), EPA could comment unfavorably upon permit issuance. The public, of course, could bring pressure upon the permit issuing agency.

For example applications of antidegradation in the WLA and permitting process, see Exhibit 4-2.

4.8.2 Antidegradation and the Public Participation Process

Antidegradation, as with other water quality standards activities, requires public participation and intergovernmental coordination to be an effective tool in the water quality management process. 40 CFR 131.12(a)(2) contains explicit requirements for public participation and intergovernmental coordination when determining whether to allow lower water quality in high-quality waters. Nothing in either the water quality standards or the waste load allocation regulations requires the same degree of public participation or intergovernmental coordination for such non-high-quality waters as is required for high-quality waters. However public participation would still be provided in connection with the issuance of a NPDES permit or amendment of a 208 plan. Also, if the action that causes reconsideration of the existing waste loads (such as dischargers withdrawing from the area) will result in an improvement in water quality that makes a better use attainable, even if not up to the "fishable/swimmable" goal, then the water quality standards must be upgraded and full public review is required for any action affecting changes in standards. Although not specifically required by the standards regulation between the triennial reviews, we recommend that the State conduct a use attainability analysis to determine if water quality improvement will result in attaining higher uses than currently designated in situations where significant changes in waste loads are expected.

The antidegradation public participation requirement may be satisfied in several ways. The State may hold a public hearing or hearings. The State may also satisfy the requirement by providing public notice and the opportunity for the public to request a hearing. Activities that may affect several water bodies in a river basin or sub-basin may be considered in a single hearing. To ease the resource burden on both the State and public, standards issues may be combined with hearings on environmental impact statements, water management plans, or permits. However, if this is done, the public must be clearly informed that possible changes in water quality standards are being considered along with other activities. It is inconsistent with the water quality standards regulation to "back-door" changes in standards through actions on EIS's, waste load allocations, plans, or permits.

Example 1

Several facilities on a stream segment discharge phosphorus-containing wastes. Ambient phosphorus concentrations meet the designated class B (non-fishable/swimmable) standards, but barely. Three dischargers achieve elimination by developing land treatment systems. As a result, actual water quality improves (i.e., phosphorus levels decline) but not quite to the level needed to meet class A (fishable/swimmable) standards. Can the remaining dischargers now be allowed to increase their phosphorus discharge without an antidegradation analysis with the result that water quality declines (phosphorus levels increase) to previous levels?

Nothing in the water quality standards regulation explicitly prohibits this. Of course, changes in their NPDES permit limits may be subject to non-water quality constraints, such as BPT, BAT, or the NPDES antibacksliding provisions, which may restrict the increased loads.

Example 2

Suppose, in the above situation, water quality improves to the point that actual water quality now meets class A requirements. Is the answer different?

Yes. The standards must be upgraded (see section 2.8).

Example 3

As an alternative case, suppose phosphorus loadings go down and water quality improves because of a change in farming practices (e.g., initiation of a successful nonpoint source program.) Are the above answers the same?

Yes. Whether the improvement results from a change in point or nonpoint source activity is immaterial to how any aspect of the standards regulation operates. Section 131.10(d) clearly indicates that uses are deemed attainable if they can be achieved by "... cost-effective and reasonable best management practices for nonpoint source control." Section 131.12(a)(2) of the antidegradation policy contains essentially the same wording.

Exhibit 4-2. Examples of the Application of Antidegradation in the Waste Load/Load Allocation and NPDES Permitting Process

CHAPTER 5

GENERAL POLICIES

(40 CFR 131.13)

Table of Contents

CHAPTER 5
GENERAL POLICIES

States may, at their discretion, adopt certain policies in their standards affecting the application and implementation of standards. For example, policies concerning mixing zones, water quality standards variances, and critical flows for water quality-based permit limits may be adopted. Although these are areas of State discretion, EPA retains authority to review and approve or disapprove such policies (see 40 CFR 131.13).

5.1 Mixing Zones

It is not always necessary to meet all water quality criteria within the discharge pipe to protect the integrity of the water body as a whole. Sometimes it is appropriate to allow for ambient concentrations above the criteria in small areas near outfalls. These areas are called mixing zones. Whether to establish a mixing zone policy is a matter of State discretion, but any State policy allowing for mixing zones must be consistent with the Clean Water Act and is subject to approval of the Regional Administrator.

A series of guidance documents issued by EPA and its predecessor agencies have addressed the concept of a mixing zone as a limited area or volume of water where initial dilution of a discharge takes place. Mixing zones have been applied in the water quality standards program since its inception. The present water quality standards regulation allows States' to adopt mixing zones as a matter of States discretion. Guidance on defining mixing zones previously has been provided in several EPA documents, including FWPCA (1968); NAS/NAE (1972); USEPA (1976); and USEPA (1983a).

EPA's current mixing zone guidance, contained in this Handbook and the *Technical Support Document for Water Quality-based Toxics Control* (USEPA, 1991a), evolved from and supersedes these sources.

Allowable mixing zone characteristics should be established to ensure that:

- mixing zones do not impair the integrity of the water body as a whole,
- there is no lethality to organisms passing through the mixing zone (see section 5.1.2, this Handbook); and
- there are no significant health risks, considering likely pathways of exposure (see section 5.1.3, this Handbook).

EPA recommends that mixing zone characteristics be defined on a case-by-case basis after it has been determined that the assimilative capacity of the receiving system can safely accommodate the discharge. This assessment should take into consideration the physical, chemical, and biological characteristics of the discharge and the receiving system; the life history and behavior of organisms in the receiving system; and the desired uses of the waters. Mixing zones should not be permitted where they may endanger critical areas (e.g., drinking water supplies, recreational areas, breeding grounds, areas with sensitive biota).

EPA has developed a holistic approach to determine whether a mixing zone is tolerable (Brungs, 1986). The method considers all the impacts to the water body and all the impacts that the drop in water quality will have on the surrounding ecosystem and water body uses. It is a multistep data collection and analysis procedure that is particularly sensitive to overlapping mixing zones. This method includes the identification of all upstream and downstream water bodies and the ecological and cultural data pertaining to them; the collection of data on all present and future discharges to the water body; the assessment of relative environmental value and level of protection needed for the water body; and, finally, the allocation of environmental impact for a discharge applicant. Because of the difficulty in collecting the data necessary for this procedure and the general lack of agreement concerning relative values, this method will be difficult to implement in full. However, the method does serve as a guide on how to proceed in allocating a mixing zone.

Mixing zone allowances will increase the mass loadings of the pollutant to the water body and decrease treatment requirements. They adversely impact immobile species, such as benthic communities, in the immediate vicinity of the outfall. Because of these and other factors, mixing zones must be applied carefully, so as not to impede progress toward the Clean Water Act goals of maintaining and improving water quality. EPA recommendations for allowances for mixing zones, and appropriate cautions about their use, are contained in this section.

MIXING ZONES

A limited area or volume of water where initial dilution of a discharge takes place and where numeric water quality criteria can be exceeded but acutely toxic conditions are prevented.

The *Technical Support Document for Water Quality-based Toxics Control* (USEPA, 1991a, sections 2.2, 4.3, 4.4) discusses mixing zone analyses for situations in which the discharge does not mix completely with the receiving water within a short distance. Included are discussions of outfall designs that maximize initial dilution in the mixing zone, critical design periods for mixing zone analyses, and methods to analyze and model nearfield and farfield mixing.

5.1.1 State Mixing Zone Methodologies

EPA recommends that States have a definitive statement in their standards on whether or not mixing zones are allowed. Where mixing zones provisions are part of the State standards, the State should describe the procedures for defining mixing zones. Since these areas of impact, if disproportionally large, could potentially adversely impact the productivity of the water body and have unanticipated ecological consequences, they should be carefully evaluated and appropriately limited in size. As our understanding of pollutant impacts on ecological systems evolves, cases could be identified where no mixing zone is appropriate.

State water quality standards should describe the State's methodology for determining the location, size, shape, outfall design, and in-zone quality of mixing zones. The methodology should be sufficiently precise to support regulatory actions, issuance of permits, and determination of BMPs for nonpoint sources. EPA recommends the following:

- **Location**

Biologically important areas are to be identified and protected. Where necessary to preserve a zone of passage for migrating fish or other organisms in a water course, the standards should specifically identify the portions of the waters to be kept free from mixing zones.

Where a mixing zone is allowed, water quality standards are met at the edge of that regulatory mixing zone during design flow conditions and generally provide:

- a continuous zone of passage that meets water quality criteria for free-swimming and drifting organisms; and
- prevention of impairment of critical resource areas.

Individual State mixing zone dimensions are designed to limit the impact of a mixing zone on the water body. Furthermore, EPA's review of State waste load allocations (WLAs) should evaluate whether assumptions of complete or incomplete mixing are appropriate based on available data.

In river systems, reservoirs, lakes, estuaries, and coastal waters, zones of passage are defined as continuous water routes of such volume, area, and quality as to allow passage of free-swimming and drifting organisms so that no significant effects are produced on their populations. Transport of a variety of organisms in river water and by tidal movements in estuaries is biologically important for a number of reasons:

- food is carried to the sessile filter feeders and other nonmotile organisms;
- spatial distribution of organisms and reinforcement of weakened populations are enhanced; and
- embryos and larvae of some fish species develop while drifting.

Anadromous and catadromous species must be able to reach suitable spawning areas. Their young (and in some cases the adults) must be assured a return route to their growing and living areas. Many species make migrations for spawning and other purposes. Barriers or blocks that prevent or interfere with these types of essential transport and movement can be created by water with inadequate chemical or physical quality.

Size

Various methods and techniques for defining the surface area and volume of mixing zones for various types of waters have been formulated. Methods that result in quantitative measures sufficient for permit actions and that protect designated uses of a water body as a whole are acceptable. The area or volume of an individual zone or group of zones must be limited to an area or volume as small as practicable that will not interfere with the designated uses or with the established community of aquatic life in the segment for which the uses are designated.

To ensure that mixing zones do not impair the integrity of the water body, it should be determined that the mixing zone will not cause lethality to passing organisms and that, considering likely pathways of exposure, no significant human health risks exist. One means to achieve these objectives is to limit the size of the area affected by the mixing zones.

In the general case, where a State has both acute and chronic aquatic life criteria, as well as human health criteria, independently established mixing zone specifications may apply to each of the three types of criteria. For application of two-number aquatic life criteria, there may be up to two types of mixing zones (see Figure 5-1). In the zone immediately surrounding the outfall, neither the acute nor the chronic criteria are met. The acute criteria are met at the edge of this zone. In the next mixing zone, the acute, but not the chronic, criteria are met. The chronic criteria are met at the edge of the second mixing zone. The acute mixing zone may be sized to prevent lethality to passing organisms, the chronic mixing zone sized to protect the ecology of the water body as a whole, and the health criteria mixing zone sized to prevent significant human risks. For any particular pollutant from any

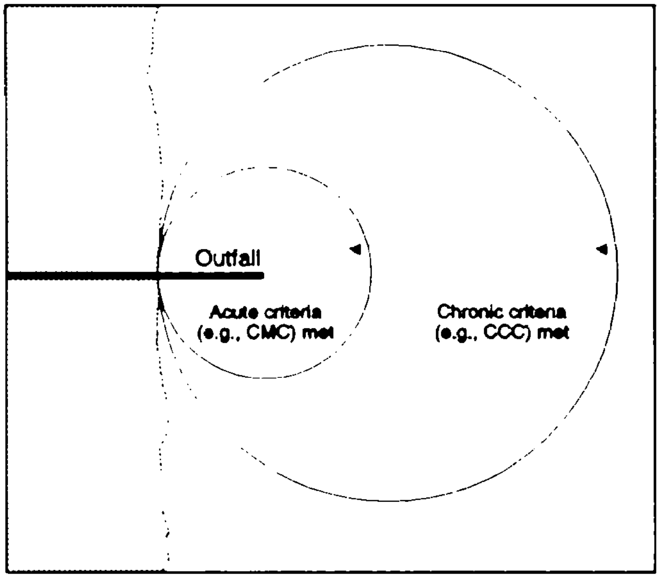


Figure 5-1. Diagram of the Two Parts of the Aquatic Life Mixing Zone

particular discharge, the magnitude, duration, frequency, and mixing zone associated with each of the three types of criteria (acute and chronic aquatic life, and human health) will determine which one most limits the allowable discharge.

Concentrations above the chronic criteria are likely to prevent sensitive taxa from taking up long-term residence in the mixing zone. In this regard, benthic organisms and territorial organisms are likely to be of greatest concern. The higher the concentrations occurring within certain isopleths, the more taxa are likely to be excluded, thereby affecting the structure and function of the ecological community. It is thus important to minimize the overall size of the mixing zone and the size of elevated concentration isopleths within the mixing zone.

To determine that, for aquatic life protection, a mixing zone is appropriately sized, water quality conditions within the mixing zone may be compared to laboratory-measured or predicted toxicity benchmarks as follows:

- It is not necessary to meet chronic criteria within the mixing zone, only at the edge of the mixing zone. Conditions within the mixing zone would thus not be adequate to assure survival, growth, and reproduction of all organisms that might otherwise attempt to reside continuously within the mixing zone.

- If acute criteria (criterion maximum concentration, or CMC, derived from 48- to 96-hour exposure tests) are met throughout the mixing zone, no lethality should result from temporary passage through the mixing zone. If acute criteria are exceeded no more than a few minutes in a parcel of water leaving an outfall (as assumed in deriving the section 5.1.2 options for an outfall velocity of 3 m/sec, and a size of 50 times the discharge length scale), this likewise assures no lethality to passing organisms.

- If a full analysis of concentrations and hydraulic residence times within the mixing zone indicates that organisms drifting through the centerline of the plume along the path of maximum exposure would not be exposed to concentrations exceeding the acute criteria when averaged over the 1-hour (or appropriate site-specific) averaging period for acute criteria, then lethality to swimming or drifting organisms should ordinarily not be expected, even for rather fast-acting toxicants. In many situations, travel time through the acute mixing zone must be less than roughly 15 minutes if a 1-hour average exposure is not to exceed the acute criterion.

Where mixing zone toxicity is evaluated using the probit approach described in the water quality criteria "Blue Book" (NAS/NAE, 1973), or using models of toxicant accumulation and action in organisms (such as described by Mancini, 1983, or Erickson et al., 1989), the phenomenon of delayed mortality should be taken into account before judging the mixing zone concentrations to be safe.

The above recommendations assume that the effluent is repulsive, such that free-swimming organisms would avoid the mixing zones. While most toxic effluents are repulsive, caution is necessary in evaluating attractive mixing zones of known effluent toxicity, and denial of such mixing zones may well be appropriate. It is also important to assure that concentration isopleths within any plume will not extend to restrict passage of swimming organisms into tributary streams.

In all cases, the size of the mixing zone and the area within certain concentration isopleths should be evaluated for their effect on the overall biological integrity of the water body. If the total area affected by elevated concentrations within all mixing zones combined is small compared with the total area of a water body (such as a river segment), then mixing zones are likely to have little effect on the integrity of the water body as a whole, provided that they do not impinge on unique or critical habitats. EPA has developed a multistep procedure for evaluating the overall acceptability of mixing zones (Brungs, 1986).

Shape

The shape of a mixing zone should be a simple configuration that is easy to locate in a body of water and that avoids impingement on biologically important areas. In lakes, a circle with a specified radius is generally preferable, but other shapes may be specified in the case of unusual site requirements. Most States allow mixing zones as a policy issue but provide spatial dimensions to limit the areal extent of the mixing zones. The mixing zones are then allowed (or not allowed) after case-by-case determinations. State regulations dealing with streams and rivers generally limit mixing zone widths, cross-sectional areas, and flow volumes, and allow lengths to be determined on a case-by-case basis. For lakes, estuaries, and coastal waters, dimensions are usually specified by surface area, width, cross-sectional area, and volume. "Shore-hugging" plumes should be avoided in all water bodies.

Outfall Design

Before designating any mixing zone, the State should ensure that the best practicable engineering design is used and that the location of the existing or proposed outfall will avoid significant adverse aquatic resource and water quality impacts of the wastewater discharge.

In-Zone Quality

Mixing zones are areas where an effluent discharge undergoes initial dilution and are extended to cover the secondary mixing in the ambient water body. A mixing zone is an allocated impact zone where acute and chronic water quality criteria can be exceeded as long as a number of protections are maintained, including freedom from the following:

(1) materials in concentrations that will cause acutely toxic conditions to aquatic life;

(2) materials in concentrations that settle to form objectionable deposits;

(3) floating debris, oil, scum, and other material in concentrations that form nuisances;

(4) substances in concentrations that produce objectionable color, odor, taste, or turbidity; and

(5) substances in concentrations that produce undesirable aquatic life or result in a dominance of nuisance species.

Acutely toxic conditions are defined as those lethal to aquatic organisms that may pass through the mixing zone. As discussed in section 5.1.2 below, the underlying assumption for allowing a mixing zone is that a small area of concentrations in excess of acute and chronic criteria but below acutely toxic releases can exist without causing adverse effects to the overall water body. The State regulatory agency can decide to allow or deny a mixing zone on a site-specific basis. For a mixing zone to be permitted, the discharger should prove to the State regulatory agency that all State requirements for a mixing zone are met.

5.1.2 Prevention of Lethality to Passing Organisms

Lethality is a function of the magnitude of pollutant concentrations and the duration an organism is exposed to those concentrations. Requirements for wastewater plumes that tend to attract aquatic life should incorporate measures to reduce the toxicity (e.g., via pretreatment, dilution) to minimize lethality or any irreversible toxic effects on aquatic life.

EPA's water quality criteria provide guidance on the magnitude and duration of pollutant concentrations causing lethality. The CMC is used as a means to prevent lethality or other acute effects. As explained in Appendix D to the *Technical Support Document for Water Quality-based Toxics Control* (USEPA, 1991a), the CMC is a toxicity level and should not be confused with an LC_{50} level. The CMC is defined as one-half of the final acute value (FAV) for specific toxicants and 0.3 acute toxicity unit (TU_a) for effluent toxicity (USEPA, 1991a. chap. 2). The CMC describes the condition under which lethality will not occur if the duration of the exposure to the CMC level is less than 1 hour. The CMC for whole-effluent toxicity is intended to prevent lethality or acute effects in the aquatic biota. The CMC for individual toxicants prevents acute effects in all but a small percentage of the tested species. Thus, the areal extent and concentration isopleths of the mixing zone must be such that the 1-hour average exposure of organisms passing through the mixing zone is less than the CMC. The organism must be able to pass through quickly or flee the high-concentration area. The objective of mixing zone water quality recommendations is to provide time-exposure histories that produce negligible or no measurable effects on populations of critical species in the receiving system.

Lethality to passing organisms can be prevented in the mixing zone in one of four ways. The first method is to prohibit concentrations in excess of the CMC in the pipe itself, as measured directly at the end of the pipe. As an example, the CMC should be met in the pipe whenever a continuous discharge is made to an intermittent stream. The second approach is to require that the CMC be met within a very short distance from the outfall during chronic design flow conditions for receiving waters (see section 5.2, this Handbook).

If the second alternative is selected, hydraulic investigations and calculations indicate that the use of a high-velocity discharge with an initial velocity of 3 m/sec, or greater, together with a mixing zone spatial limitation of 50 times the discharge length scale in any direction, should ensure that the CMC is met within a few minutes under practically all conditions.

The discharge length scale is defined as the square root of the cross-sectional area of any discharge pipe.

A third alternative (applicable to any water body) is not to use a high-velocity discharge.

Rather the discharger should provide data to the State regulatory agency showing that the most restrictive of the following conditions are met for each outfall:

- The CMC should be met within 10 percent of the distance from the edge of the outfall structure to the edge of the regulatory mixing zone in any spatial direction.

- The CMC should be met within a distance of 50 times the discharge length scale in any spatial direction. In the case of a multiport diffuser, this requirement must be met for each port using the appropriate discharge length scale of that port. This restriction will ensure a dilution factor of at least 10 within this distance under all possible circumstances, including situations of severe bottom interaction, surface interaction, or lateral merging.

- The CMC should be met within a distance of 5 times the local water depth in any horizontal direction from any discharge outlet. The local water depth is defined as the natural water depth (existing prior to the installation of the discharge outlet) prevailing under mixing-zone design conditions (e.g., low-flow for rivers). This restriction will prevent locating the discharge in very shallow environments or very close to shore, which would result in significant surface and bottom concentrations.

A fourth alternative (applicable to any water body) is for the discharger to provide data to the State regulatory agency showing that a drifting organism would not be exposed to 1-hour average concentrations exceeding the CMC, or would not receive harmful exposure when evaluated by other valid toxicological analysis (USEPA, 1991a, chap. 2). Such data should be collected during environmental conditions that replicate critical conditions.

For the third and fourth alternatives, examples of such data include monitoring studies, except for those situations where collecting chemical samples to develop monitoring data would be impractical, such as at deep outfalls in oceans, lakes, or embayments. Other types of data could include field tracer studies using dye, current meters, other tracer materials, or detailed analytical calculations, such as modeling estimations of concentration or dilution isopleths.

The following outlines a method, applicable to the fourth alternative, to determine whether a mixing zone is tolerable for a free-swimming or drifting organism. The method incorporates mortality rates (based on toxicity studies for the pollutant of concern and a representative organism) along with the concentration isopleths of the mixing zone and the length of time the organism may spend in each isopleth. The intent of the method is to prevent the actual time of exposure from exceeding the exposure time required to elicit an effect:

$$\sum \left(\frac{T(n)}{ET(X)\ at\ C_{(n)}} \right) \le 1$$

where T(n) is the exposure time an organism is in isopleth n, and ET(X) is the "effect time." That is, ET(X) is the exposure time required to produce an effect (including a delayed effect) in X percent of organisms exposed to a concentration equal to $C_{(n)}$, the concentration in isopleth n. ET(X) is experimentally determined; the effect is usually mortality. If the summation of ratios of exposure time to effect time is less than 1, then the percent effect will not occur.

5.1.3 Human Health Protection

For protection of human health, the presence of mixing zones should not result in significant health risks when evaluated using reasonable assumptions about exposure pathways. Thus, where drinking water contaminants are a concern, mixing zones should not encroach on drinking water intakes. Where fish tissue residues are a concern (either because of measured or predicted residues), mixing zones should not be projected to result in significant health risks to average consumers of fish and shellfish, after considering exposure duration of the affected aquatic organisms in the mixing zone and the patterns of fisheries use in the area.

While fish tissue contamination tends to be a far-field problem affecting entire water bodies rather than a narrow-scale problem confined to mixing zones, restricting or eliminating mixing zones for bioaccumulative pollutants may be appropriate under conditions such as the following:

- Mixing zones should be restricted such that they do not encroach on areas often used for fish harvesting particularly of stationary species such as shellfish.
- Mixing zones might be denied (see section 5.1.4) where such denial is used as a device to compensate for uncertainties in the protectiveness of the water quality criteria or uncertainties in the assimilative capacity of the water body.

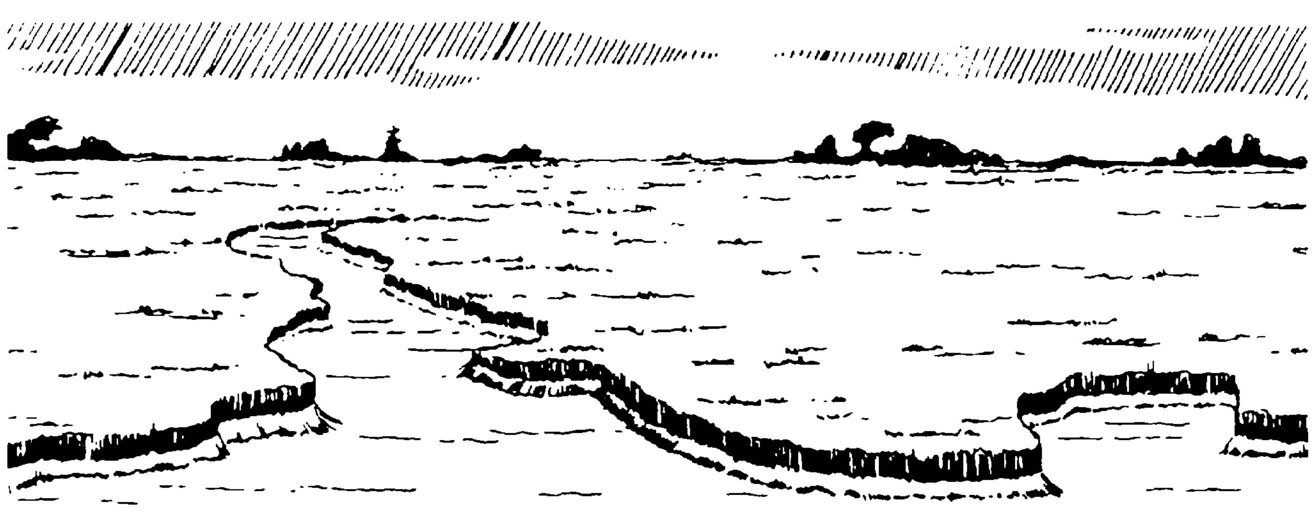
5.1.4 Where Mixing Zones Are Not Appropriate

States are not required to allow mixing zones and, if mixing zones are allowed, a State regulatory agency may decide to deny a mixing zone in a site-specific case. Careful consideration must be given to the appropriateness of a mixing zone where a substance discharged is bioaccumulative, persistent, carcinogenic, mutagenic, or teratogenic.

Denial should be considered when bioaccumulative pollutants are in the discharge. The potential for a pollutant to bioaccumulate in living organisms is measured by:

- the bioconcentration factor (BCF), which is chemical-specific and describes the degree to which an organism or tissue can acquire a higher contaminant concentration than its environment (e.g., surface water);
- the duration of exposure; and
- the concentration of the chemical of interest.

While any BCF value greater than 1 indicates that bioaccumulation potential exists, bioaccumulation potential is generally not considered to be significant unless the BCF exceeds 100 or more. Thus, a chemical that is discharged to a receiving stream resulting in



low concentrations and has a low BCF value will not result in a bioaccumulation hazard. Conversely, a chemical that is discharged to a receiving stream resulting in a low concentration but having a high BCF value may result in a bioaccumulation hazard. Also, some chemicals of relatively low toxicity, such as zinc, will bioconcentrate in fish without harmful effects resulting from human consumption.

Factors such as size of zone, concentration gradient within the zone, physical habitat, and attraction of aquatic life are important in this evaluation. Where unsafe fish tissue levels or other evidence indicates a lack of assimilative capacity in a particular water body for a bioaccumulative pollutant, care should be taken in calculating discharge limits for this pollutant or the additivity of multiple pollutants. In such instances, the ecological or human health effects may be so adverse that a mixing zone is not appropriate.

Another example of when a regulator should consider prohibiting a mixing zone is in situations where an effluent is known to attract biota. In such cases, provision of a continuous zone of passage around the mixing area will not serve the purpose of protecting aquatic life. A review of the technical literature on avoidance/attraction behavior revealed that the majority of toxicants elicited an avoidance or neutral response at low concentrations (Versar, 1984). However, some chemicals did elicit an attractive response, but the data were not sufficient to support any predictive methods. Temperature can be an attractive force and may counter an avoidance response to a pollutant, resulting in attraction to the toxicant discharge. Innate behavior such as migration may also supersede an avoidance response and cause a fish to incur a significant exposure.

5.1.5 Mixing Zones for the Discharge of Dredged or Fill Material

EPA, in conjunction with the Department of the Army, has developed guidelines to be applied in evaluating the discharge of dredged or fill material in navigable waters (see 40 CFR 230). The guidelines include provisions for determining the acceptability of mixing discharge zones (section 230.11(f)). The particular pollutant involved should be evaluated carefully in establishing dredging mixing zones. Dredged spoil discharges generally result in temporary short-term disruption and do not represent continuous discharge that will affect beneficial uses over a long term. Disruption of beneficial uses should be the primary consideration in establishing mixing zones for dredge and fill activities. State water quality standards should reflect these principles if mixing zones for dredging activities are referenced.

5.1.6 Mixing Zones for Aquaculture Projects

The Administrator is authorized, after public hearings, to permit certain discharges associated with approved aquaculture projects (section 318 of the Act). The regulations relating to aquaculture (40 CFR 122.56 and 125.11) provide that the aquaculture project area and project approval must not result in the enlargement of any previously approved mixing zone. In addition, aquaculture regulations provide that designated project areas must not include so large a portion of the body of water that a substantial portion of the indigenous biota will be exposed to conditions within the designated projects area (section 125.11(d)). Areas designated for approved aquaculture projects should be treated in the same manner as other mixing zones. Special allowances should not be made for these areas.

5.2 Critical Low-Flows

Water quality standards should protect water quality for designated uses in critical low-flow situations. In establishing water quality standards, States may designate a critical low-flow below which numerical water quality criteria do not apply. At all times, waters shall be free from substances that settle to form objectionable deposits; float as debris, scum, oil, or other matter; produce objectionable color, odor, taste, or turbidity; cause acutely toxic conditions; or produce undesirable or nuisance aquatic life.

To do steady-state waste load allocation analyses, these low-flow values become design flows for sizing treatment plants, developing waste load allocations, and developing water quality-based effluent limits. Historically, these so-called "design" flows were selected for the purposes of waste load allocation analyses that focused on instream dissolved oxygen concentrations and protection of aquatic life. EPA introduced hydrologically and biologically based analyses for the protection of aquatic life and human health with the publication of the *Technical Support Document for Water Quality-based Toxics Control.* These concepts have been expanded subsequently in guidance entitled *Technical Guidance Manual for Performing Wasteload Allocations, Book 6, Design Conditions*, (USEPA, 1986c). These new developments are included in Appendix D of the 1991 *Technical Support Document for Water Quality-based Toxics Control* (USEPA, 1991a). The discussion here is greatly simplified; it is provided to support EPA's recommendation for baseline application values for instream flows and thereby maintain the intended stringency of the criteria for priority toxic pollutants. EPA recommended either of two methods for calculating acceptable low-flows, the traditional hydrologic method developed by the U.S. Geological Survey and a biologically based method developed by EPA.

Most States have adopted specific low-flow requirements for streams and rivers to protect designated uses against the effects of toxics. Generally, these have followed the guidance in the TSD. EPA believes it is essential that States adopt design flows for steady-state analyses so that criteria are implemented appropriately. The TSD also recommends the use of three dynamic models to perform waste load allocations. Because dynamic waste load models do not generally use specific steady-state design flows but accomplish the same effect by factoring in the probability of occurrence of stream flows based on the historical flow record, only steady-state conditions will be discussed here. Clearly, if the criteria are implemented using inadequate design flows, the resulting toxics controls would not be fully effective because the resulting ambient concentrations would exceed EPA's criteria.

In the case of aquatic life, more frequent violations than the assumed exceedences once in 3 years would result in diminished vitality of stream ecosystems characteristics by the loss of desired species such as sport fish. Numeric water quality criteria should apply at all flows that are equal to or greater than flows specified in Exhibit 5-1.

EPA is recommending the harmonic mean flow to be applied with human health criteria for carcinogens. The concept of a harmonic mean is a standard statistical data analysis technique. EPA's model for human health effects assumes that such effects occur because of a long-term exposure to low concentration of a toxic pollutant (for example, 2 liters of water per day for 70 years). To estimate the concentrations of the toxic pollutant in those 2 liters per day by withdrawal from streams with a high daily variation in flow, EPA believes the harmonic mean flow is the correct statistic to use in computing such design flows rather than other averaging techniques. For a description of harmonic means, refer to Rossman (1990).

AQUATIC LIFE

Acute criteria (CMC)	1Q10 or 1B3
Chronic criteria (CCC)	7Q10 or 4B3

HUMAN HEALTH

Non-carcinogens	30Q5
Carcinogens	Harmonic mean flow

Where:

1Q10 is the lowest one day flow with an average recurrence frequency of once in 10 years determined hydrologically;

1B3 is biologically based and indicates an allowable exceedence of once every 3 years. It is determined by EPA's computerized method (DFLOW model);

7Q10 is the lowest average 7 consecutive day low flow with an average recurrence frequency of once in 10 years determined hydrologically;

4B3 is biologically based and indicates an allowable exceedence for 4 consecutive days once every 3 years. It is determined by EPA's computerized method (DFLOW model);

30Q5 is the lowest average 30 consecutive day low flow with an average recurrence frequency of once in 5 years determined hydrologically; and

harmonic mean flow is a long term mean flow value calculated by dividing the number of daily flows analyzed by the sum of the reciprocals of those daily flows.

Exhibit 5-1. EPA recommendations for design flows

EPA has produced guidance on flow considerations (USEPA, 1986d) which calculates design flows based on steady-state modeling. Two design flows are calculated, one for the criterion continuous concentration (CCC) and one for the criterion maximum concentration (CMC). The CCC is the 4-day average concentration of a pollutant in ambient water that should not be exceeded more than once every 3 years on average. The CCC is therefore, a chronic concentration. The CMC is a 1-hour average concentration in ambient waters that should not be exceeded more than once every 3 years on average. The CMC is an acute concentration. Note that when a criterion specifies a 4-day average concentration that should not be exceeded more than once every 3 years, this should not be interpreted as implying that a 4Q3 low-flow is appropriate for use as the design flow.

EPA had recommended interim use of the 1Q5 and 1Q10 low-flow as the CMC design flow and the 7Q5 and 7Q10 low-flows as the CCC design flow for unstressed and stressed systems, respectively. Further consideration of stress placed on aquatic ecosystems resulting from exceedences of water quality criteria indicates that there is little justification for different design flows for unstressed and stressed systems. All ecosystems have been changed and, therefore, stressed as a result of human activities. Therefore, the recommended design flow for CMC is 1Q10 and for CCC is 7Q10. States may designate other design or low-flows but such flows, must be scientifically justified. That many streams within a State have no flow at 7Q10 is not adequate justification for designating alternative flows.

5.3 Variances From Water Quality Standards

EPA first formally indicated allowability of State WQS variance provisions in Decision of the General Counsel No. 44, dated June 22, 1976, which specifically considered an Illinois variance provision, and expanded upon the acceptability of State WQS variance procedures in Decision of the General Counsel No. 58 (OGC No. 58) dated March 29, 1977 (published, in part, at 44 F.R. 39508 (July 6, 1979)). Subsequent guidance has elaborated on or clarified the policy over the years. For example, the Director of EPA's Criteria and Standards Division transmitted EPA's definition of a WQS variance to the Regional WQS Coordinators on July 3, 1979, and on March 15, 1985, the Director of the Office of Water Regulations and Standards, responding to questions raised on WQS variances, issued a reinterpretation of the factors that could be considered when granting variances.

Variance procedures involve the same substantive and procedural requirements as removing a designated use (see section 2.7,this Handbook), but unlike use removal, variances are both discharger and pollutant specific, are time-limited, and do not forego the currently designated use.

A variance should be used instead of removal of a use where the State believes the standard can ultimately be attained. By maintaining the standard rather than changing it, the State will assure that further progress is made in improving water quality and attaining the standard. With a variance, NPDES permits may be written such that reasonable progress is made toward attaining the standards without violating section 402(a)(1) of the Act, which requires that NPDES permits must meet the applicable water quality standards.

State variance procedures, as part of State water quality standards, must be consistent with the substantive requirements of 40 CFR 131. EPA has approved State-adopted variances in the past and will continue to do so if:

- each individual variance is included as part of the water quality standard;
- the State demonstrates that meeting the standard is unattainable based on one or more of the grounds outlined in 40 CFR 131.10(g) for removing a designated use;
- the justification submitted by the State includes documentation that treatment more advanced than that required by sections 303(c)(2)(A) and (B) has been carefully considered, and that alternative effluent control strategies have been evaluated;
- the more stringent State criterion is maintained and is binding upon all other dischargers on the stream or stream segment;
- the discharger who is given a variance for one particular constituent is required to meet the applicable criteria for other constituents;
- the variance is granted for a specific period of time and must be rejustified upon expiration but at least every 3 years (Note: the 3-year limit is derived from the triennial review requirements of section 303(c) of the Act.);
- the discharger either must meet the standard upon the expiration of this time period or must make a new demonstration of "unattainability";
- reasonable progress is being made toward meeting the standards; and
- the variance was subjected to public notice, opportunity for comment, and public hearing. (See section 303(c)(1) and 40 CFR 131.20.) The public notice should contain a clear description of the impact of the variance upon achieving water quality standards in the affected stream segment.

CHAPTER 6

PROCEDURES FOR REVIEW AND REVISION OF WATER QUALITY STANDARDS

(40 CFR 131 - Subpart C)

Table of Contents

CHAPTER 6
PROCEDURES FOR REVIEW AND REVISION OF WATER QUALITY STANDARDS

State review and revision of water quality standards are discussed in section 6.1. of this chapter. Guidance is provided on the administrative and regulatory requirements and procedures that should be followed in the State review and submittal process as well as the implication of a State's failure to submit standards. EPA review and approval procedures are discussed in section 6.2, and the procedures for promulgation of Federal standards are described in section 6.3.

6.1 State Review and Revision

Section 303(c)(1) of the Clean Water Act requires that a State shall, from time to time, but at least once every 3 years, hold public hearings to review applicable water quality standards and, as appropriate, to modify and adopt standards. The 3-year period is measured from the date of the letter in which the State informs EPA that revised or new standards have been adopted for the affected waters and are being submitted for EPA review or, if no changes were made in the standards for those waters, from the date of the letter in which the State informs EPA that the standards were reviewed and no changes were made.

States identify additions or revisions necessary to existing standards based on their 305(b) reports, other available water quality monitoring data, previous water quality standards reviews, or requests from industry, environmental groups, or the public. Water quality standards reviews and revisions may take many forms, including additions to and modifications in uses, in criteria, in the antidegradation policy, in the antidegradation implementation procedures, or in other general policies.

6.1.1 Consultation with EPA

State consultation with EPA regional offices should occur when States begin activities to revise or adopt new water quality standards and long before the State standards are formally submitted for EPA review. Reasons for early consultation with EPA include the following:

- States will benefit from early identification of potential areas of disagreement between EPA and the States, and EPA can determine where assistance may be provided;
- EPA must be in a position to respond to litigation and to congressional and other inquiries relating to actions on the revised State water quality standards;
- Headquarters must be ready to support promulgation actions when State standards have been disapproved;
- early consultation with EPA allows issues to be discussed well before a formal review request is received from the State; and
- EPA actions related to State standards should receive as comprehensive a review as possible.

6.1.2 Public Notice Soliciting Suggestions for Additions or Revisions to Standards

An important component of the water quality standards setting and review process is a

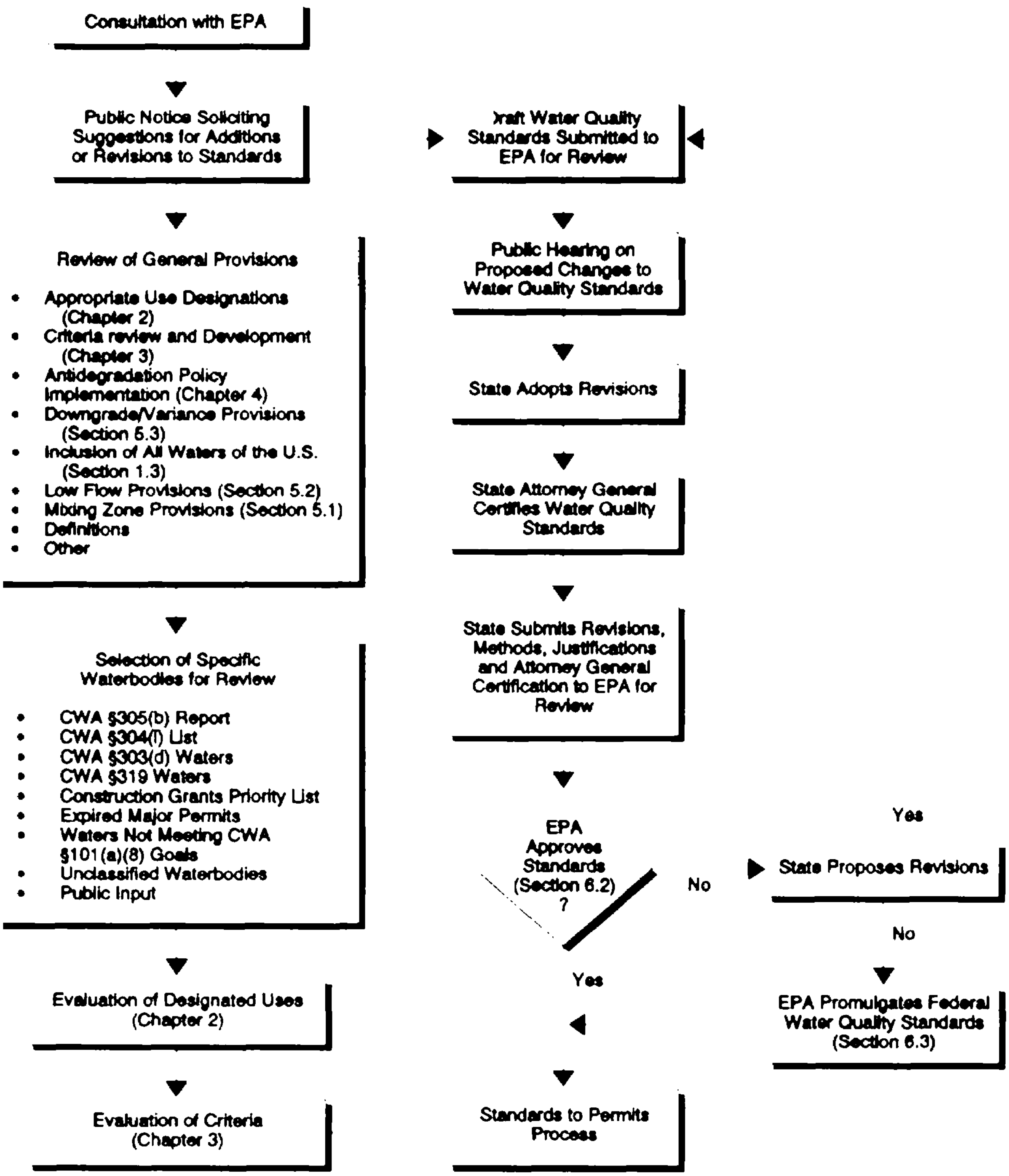


Figure 6-1. Simplified Flow Chart of a Typical State Water Quality Standards Review Process

meaningful involvement of those affected by the standards decisions. At a minimum, section 303(c) of the Clean Water Act requires States to hold a public hearing in reviewing and revising water quality standards. (State law may require more than one hearing.) However, States are urged to involve the public more actively in the review process. Involvement of the public includes the involvement of citizens affected by standards decisions, the regulated community (municipalities and industry), and inter-governmental coordination with local, State, and Federal agencies, and Indian Tribes with an interest in water quality issues. This partnership will ensure the sharing of ideas, data, and information, which will increase the effectiveness of the total water quality management process.

Public involvement is beneficial at several points in the water quality standards decision making process. Enlisting the support of municipalities, industries, environmentalists, universities, other agencies, and the affected public in collecting and evaluating information for the decision making process should assist the State in improving the scientific basis for, and in building support for, standards decisions. The more that people and groups are involved early in the process of setting appropriate standards, the more support the State will have in implementing the standards.

6.1.3 Review of General Provisions

In each 3-year water quality standards review cycle, States review the general provisions of the standards for adequacy taking into consideration:

- new Federal or State statutes, regulations, or guidance;
- legal decisions involving application of standards; or
- other necessary clarifications or revisions.

Inclusion of All Waters of the United States

Water quality standards are needed for all "waters of the United States," defined in the National Pollution Discharge Elimination System Regulations at 40 CFR 122.2 to include all interstate waters, including wetlands, and all intrastate lakes, rivers, streams (including intermittent streams), wetlands, natural ponds, etc., the use, degradation or destruction of which would affect or could affect interstate or foreign commerce. The term "waters of the United States" should be read broadly during the standards review process. States should ensure that all waters under this definition are included in the States' water quality standards, are assigned designated uses, and have protective criteria.

Definitions

Terms used in the Water Quality Standards Regulation are defined in 40 CFR 131.3. The glossary of this document contains these and other water quality standards-related terms defined by the Clean Water Act, EPA regulation, or guidance. States, when reviewing their water quality standards, should at a minimum define those terms included in the Definitions section of the regulation to be synonymous with the EPA definitions.

6.1.4 Selection of Specific Water Bodies for Review

The Water Quality Standards Regulation allows States to establish procedures for identifying and reviewing the standards on specific water bodies in detail. Any procedures States establish to revise standards should be articulated in the continuing planning process consistent with the water quality management regulation. Water bodies receiving a detailed standards review are most likely to be those where:

- combined sewer overflow (CSO) funding decisions are pending;
- water quality-based permits are scheduled to be issued or reissued;
- CWA goal uses are not being met;
- toxics have been identified and are suspected of precluding a use or may be posing an unreasonable risk to human health; or
- there may be potential impacts on threatened or endangered species.

States may have other reasons for wishing to examine a water body in detail, such as human health problems, court orders, or costs or economic and social impacts of implementing the existing water quality standards. States must reexamine any water body with standards not consistent with the section 101(a)(2) goals of the Act every 3 years, and if new information indicates that section 101(a)(2) goal uses are attainable, revise its standards to reflect those uses.

States are encouraged to review standards for a large enough area to consider the interaction between both point and nonpoint source discharges. In carrying out standards reviews, the States and EPA should ensure proper coordination of all water quality programs.

6.1.5 Evaluation of Designated Uses

Once priority water bodies have been selected for review, the designated uses must be evaluated. This may involve some level of data collection up to and including a full water body survey and assessment; however, an intensive survey of the water body is not necessary if adequate data are available. The purpose of the evaluation is to pinpoint problems and to characterize present uses, attainable uses (uses that could exist in the absence of anthropogenic effects), uses impaired or precluded, and the reasons why uses are impaired or precluded. Information generated in the survey also can be used to establish the basis for seasonal uses and subcategories of uses.

Included in section 2.9 of this Handbook are examples of a range of physical, chemical, and biological characteristics of the water body that may be surveyed when evaluating aquatic protection uses. This information is then used in determining the existing species in the water body and the health of those species, as well as what species could be in the water body given the physical characteristics of the water body, or what species might be in the water if the quality of the water were improved.

Review of the Cause of Uses Not Being Met

If the survey indicates that designated uses are impaired, the next step is to determine the cause. In many situations, physical conditions and/or the presence of pollutants prevent the water body from meeting its designated use. Physical limitations refer to such factors as depth, flow, habitat, turbulence, or structures such as dams that might make a use unsuitable or impossible to achieve regardless of water quality.

If uses are precluded because of physical limitations of the water body, the State may wish to examine modifications that might allow a habitat suitable for a species to thrive where it could not before. Some of the techniques which have been used include bank stabilization, current deflectors, construction of oxbows, or installation of spawning beds. A State also might wish to consider improving the access to the water body, improving facilities nearby so that it can be used for recreational purposes, or establishing seasonal uses or subcategories of a use.

If uses are not being met because of water pollution problems, the first step in the process is to determine the cause. If the standards review process is well coordinated with the total maximum daily load (TMDL) determination and the permit process, permitees may be required to conduct some of the analyses necessary to determine why uses are not attained (For more information on the TMDL process, see chapter 7, this Handbook.) When background levels of pollutants are irreversible and criteria cannot be met, States should evaluate other more appropriate uses and revise the water quality standards appropriately.

Determination of Attainable Uses

Consideration of the suitability of the water body to attain a use is an integral part of the water quality standards review and revision process. The data and information collected from the water body survey provide a firm basis for evaluating whether the water body is suitable for the particular use. Suitability depends on the physical, chemical, and biological characteristics of the water body, its geographic setting and scenic qualities, and the socioeconomic and cultural characteristics of the surrounding area. Suitability must be assessed through the professional judgment of the evaluators. It is their task to provide sufficient information to the public and the State decision makers.

In some instances, physical factors may preclude the attainment of uses regardless of improvements in the chemistry of the receiving water. This is particularly true for fish and wildlife protection uses where the lack of a proper substrate may preclude certain forms of aquatic life from using the stream for propagation, or the lack of cover, depth, flow, pools, riffles, or impacts from channelization, dams, or diversions may preclude particular forms of aquatic life from the stream altogether. While physical factors may influence a State's decision regarding designation of uses for a water body, States need to give consideration to the incidental uses that may be made of the water body notwithstanding the use designation. For example, even though it may not make sense to encourage use of a stream for swimming because of the flow, depth, or velocity of the water, the States and EPA must recognize that swimming and/or wading may, in fact, occur. To protect public health, States must set criteria to reflect swimming if it appears that primary contact recreation will, in fact, occur in the stream.

While physical factors are important in evaluating whether a use is attainable, physical limitations of the stream may not be an overriding factor. Common sense and good judgment play an important role in setting appropriate uses and criteria. In setting criteria and uses, States must assure the attainment of downstream standards. The downstream uses may not be affected by the same physical limitations as the upstream uses.

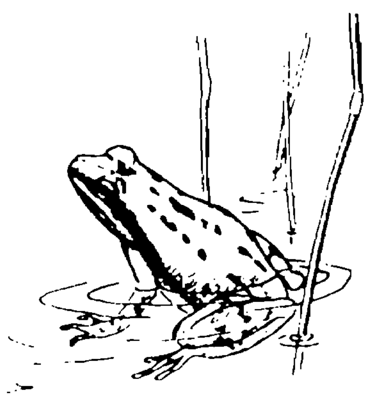
If a change in the designated use is warranted based on a use attainability analysis, States may modify the uses currently assigned. In doing so, the State should designate uses that can be supported given the physical, chemical, or biological limitations of the water body. Or, a State may designate uses on a seasonal basis. Seasonal use designations may be appropriate for streams that lack adequate water volume to support aquatic life year round, but can be used for fish spawning, etc., during higher flow periods. In setting seasonal uses, care must be taken not to allow the creation of conditions instream that preclude uses in another season. EPA encourages the designation of seasonal uses as an alternative to completely downgrading the use of a water body.

Economic Impact Assessment

The Water Quality Standards Regulation allows States to establish uses that are inconsistent with the section 101(a)(2) goals of the Act if the more stringent technology required to meet the goals will cause substantial and widespread economic and social impact. These are impacts resulting specifically from imposition of the pollution controls and reflect such factors as unemployment, plant closures, and changes in the governmental fiscal base. The analysis should address the incremental effects of water quality standards beyond technology-based or other State requirements. If the requirements are not demonstrated to have an incremental, substantial, and widespread impact on the affected community, the standard must be maintained or made compatible with the goals of the Act.

6.1.6 Evaluation of Criteria

Changes in use designations also must be accompanied by consideration of the need for a change in criteria. If a use is removed, the criteria to protect that use may be deleted or revised to assure protection of the remaining uses. If a use is added, there must be adequate water quality criteria to protect the use. Regardless of whether changes or modifications in uses are made, criteria protective of the use must be adopted. Certain criteria are deemed essential for inclusion in all State standards, and criteria for section 307(a) toxic pollutants must be addressed consistent with section 303(c)(2)(B) (see chapter 3, this Handbook). All State standards should contain the "free froms" narrative statements (see section 3.5.2) in addition to numerical limits that can be used as a basis for regulating discharges into surface waters. Also, water quality parameters such as temperature, dissolved oxygen, pH, and bacteriological requirements are basic to all State standards.



EPA's laboratory-derived criteria may not always accurately reflect the bioavailability and/or toxicity of a pollutant because of the effect of local physical and chemical characteristics or varying sensitivities of local aquatic communities. Similarly, certain compounds may be more or less toxic in some waters because of differences in temperature, hardness, or other conditions. Setting site-specific criteria is appropriate where:

- background water quality parameters, such as pH, hardness, temperature, color, appear to differ significantly from the laboratory water used in developing the section 304(a) criteria; or
- the types of local aquatic organisms differ significantly from those actually tested in developing the section 304(a) criteria.

Developing site-specific criteria is a method of taking local conditions into account so that criteria are adequate to protect the designated use without being more or less stringent than needed. A three-phase testing program that includes water quality sampling and analysis, a biological survey, and acute bioassays provides an approach for developing site-specific criteria. Much of the data and information for the water quality sampling and analysis and the biological survey can be obtained while conducting the assessment of the water body. Included in section 3.10 of this Handbook are scientifically acceptable procedures for setting site-specific pollutant concentrations that will protect designated uses. EPA believes that setting site-specific criteria will occur on only a limited number of stream segments because of the resources required to conduct the analyses and the basic soundness of the section 304(a) recommendations.

6.1.7 Draft Water Quality Standards Submitted to EPA for Review

While not a regulatory requirement, prudence dictates that draft State water quality standards be submitted to EPA for review. The EPA regional office and Headquarters will conduct concurrent reviews of draft standards and make comments on proposed revisions to assist the State in producing standards that are approvable by the Regional Administrator. Continuing cooperation between the State and EPA is essential to timely approval of State standards.

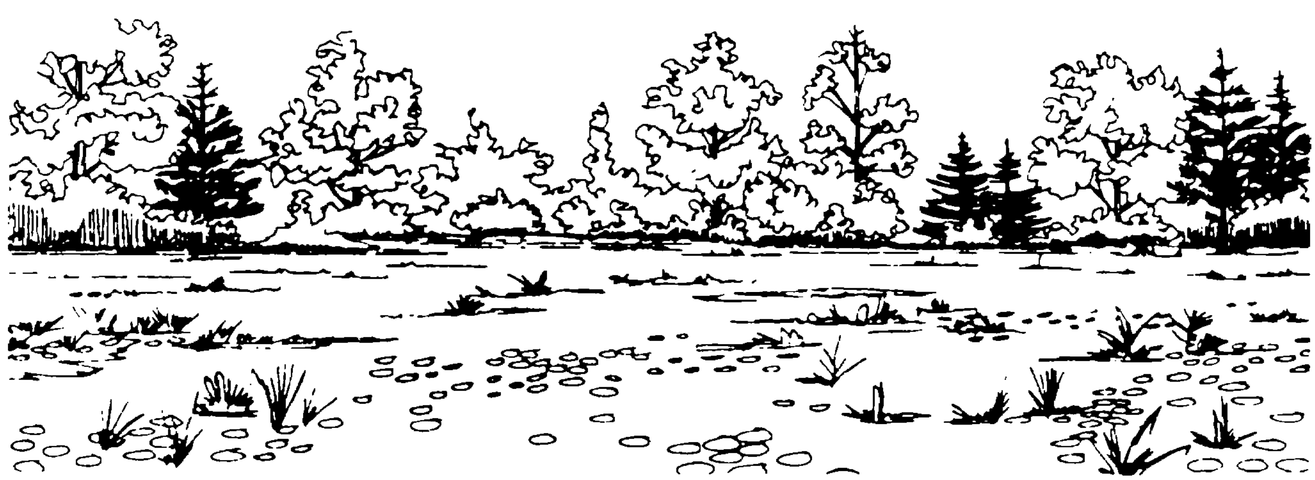
6.1.8 Public Hearing on Proposed Changes to Standards

Before removing or modifying any use or changing criteria, the Clean Water Act requires the State to hold a public hearing. More than one hearing may be required depending on State regulations. It may be appropriate to have EPA review the adequacy of justifications including the data and the suitability and appropriateness of the analyses and how the analyses were applied prior to the public hearing. In cases where the analyses are judged to be inadequate, EPA will identify how the analyses could be improved and suggest the additional types of evaluations or data needed. By consulting with EPA frequently throughout the review process, States can be better assured that EPA will be able to expeditiously review State submissions and make the determination that the standards meet the requirements of the Act.

The analyses and supporting documentation prepared in conjunction with the proposed water quality standards revision should be made available to the interested public prior to the hearing. Open discussion of the scientific evidence and analysis supporting proposed revisions in the water quality standards will assist the State in making its decision.

6.1.9 State Adopts Revisions; Submits Standards Package to EPA for Review

Within 30 days of their final administrative action, States submit to EPA water quality standards revisions, supporting analyses, and State Attorney General certification that the standards were duly adopted pursuant to State law. Final administrative action is meant to be the last action a State must take before its revision becomes a rule under State law and it can officially transmit State-adopted standards to EPA for review. This last action might be a signature, a review by a legislative committee or



State Board, or a delay mandated by a State administrative procedures act.

In reviewing changes in uses that are inconsistent with the section 101(a)(2) goals of the Act or changes in criteria, EPA will carefully consider the adequacy of the analyses and the public comments received during the hearing process. Standards are to meet the goals of the Act unless the State can clearly demonstrate that the uses reflected in the goals are unattainable.

6.2 EPA Review and Approval

When States adopt new or revised water quality standards, the State is required under CWA Section 303(c) to submit such standards to EPA for review and approval/disapproval. Section 131.20(c) of the Water Quality Standards Regulation requires the submittal to EPA to occur within 30 days of the final State action. Figure 6.2 outlines EPA's review process. EPA reviews and approves/disapproves the standards based on whether the standards meet the requirements of the CWA and the Water Quality Standards Regulation. States are encouraged to provide early drafts to the EPA Regional Office so that issues can be resolved during the water quality standards review process, prior to formal State proposal or adoption of revised or new standards.

When reviewing State water quality standards, EPA ensures that the standards meet the minimum requirements of the Act and Water Quality Standards Regulation. Pursuant to section 510 of the Act, State water quality standards may be more stringent than EPA's minimum requirements.

The general elements of an EPA review include, but are not limited to, the following:

- EPA determines whether "fishable/ swimmable" designated uses have been assigned to all State waters or a use attainability analysis (UAA) is available to support the designation of other uses. Other uses may satisfy the CWA section 101(a)(2) goal if properly supported by a UAA. EPA reviews the adequacy of the analyses.

- EPA determines whether the State's water quality criteria are sufficient to protect the designated uses by ensuring that all numeric criteria are based on CWA Section 304(a) guidance, 304(a) guidance modified to reflect site-specific conditions, or other scientifically defensible methods. EPA's decision to accept criteria based on site-specific calculations or alternative scientific procedures is based on a determination of the validity and adequacy of the supporting scientific procedures and assumptions and not on whether the resulting criterion is more or less stringent than the EPA guideline.

- EPA ensures that uses and/or criteria are consistent throughout the water body and that downstream standards are protected. A review to determine compliance with downstream standards is most likely to involve bodies of water on, or crossing, interstate and international boundaries.

- Where the analyses supporting any changes in the standards are inadequate, EPA identifies how the analyses need to be improved and suggests the type of information or analyses needed.

- For waters where uses have not been designated in support of the fishable/ swimmable goal of the CWA, EPA determines whether the alternative uses are based on an acceptable UAA and whether such UAAs have been reviewed every 3 years as required by 40 CFR 131.20(a).

- EPA ensures that general "free from" narrative criteria are included that protect all waters at all flows from substances that

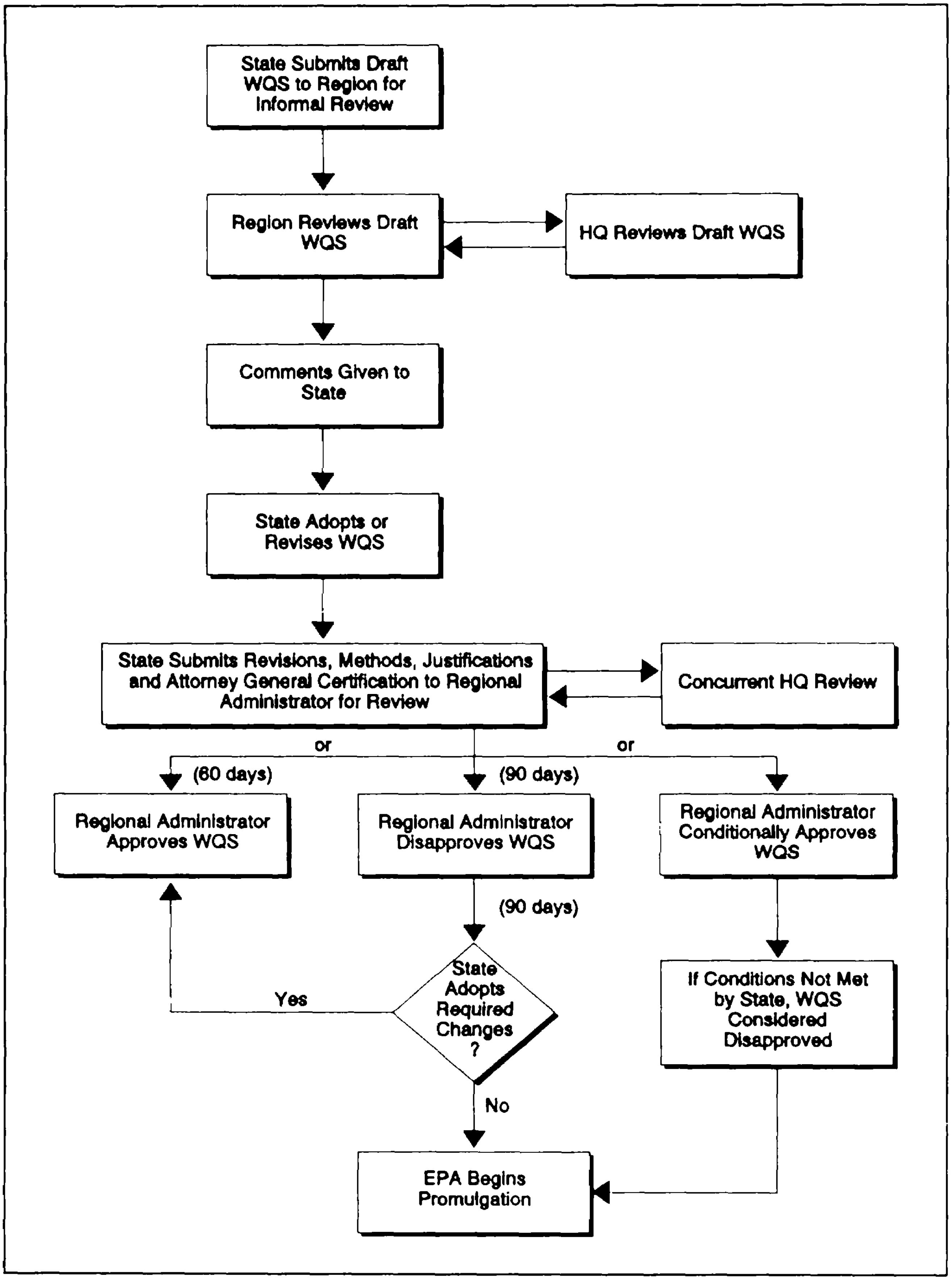


Figure 6-2. Overview of EPA Water Quality Standards Review Process

settle to form objectionable deposits; float as debris, scum, oil, or other matter; produce objectionable color, odor, taste, or turbidity; are acutely toxic; or produce undesirable or nuisance aquatic life.

- EPA determines whether the State has included criteria for CWA section 307(a) "priority" pollutants sufficient to satisfy the requirements of CWA section 303(c)(2)(B).

- For toxic pollutants where EPA has not issued guidance or it is not known which toxicant or toxicants are causing the problem, EPA ensures that the State standards include or reference a method for implementing the narrative toxics "free from" criterion.

- EPA ensures that the State's antidegradation policy meets the requirements of section 131.12 of the Water Quality Standards Regulation.

- EPA reviews whether the State has provided or referenced a procedure for implementing the antidegradation policy.

- Where (optional) general policies are included in the State water quality standards (e.g., mixing zone provisions, variance policies, low-flow exemption policies), EPA reviews whether the policies are consistent with the latest EPA guidance.

- EPA reviews comments and suggestions on previous State water quality standards to ensure that any areas for improvement or conditions attached to previous approvals have been acted upon satisfactorily.

- EPA reviews whether the policies are consistent with the latest EPA guidance and regulatory requirements.

- EPA ensures that the State has met the minimum requirements for a standards submission as outlined in section 131.6 of the Water Quality Standards Regulation.

- EPA reviews whether the State has complied with the procedural requirements (e.g., public participation) for conducting water quality standards reviews.

Since 1972, EPA review and approval/disapproval includes concurrent reviews by the Regions and Headquarters. However, because the EPA regional Administrator has the responsibility for approving/disapproving water quality standards and because of the decentralized structure of EPA, the regional offices are the primary point of contact with the States. The EPA regional offices, not the States, are responsible for providing copies of State water quality standards to EPA Headquarters for review and for acting as liaison between States and EPA Headquarters on most matters affecting the water quality standards program. The basic internal EPA review procedures have been described in various guidance documents over the years; the most was a memorandum dated December 17, 1984. This memorandum also made one minor change to the process. It required that Headquarters be consulted immediately for possible advice and assistance when the Regional Office learns that a State:

- is proposing to lower designated water uses below the section 101(a)(2) goals of the Act;

- is not raising water uses to meet the section 101(a)(2) goals of the Act; or

- is considering adopting a water quality criterion less stringent than currently included in a State's standard.

To expedite Headquarters review, copies of State water quality standards revisions (draft and final) must be provided to the Director, Standards and Applied Science Division, at the time they are received by the Region. The Standards and Applied Science Division will involve other EPA offices in the review as appropriate, and provide comments and suggestions, if any, to regional offices for consideration in State-EPA negotiations and final standards decisions. Their review will be expeditiously accomplished so as not to slow regional approval/disapproval. Neither the regional nor Headquarters review need be limited only to revisions to existing standards or to new standards.

In general, three outcomes are possible:

- EPA approval, in whole or in part, of the submitted State water quality standards;
- EPA disapproval, in whole or in part, of the submitted State water quality standards; and
- EPA conditional approval, in whole or in part, of the submitted State water quality standards.

Unconditional approval or disapproval of State-adopted water quality standards within the statutory time limits is the preferred approach. Conditional approvals should be used only as a limited exception to this general policy for correcting minor deficiencies in State standards and only if a State provides assurance that it will submit corrections on a specified, written schedule. Failure of a State to respond in a timely manner to the conditions expressed in the letter means that the standards are disapproved and the Region must promptly request Headquarters to initiate a promulgation action. Where this occurs, the Region should formally notify the State in writing that their failure to meet the conditions previously specified results in the standards now being disapproved as of the original date of the conditional approval letter.

6.2.1 Policies and Procedures Related to Approvals

Authority to approve or disapprove State water quality standards is delegated by the Administrator to each Regional Administrator. The Administrator retains the authority to promulgate standards. Revisions to State water quality standards that meet the requirements of the Act and the Water Quality Standards Regulation are approved by the appropriate EPA Regional Administrator. The Regional Administrator must, within 60 days, notify the Governor or his designee by letter of the approval and forward a copy of the letter to the appropriate State agency. The letter should contain any information that might be helpful in understanding the scope of the approval action. If particular events (e.g., State implementation decisions, pending Federal legislation pertaining to water quality standards requirements) could result in a failure of the approved standards to continue to meet the requirements of the Act, these events should be identified in the approval letter. Such events should be identified for the record to guide future review and revision activities.

When only a portion of the revisions submitted meet the requirements of the Act and the Water Quality Standards Regulation, the Regional Administrator may approve only that portion. If only a partial approval is made, the Region must, in notifying the State, be as specific as possible in identifying what is disapproved and why. The Regional Administrator must also clearly indicate what action the State could take to make the disapproved item acceptable.

6.2.2 Policies and Procedures Related to Disapprovals

If the Regional Administrator determines that the revisions submitted are not consistent with or do not meet the requirements of the Act or the Water Quality Standards Regulation, the Regional Administrator must disapprove such standards within 90 days. Such disapproval must be via written notification to the Governor of the State or his designee. The letter must state why the revisions are not consistent with the Act or the Water Quality Standards

Regulation and specify the revisions that must be adopted to obtain full approval. The letter must also notify the Governor that the Administrator will initiate promulgation proceedings if the State fails to adopt and submit the necessary revisions within 90 days after notification.

A State water quality standard remains in effect, even though disapproved by EPA, until the State revises it or EPA promulgates a rule that supersedes the State water quality standard. This is because water quality standards are State laws, not Federal laws, and once the law is amended by the State, the previously adopted and EPA-approved standards no longer legally exist.

6.2.3 Policies and Procedures Related to Conditional Approvals

Conditional approvals are EPA approvals contingent on the performance of specified actions on the part of a State in a timely manner. There is an implicit or explicit statement in the letter to the State that failure to satisfy the identified conditions will nullify the conditional approval and lead to Federal promulgation action. Problems have arisen with inconsistent use of conditional approvals among the regions and with followup actions to ensure that a State is responding to the conditions in a timely manner.

Because promulgation of Federal standards is inherently a lengthy process, the use of conditional approvals evolved over the years as another mechanism to maintain the State-Federal relationship in establishing standards. When used properly, conditional approvals can result in standards that fully meet the requirements of the Act without undue Federal intervention and promote smooth operation of the national program.

If used improperly, conditional approvals can be an unacceptable delaying tactic to establishing standards and can be construed as EPA failing to properly exercise its duty to review and either approve or disapprove and promptly initiate promulgation action after the allotted 90-day period for State action. This improper use of conditional approvals must be avoided.

It is incumbent on a Region that uses a conditional approval to ensure that State action is timely. When a State fails to meet the agreed-upon schedule, EPA should initiate promulgation action. Conditional approvals are to be used only to correct minor deficiencies and should be the exception, not the rule, governing regional responses to State standards. Note that requests for clarification or additional information are not approval actions of any type.

This policy is modeled after that applied to EPA approval of State implementation plans

(SIPs) in the air program. (See 44 F.R. 38583, July 2, 1979. See also *Mississippi Commission on Natural Resources* v. *Costle*, 625 F. 2d 1269 (5th Cir.) 1980.)

Necessary Elements of Conditional Approvals

First, conditional approvals are appropriate only for "minor deficiencies." Blatant disregard of Federal statutory or regulatory requirements or changes that will affect major permit issuance or reissuance are not minor deficiencies. In addition, the State's standards submission as a whole must be in substantial compliance with EPA's regulation. Major deficiencies must be disapproved to allow prompt Federal promulgation action.

Second, the State must commit, in writing, to a mutually satisfactory, negotiated schedule to correct the identified regulatory deficiencies in as short a time period as possible. The time allowed should bear a reasonable relationship to the required action. However, in consideration of the first element above, it is expected that the time period for compliance will be limited to a few months. It is definitely not expected that a year or more will be required. If that is the case, disapproval would be more appropriate. Headquarters concurrence in the schedule is required if it extends for more than 3 months.

6.3 EPA Promulgation

As a matter of policy, EPA prefers that States adopt their own standards. However, under section 303(c)(4) of the Act, EPA may promulgate Federal standards:

- if a revised or new water quality standard submitted by a State is determined by the Administrator not to be consistent with the requirements of the Clean Water Act, or
- in any case where the Administrator determines that a new or revised standard is necessary to meet the requirements of the Act.

Under the latter provision of the statute, EPA would be able to promulgate standards for a State, or States, that failed to conduct a triennial review and submit new or revised standards to EPA for review so long as the Administrator determined new standards were necessary. Where one of these conditions is met, the Administrator has the authority to publish proposed revisions to the State(s) standards in the *Federal Register*. Generally, a public hearing will be held on the proposed standards. Final standards are promulgated after giving due consideration to written comments received and statements made at any public hearings on the proposed revisions.

Although only the Administrator may promulgate State standards, the Regional Office has a major role in the promulgation process. The Regional Office provides the necessary background information and conducts the public hearings. The Regional Office prepares drafts of the rationale supporting EPA's action included in the proposed and final rulemakings. The rationale should clearly state the reason for the disapproval of the State standard.

If conditions warrant (e.g.,a State remedies the deficiencies in its water quality standards prior to promulgation), the Administrator may terminate the rulemaking proceeding at any time. However, if a proposed rulemaking has been published in the *Federal Register*, then the Regional Administrator must not approve the State's changes without obtaining concurrence from Headquarters.

Whenever promulgation proceedings are terminated, a notice of withdrawal of the proposed rulemaking will be published in the *Federal Register*. The Regional Offices are responsible for initiating such action and furnishing a rationale for use in preparing the notice for the Administrator's signature.

An EPA-promulgated standard will be withdrawn when revisions to State water quality standards are made that meet the requirements of the Act. In such a situation, the Regional Office should initiate the withdrawal action by notifying the Standards and Applied Science Division (WH-585) that it is requesting the withdrawal, specifying the rationale for the withdrawal, and obtaining Headquarters concurrence on the acceptability of the State's water quality standards. EPA's action to withdraw a federally promulgated standard requires both a proposed and final rulemaking if the State-adopted standards are less stringent than federally promulgated standards but, in the Agency's judgment, fully meet the requirements of the Act. EPA will withdraw the Federal rule without a notice and comment rulemaking when the State standards are no less stringent than the Federal rule (i.e., standards that provide, at least, equivalent environmental and human health protection).

Withdrawal of a Federal promulgation is based on a determination that State-adopted water quality standards meet the requirements of the Clean Water Act. Such State-adopted standards may be the same as, more stringent than, or less stringent than the Federal rule.

CHAPTER 7

THE WATER QUALITY-BASED APPROACH TO POLLUTION CONTROL

Table of Contents

CHAPTER 7
THE WATER QUALITY-BASED APPROACH TO POLLUTION CONTROL

This chapter briefly describes the overall water quality-based approach and its relationship to the water quality standards program. The water quality-based approach emphasizes the overall quality of water within a water body and provides a mechanism through which the amount of pollution entering a water body is controlled based on the intrinsic conditions of that body of water and the standards set to protect it.

As shown in Figure 7.1, the water quality-based approach contains eight stages. These stages each represent a major Clean Water Act program with specific regulatory requirements and guidance. The presentations in this chapter summarize how the different programs fit into the overall water quality control scheme and are not intended as implementation guidance. Implementation of these programs should be consistent with the specific programmatic regulations and guidance documents provided by the appropriate program office, many of which are cited herein.

The first stage, "Determining Protection Level," involves State development of water quality standards, the subject of the preceding chapters of this Handbook.

In the second stage, "Monitoring and Assessing Water Quality," States identify impaired waters, determine if water quality standards are being met, and detect pollution trends. Sections of the Clean Water Act require States to compile data, assess, and report on the status of their water bodies. States generally use existing information and new data collected from ongoing monitoring programs to assess their waters. This stage is discussed in section 7.2. of this Handbook.

In the third stage, "Establishing Priorities," States rank water bodies according to the severity of the pollution, the uses to be made of the waters, and other social-economic considerations, and determine how best to utilize available resources to solve problems. Section 7.3 of this Handbook discusses the ranking and targeting of water bodies.

In the fourth stage, "Evaluating WQS for Targeted Waters," the appropriateness of the water quality standards for specific waters is evaluated. States may revise or reaffirm their water quality standards. A State may choose, for example, to develop site-specific criteria for a particular stream because a particular species needs to be protected. This stage is discussed in section 7.4 of this Handbook.

In the fifth stage "Defining and Allocating Control Responsibilities," the level of control needed to meet water quality standards is established, and control responsibilities are defined and allocated. States use mathematical models and/or monitoring to determine total maximum daily loads (TMDLs) for water bodies; the TMDLs include waste load allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources, and a margin of safety. The TMDL is the amount of a pollutant that may be discharged into a water body and still maintain water quality standards. Pollutant loadings above this amount generally will result in waters exceeding the standards. Allocations for pollution limits for point and nonpoint sources are calculated to ensure that water quality standards are not exceeded. Section 7.5 discusses the TMDL process in greater detail.

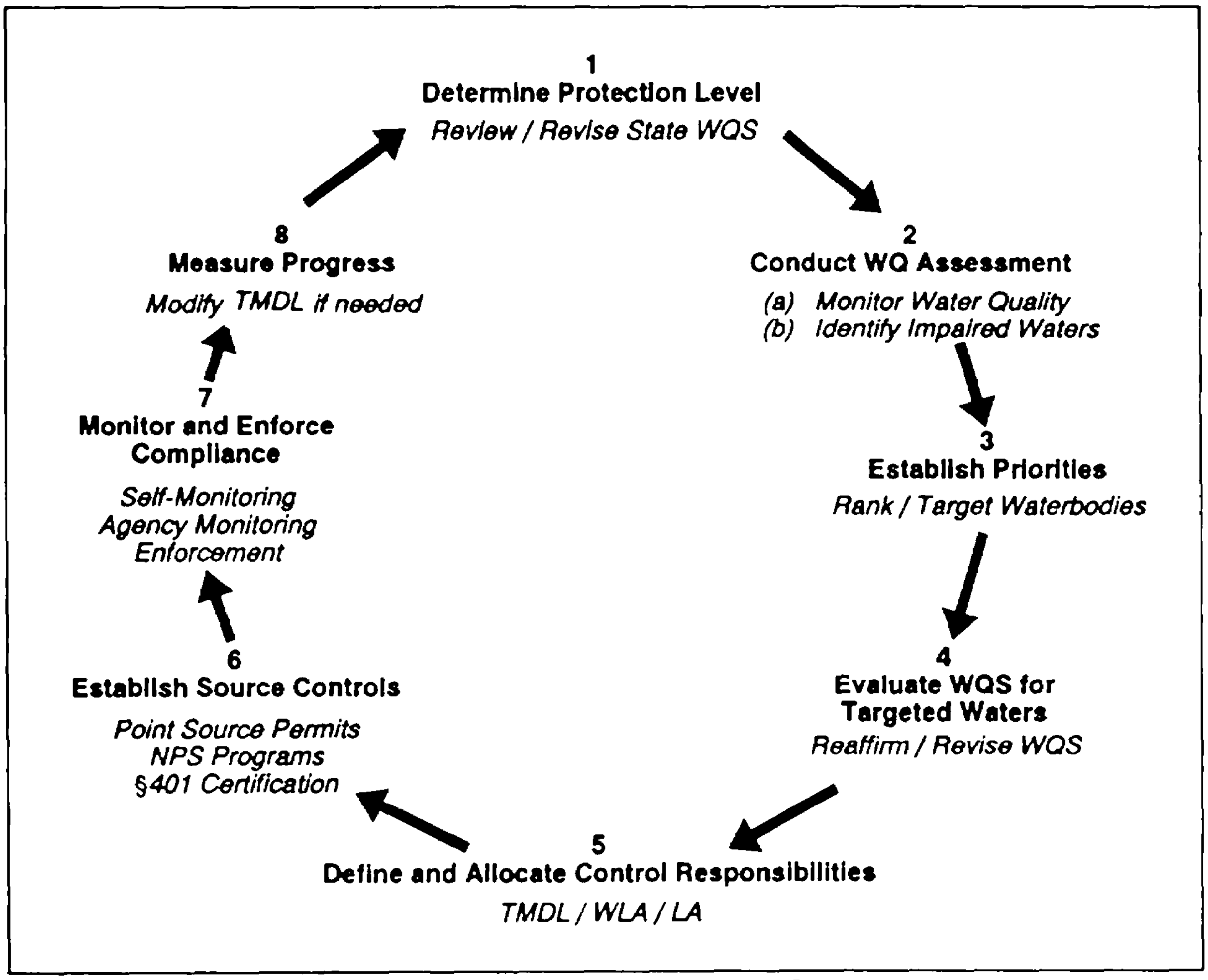


Figure 7-1. Water Quality-Based Approach to Pollution Control

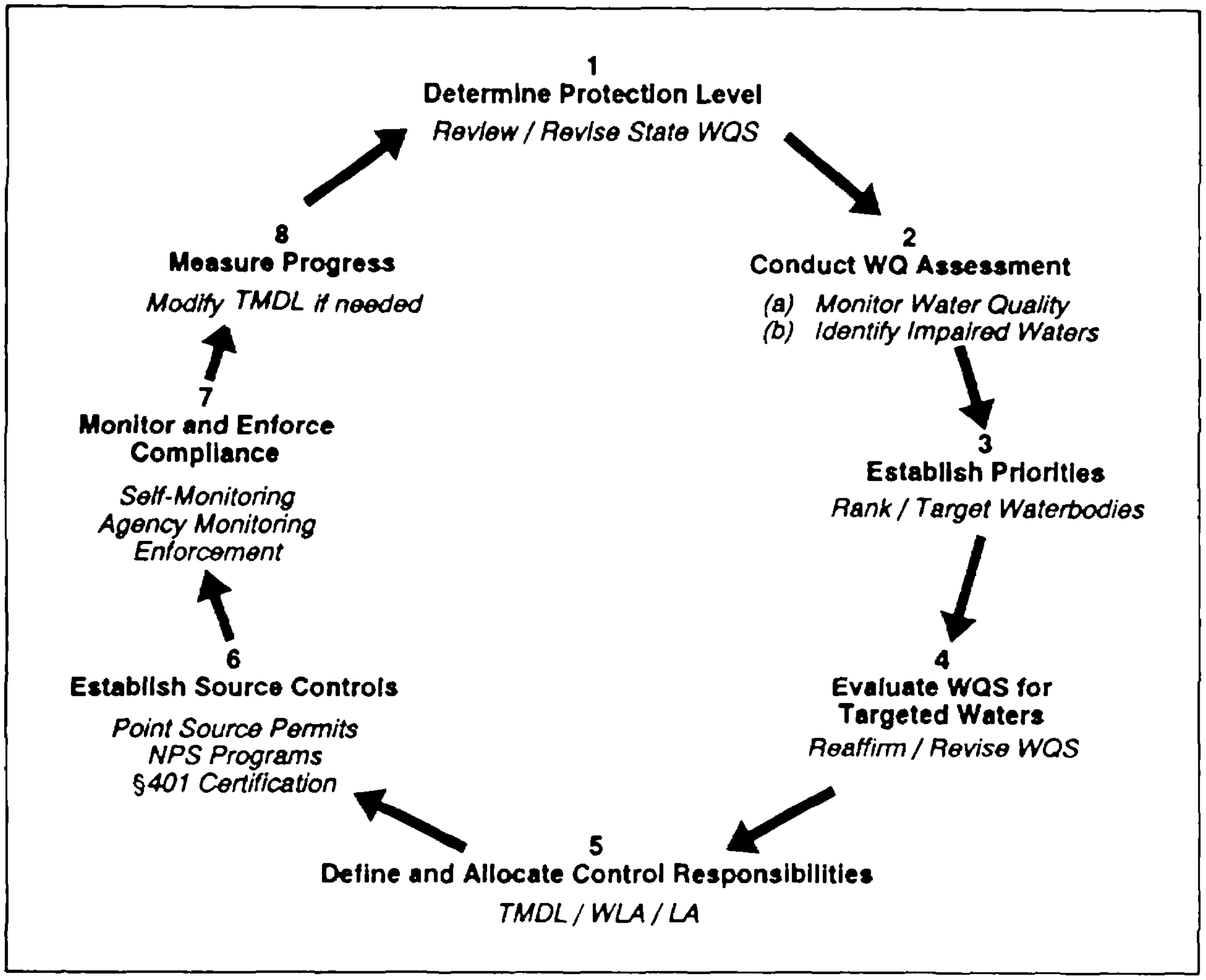
In the sixth stage, "Establishing Source Control," States and EPA implement point source controls through NPDES permits, State and local governments implement nonpoint source management programs through State laws and local ordinances, and States assure attainment of water quality standards through the CWA section 401 certification process. Control actions are discussed in Section 7.6.

In the seventh stage, "Monitoring and Enforcing Compliance," States (or EPA) evaluate self-monitoring data reported by dischargers to see that the conditions of the NPDES permit are being met and take actions against any violators. Dischargers are monitored to determine whether or not they meet permit conditions and to ensure that expected water quality improvements are achieved. State nonpoint source programs are monitored and enforced under State law and to the extent provided by State law.

In the final stage, "Measuring Progress," the States (and EPA) assess the effectiveness of the controls and determine whether water quality standards have been attained, water quality standards need to be revised, or more stringent controls should be applied.

7.1 Determine Protection Level

The water quality-based approach to pollution control begins with the identification of problem water bodies. State water quality standards form the basis and "yardstick" by which States can assess the water body status



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(b)(1) Each State shall identify those water quality segments still requiring WLAs/LAs and TMDLs within its boundaries for which:

> **(i) Technology-based effluent limitations required by sections 301(b), 306, 307, or other section of the Act;**
>
> **(ii) More stringent effluent limitations (including prohibitions) required by either State or local authority preserved by section 510 of the Act, of Federal authority (*e.g.*, law, regulation, or treaty); and**
>
> **(iii) Other pollution control requirements (*e.g.*, best management practices) required by local, State, or Federal authority**

are not stringent enough to implement any water quality standard applicable to such waters.

Exhibit 7-1. Identifying Waters Still Requiring TMDLs: 40 CFR 130.7(b)

or local authority may establish enforceable requirements beyond technology-based controls. Examples of such requirements may be those that (1) provide more stringent NPDES permit limitations to protect a valuable water resource, or (2) provide for the management of certain types of nonpoint source pollution.

Identification of good quality waters that are threatened is an important part of this approach. Adequate control of new discharges from either point or nonpoint sources should be a high priority for States to maintain the existing use or uses of these water bodies. In the identification of threatened waters, it is important that the 303(d) process consider all parts of the State water quality standards program to ensure that a State's antidegradation policy and narrative provisions, as well as parameter-specific criteria, are maintained.

Section 303(d) requires States to identify those water quality-limited waters needing TMDLs. States must regularly update their lists of waters as assessments are made and report these lists to EPA once every 2 years. In their biennial submission, States should identify the water quality-limited waters targeted for TMDL development in the next 2 years, and the pollutants or stressors for which the water is water quality-limited.

Each State may have different methods for identifying and compiling information on the status of its water bodies, depending on its specific programmatic or cross-programmatic needs and organizational arrangements. Typically, States utilize both existing information and new data collected from ongoing monitoring programs to assess whether water quality standards are being met, and to detect trends.

States assess their waters for a variety of purposes, including targeting cleanup activities, assessing the extent of contamination at potential Superfund sites, and meeting federally mandated reporting requirements. While the identification of water quality-limited waters may appear to be a major task for the States, a significant amount of this work has already begun or has been completed under sections 305(b), 304(l), 314(a), and 319(a) of the Clean Water Act as amended in 1987.

Section 305(b) requires States to prepare a water quality inventory every 2 years to document the status of water bodies that have been assessed. Under section 304(l), States identified all surface waters adversely affected by toxic (65 classes of compounds), conventional (such as BOD, total suspended solids, fecal coliform, and oil and grease), and nonconventional (such as ammonia, chlorine, and iron) pollutants from both point and nonpoint sources. Under section 314(a), States identify publicly owned lakes for which uses are known to be impaired by point and nonpoint sources, and report those identified in their

305(b) reports. Section 319 of the CWA requires each State to develop an NPS assessment report. Guidance on the submission and approval process for Section 319 reports is contained in *Nonpoint Source Guidance* (USEPA, 1987c).

Lists prepared to satisfy requirements under section 305(b), 304(l), 314(a) and 319 should be very useful in preparing 303(d) lists. Appendix B of *Guidance for Water Quality-based Decisions: The TMDL Process* (USEPA, 1991c) provides a summary of these supporting CWA programs.

7.3 Establish Priorities

Once waters needing additional controls have been identified, a State prioritizes its list of waters using established ranking processes that should consider all water pollution control activities within the State. Priority ranking has traditionally been a process defined by the State and may vary in complexity and design. A priority ranking should enable the State to make efficient use of its available resources and meet the objectives of the Clean Water Act.

The Clean Water Act states that the priority ranking for such waters must take into account the severity of the pollution and the uses to be made of such waters. Several documents (USEPA, 1987e, 1988c,d, 1989d, 1990c, 1993c) are available from EPA to assist States in priority setting.

According to EPA's State Clean Water Strategy document: "Where all water quality problems cannot be addressed immediately, EPA and the States will, using multi-year approaches, set priorities and direct efforts and resources to maximize environmental benefits by dealing with the most serious water quality problems and the most valuable and threatened resources first."

Targeting high-priority waters for TMDL development should reflect an evaluation of the relative value and benefit of water bodies within the State and take into consideration the following:

- risk to human health, aquatic life, and wildlife;
- degree of public interest and support;
- recreational, economic, and aesthetic importance of a particular water body;
- vulnerability or fragility of a particular water body as an aquatic habitat;
- immediate programmatic needs such as waste load allocations needed for permits that are coming up for revisions or for new or expanding discharges, or load allocations for needed BMPs;
- waters and pollution problems identified during the development of the section 304(l) "long list";
- court orders and decisions relating to water quality; and
- national policies and priorities such as those identified in EPA's Annual Operating Guidance.

States are required to submit their priority rankings to EPA for review. EPA expects all waters needing TMDLs to be ranked, with "high" priority waters — targeted for initiation

of *TMDL development within 2 years following* the listing process — identified. (See USEPA (1991c) for further details on submission of priorities to EPA.)

To effectively develop and implement TMDLs for all waters identified, States should establish multi-year schedules that take into consideration the immediate TMDL development for targeted water bodies and the long-range planning for addressing all water quality-limited waters still requiring TMDLs.

While the CWA section 319 NPS assessment report identifies the overall dimensions of the State's NPS water quality problems and States are to develop statewide program approaches for specific categories of pollution to address NPS problems, States are also encouraged to target subsets of waters for concerted action on a watershed-by-watershed basis. EPA has issued guidance on NPS targeting (USEPA, 1987e).

7.4 Evaluate Water Quality Standards for Targeted Waters

At this point in the water quality management process, States have identified and targeted priority water quality-limited water bodies. It is often appropriate, to re-evaluate the appropriateness of the water quality standards for the targeted waters for several reasons including, but not limited to, the following.

First, many States have not conducted in-depth analyses of appropriate uses and criteria for all water bodies but have designated general fishable/swimmable use classifications and statewide criteria on a "best professional judgment" basis to many waters. *In addition*, many States make general assumptions about the antidegradation status of State waters (e.g., all waters not specifically assigned to an antidegradation category will be considered tier 2 or high-quality waters). It is possible that these generally applied standards, although meeting the minimum requirements of the CWA and WQS regulation, may be inappropriate (either over- or under-protective) for a specific water body that has not had an in-depth standards analysis. For example, if a water body was classified as a coldwater fishery based solely on its proximity to other coldwater fisheries, a water body-specific analysis may show that only a warmwater fishery use is existing or attainable. If the listing of the water body was based on exceedences of criteria that are more stringent for coldwater fish (such as ammonia or dissolved oxygen), changing the designated use through a use attainability analysis and applying appropriate criteria may allow standards to be met without further water quality controls.

Second, even if an in-depth analysis has been done in the past, changes in the uses of the water body since that time may have made *different standards more appropriate or* generated an additional "existing use" which must be protected. For example, a water body designated for fish, aquatic life, and recreation in the past may now be used as a public water supply, without that use and protective criteria ever being formally adopted in the standards. Another example might be a designated warmwater fishery that, due to the removal of a thermal discharge, now supports a coldwater fishery as the existing use.

Third, monitoring data used to identify the water body as impaired may be historical, and subsequent water quality improvements have allowed standards to be met. And fourth, site-specific criteria may be appropriate because of specific local environmental conditions. For example, the species capable of living at the site are more or less sensitive than those included *in the national criteria data set, or physical* and/or chemical characteristics of the site alter the biological availability and/or toxicity of the chemical.

7.5 Define and Allocate Control Responsibilities

For a water quality-limited water that still requires a TMDL, a State must establish a TMDL that quantifies pollutant sources, and a margin of safety, and allocates allowable loads to the contributing point and nonpoint source discharges so that the water quality standards are attained. The development of TMDLs should be accomplished by setting priorities, considering the geographic area impacted by the pollution problem, and in some cases where there are uncertainties from lack of adequate data, using a *phased approach to establishing control measures* based on the TMDL.

Many water pollution concerns are areawide phenomena caused by multiple dischargers, multiple pollutants (with potential synergistic and additive effects), or nonpoint sources. Atmospheric deposition and ground water discharge may also result in significant pollutant loadings to surface waters. As a result, EPA recommends that States develop TMDLs on a watershed basis to efficiently and effectively manage the quality of surface waters.

The TMDL process is a rational method for weighing the competing pollution concerns and developing an integrated pollution reduction strategy for point and nonpoint sources. The TMDL process allows States to take a holistic view of their water quality problems from the perspective of instream conditions. Although States may define a water body to correspond with their current programs, it is expected that States will consider the extent of pollution problems and sources when defining the geographic area for developing TMDLs. In general, the geographical approach for TMDL development supports sound environmental management and efficient use of limited water quality program resources. In cases where TMDLs are developed on watershed levels, States should consider organizing permitting cycles so that all permits in a given watershed expire at the same time.

Mathematical modeling is a valuable tool for assessment of all types of water pollution problems. Dissolved oxygen depletion and nutrient enrichment from point sources are the traditional modeling problems of the past. They continue to be problems and are joined by such new challenges as nonpoint source loadings, urban stormwater runoff, toxics, and pollutants involving sediment and bioaccumulative pathways. These new pollutants and pathways require the use of new models.

All models are simplifications of reality that express our scientific understanding of the important processes. Where we don't fully understand the process(es), or cannot collect the data that would be required to set parameters in a model that would simulate the process(es), we make simplifying assumptions. All of these

simplifications increase the uncertainty of our ability to predict responses of already highly-variable systems. While the use of conservative assumptions does reduce the possibility of underestimating pollutants effects on the waterbody, the use of conservative assumptions does not reduce the uncertainty. Calibration of a model to given waterbody does more to reduce uncertainty surrounding the system's response to reduced pollutant loadings. Sensitivity analyses can further this process.

For TMDLs involving both traditional and nontraditional problems, the margins of safety can be increased and additional monitoring required to verify attainment of water quality standards, and provide data needed to recalculate the TMDL if necessary (the phased approach).

EPA regulations provide that load allocations for nonpoint sources and natural background "are best estimates of the loading which may range from reasonably accurate estimates to gross allotments . . ." (40 CFR 130.2(g)). A phased approach to developing TMDLs may be appropriate where nonpoint sources are involved and where estimates are based on limited information. Under the phased approach, TMDL includes monitoring requirements and a schedule for reassessing TMDL allocations to ensure attainment of water quality standards. Uncertainties that cannot be quantified may also exist for certain pollutants discharged primarily by point sources. In such situations a large margin of safety and follow-up monitoring are appropriate.

By pursuing the phased approach where applicable, a State can move forward to implement water quality-based control measures and adopt an explicit schedule for implementation and assessment. States can also use the phased approach to address a greater number of water bodies including threatened waters or watersheds that would otherwise not be managed. Specific requirements relating to the phased approach are discussed in *Guidance for Water Quality-based Decisions: The TMDL Process* (USEPA 1991c).

7.6 Establish Source Controls

Once a TMDL has been established for a water body (or watershed) and the appropriate source loads developed, implementation of control actions should proceed. The State or EPA is responsible for implementation, the first step being to update the water quality management plan. Next, point and nonpoint source controls should be implemented to meet waste load allocations and load allocations, respectively. Various pollution allocation schemes (i.e., determination of allowable loading from different pollution sources in the same water body) can be employed by States to optimize alternative point and nonpoint source management strategies.

The NPDES permitting process is used to limit effluent from point sources. Section 7.6.1 provides a more complete description of the NPDES process and how it fits into the water quality-based approach to permitting. Construction decisions regarding publicly owned treatment works (POTWs), including advanced treatment facilities, must also be based on the more stringent of technology-based or water quality-based limitations. These decisions should be coordinated so that the facility plan for the discharge is consistent with the limitations in the permit.

In the case of nonpoint sources, both State and local laws may authorize the implementation of nonpoint source controls such as the installation of best management practices (BMPs) or other management measures. CWA section 319 and Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) section 6217 State management programs may also be utilized to implement nonpoint source control measures and practices to ensure improved water quality. Many BMPs may be implemented through section 319 programs even where State regulatory programs do not exist. In such cases, a State needs to document the coordination that may be necessary among State and local agencies, landowners, operators, and managers and then evaluate BMP implementation, maintenance, and overall effectiveness to ensure that load allocations are achieved. Section 7.6.2 discusses some of the programs associated with implementation of nonpoint source control measures.

States may also grant, condition, or deny "certification" for a federally permitted or licensed activity that may result in a discharge to the waters of the United States, if it is the State where the discharge will originate. The State decision is based on a State's determination of whether the proposed activity will comply with the requirements of certain sections of the Clean Water Act, including water quality standards under section 303. Section 7.6.3 of this Handbook contains further discussion of section 401 certification.

7.6.1 Point Source Control - the NPDES Process

Both technology-based and water quality-based controls are implemented through the National Pollutant Discharge Elimination System (NPDES) permitting process. Permit limits based on TMDLs are called water quality-based limits.

Waste load allocations establish the level of effluent quality necessary to protect water quality in the receiving water and to ensure attainment of water quality standards. Once allowable loadings have been developed through WLAs for specific pollution sources, limits are incorporated into NPDES permits. It is important to ensure that the WLA accounts for the fact that effluent quality is often highly variable. The WLA and permit limit should be calculated to prevent water quality standards impairment at all times. The reader is referred to the *Technical Support Document for Water Quality-based Toxics Control* (USEPA, 1991a) for additional information on deriving permit limits.

As a result of the 1987 Amendments to the Act, Individual Control Strategies (ICSs) were established under section 304(l)(1) for certain point source discharges of priority toxic pollutants. ICSs consist of NPDES permit limits and schedules for achieving such limits, along with documentation showing that the control measures selected are appropriate and adequate (e.g., fact sheets including information on how water quality-based limits were developed, such as total maximum daily loads and waste load allocations). Point sources with approved ICSs are to be in compliance with those ICSs as soon as possible or in no case later than 3 years from the establishment of the ICS (typically by 1992 or 1993).

When establishing WLAs for point sources in a watershed, the TMDL record should show that, in the case of any credit for future nonpoint source reductions (1) there is reasonable assurance that nonpoint source controls will be implemented and maintained, or (2) that nonpoint source reductions are demonstrated through an effective monitoring program. Assurances may include the application or utilization of local ordinances, grant conditions, or other enforcement authorities. For example, it may be appropriate to provide that a permit may be reopened when a WLA requiring more stringent limits is necessary because attainment of a nonpoint source load allocation was not demonstrated.

Some compliance implementation time may, in certain situations, be necessary and appropriate for permittees to meet new permit limits based on new standards. Under the Administrator's April 16, 1990 decision in an NPDES appeal (Star-Kist Caribe Inc., NPDES Appeal No. 88-5), the Administrator stated that the only basis in which a permittee may delay compliance after July 1, 1977 (for a post July 1977 standard), is pursuant to a schedule of compliance established in the permit which is authorized by the State in the water quality standard itself or in other State implementing regulations. Standards are made applicable to individual dischargers through NPDES permits which reflects the applicable Federal or State water quality standards. When a permit is issued, a schedule of compliance for water quality-based limitations may be included, as necessary.

7.6.2 Nonpoint Source Controls

In addition to permits for point sources, nonpoint sources controls such as management measures or best management practices (BMPs) are also to be implemented so that surface water quality objectives are met. To fully address water bodies impaired or threatened by nonpoint source pollution, States should implement their nonpoint source management programs and ensure adoption of control measures or practices by all contributors of nonpoint source pollution to the targeted watersheds.

Best management practices are the primary mechanism in section 319 of the CWA to enable achievement of water quality standards. Section 319 requires each State, in addition to developing the assessment reports discussed in section 7.2.1 of this Handbook, to adopt NPS management programs to control NPS pollution.

Sections 208(b)(2)(F) through (K) of the CWA also require States to set forth procedures and methods including land use requirements, to control to the extent feasible nonpoint sources of pollution reports.

Section 6217 of the Coastal Zone Reauthorization Amendments of 1990 (CZARA) requires that States with federally approved coastal zone management programs develop Coastal Nonpoint Pollution Control Programs to be approved by EPA and NOAA. EPA and NOAA have issued *Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance* (NOAA/EPA, 1993), which describes the program development and approval process and requirements. State programs are to employ an initial technology-based approach generally throughout the coastal management area, to be followed by a more stringent water quality-based approach to address known water quality problems. The Management Measures generally implemented throughout the coastal management area are described in *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* (USEPA, 1993b).

7.6.3 CWA Section 401 Certification

States may grant, condition, or deny "certification" for a federally permitted or licensed activity that may result in a discharge to the waters of the United States, if it is the State where the discharge will originate. The language of section 401(a)(1) is very broad with respect to the activities it covers:

> [A]ny activity, including, but not limited to, the construction or operation of facilities, which <u>may</u> result in <u>any discharge</u> . . .

requires water quality certification.

EPA has identified five Federal permits and/or licenses that authorize activities that may result in a discharge to the waters: permits for point source discharge under section 402 and discharge of dredged and fill material under section 404 of the Clean Water Act; permits for activities in navigable waters that may affect navigation under sections 9 and 10 of the Rivers and Harbors Act (RHA); and licenses required for hydroelectric projects issued under the Federal Power Act. There are likely other Federal permits and licenses, such as permits for activities on public lands, and Nuclear Regulatory Commission licenses, which may result in a discharge and thus require 401 certification. Each State should work with EPA and the Federal agencies active in its State to determine whether 401 certification is in fact applicable.

Congress intended for the States to use the water quality certification process to ensure that no Federal license or permits would be issued that would violate State standards or become a source of pollution in the future. Also, because the States' certification of a construction permit or license also operates as certification for an operating permit (except in certain instances specified in section 401(a)(3)), it is imperative for a State review to consider all potential water quality impacts of the project, both direct and indirect, over the life of the project.

In addition, when an activity requiring 401 certification in one State (i.e. the State in which the discharge originates) will have an impact on the water quality of another State, the statute provides that after receiving notice of application from a Federal permitting or licensing agency, EPA will notify any States whose water quality may be affected. Such States have the right to submit their objections and request a hearing. EPA may also submit its evaluation and recommendations. If the use of conditions cannot ensure compliance with the affected State's water quality requirements, the Federal permitting or licensing agency shall not issue such permit or license.

The decision to grant, condition, or deny certification is based on a State's determination from data submitted by an applicant (and any other information available to the State) whether the proposed activity will comply with the requirements of certain sections of the Clean Water Act enumerated in section 401(a)(1).

These requirements address effluent limitations for conventional and nonconventional pollutants, water quality standards, new source performance standards, and toxic pollutants (sections 301, 302, 303, 306, and 307). Also included are requirements of State law or regulation more stringent than those sections or their Federal implementing regulations.

States adopt surface water quality standards pursuant to section 303 of the Clean Water Act and have broad authority to base those standards on the waters' use and value for ". . . public water supplies, propagation of fish and wildlife, recreational purposes, and . . . other purposes" (33 U.S.C. section 1313 (c)(2)(A)). All permits must include effluent limitations at least as stringent as needed to maintain established beneficial uses and to attain the quality of water designated by States for their waters. Thus, the States' water quality standards are a critical concern of the 401 certification process.

If a State grants water quality certification to an applicant for a Federal license or permit, it is in effect saying that the proposed activity will comply with State water quality standards (and the other CWA and State law provisions enumerated above). The State may thus deny certification because the applicant has not demonstrated that the project will comply with those requirements. Or it may place whatever limitations or conditions on the certification it determines are necessary to ensure compliance with those provisions, and with any other "appropriate" requirements of State law.

If a State denies certification, the Federal permitting or licensing agency is prohibited from issuing a permit or license. While the procedure varies from State to State, a State's decision to grant or deny certification is ordinarily subject to an administrative appeal, with review in the State courts designated for appeals of agency decisions. Court review is typically limited to the question of whether the State agency's decision is supported by the record and is not arbitrary or capricious. The courts generally presume regularity in agency procedures and defer to agency expertise in their review. (If the applicant is a Federal agency, however, at least one Federal court has ruled that the State's certification decision may be reviewed by the Federal courts.)

States may also waive water quality certification, either affirmatively or involuntarily. Under section 401(a)(1), if the State fails to act on a certification request "within a reasonable time (which shall not exceed one year)" after the receipt of an application, it forfeits its authority to grant conditionally or to deny certification.

The most important regulatory tools for the implementation of 401 certification are the States' water quality standards regulations and their 401 certification implementing regulations and guidelines. Most Tribes do not yet have water quality standards, and developing them would be a first step prior to having the authority to conduct water quality certification. Also, many States have not adopted regulations implementing their authority to grant, deny, and condition water quality certification. *Wetland and 401 Certification: Opportunities and Guidelines for States and Eligible Indian Tribes* (USEPA, 1989a) discusses specific approaches, and elements of water quality standards and 401 certification regulations that EPA views as effective to implement the States' water quality certification authority.

7.7 Monitor and Enforce Compliance

As noted throughout the previous sections, monitoring is a crucial element of water quality-based decision making. Monitoring provides data for assessing compliance with water quality-based controls and for evaluating whether the TMDL and control actions that are based on the TMDL protect water quality standards.

With point sources, dischargers are required to provide reports on compliance with NPDES permit limits. Their discharge monitoring reports (DMR) provide a key source of effluent quality data. In some instances, dischargers may also be required in the permit to assess the impact of their discharge on the receiving water. A monitoring requirement can be put into the permit as a special condition as long as the information is collected for purposes of writing a permit limit.

States should also ensure that effective monitoring programs are in place for evaluating nonpoint source control measures. EPA recognizes monitoring as a high-priority activity in a State's nonpoint source management program (55 F.R. 35262, August 28, 1990). To facilitate the implementation and evaluation of NPS controls, States should consult current guidance (USEPA, 1991g); (USEPA, 1993b). States are also encouraged to use innovative monitoring programs (e.g., rapid bioassessments (USEPA, 1989e), and volunteer monitoring (USEPA, 1990b) to provide for adequate point and nonpoint source monitoring coverage.

Dischargers are monitored to determine whether or not they are meeting their permit conditions and to ensure that expected water quality improvements are achieved. If a State has not been delegated authority for the NPDES permit program, compliance reviews of all permittees in that State are the responsibility of EPA. EPA retains oversight responsibility for State compliance programs in NPDES-delegated States. NPDES permits also contain self-monitoring requirements that are the responsibility of the individual discharger. Data obtained through self-monitoring are reported to the appropriate regulatory agency.

Based on a review of data, EPA or a State regulatory agency determines whether or not a NPDES permittee has complied with the requirements of the NPDES permit. If a facility has been identified as having apparent violations, EPA or the State will review the facility's compliance history. This review focuses on the magnitude, frequency, and duration of violations. A determination of the appropriate enforcement response is then made. EPA and States are authorized to bring civil or criminal action against facilities that violate their NPDES permits. State nonpoint source programs are enforced under State law and to the extent provided by State law.

Once control measures have been implemented, the impaired waters should be assessed to determine if water quality standards have been attained or are no longer threatened. The monitoring program used to gather the data for this assessment should be designed based on the specific pollution problems or sources. For example, it is difficult to ensure, *a priori*, that implementing nonpoint source controls will achieve expected load reductions due to inadequate selection of practices or measures, inadequate design or implementation, or lack of full participation by all contributing nonpoint sources (USEPA, 1987e). As a result, long-term monitoring efforts must be consistent over time to develop a data base adequate for analysis of control actions.

7.8 Measure Progress

If the water body achieves the applicable State water quality standards, the water body may be removed from the 303(d) list of waters still needing TMDLs. If the water quality standards are not met, the TMDL and allocations of load and waste loads must be modified. This modification should be based on the additional data and information gathered as required by the phased approach for developing a TMDL, where appropriate; as part of routine monitoring activities; and when assessing the water body for water quality standards attainment.

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5 SR 1136

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION CONTROL AGENCY

In the Matter of the Proposed Amendments to MPCA Rules WPC 14, 15, 24 and 25 and the Proposed Repeal of WPC 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21, 23, 26, 29, 31 and 32.

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STATEMENT OF NEED AND REASONABLENESS

I. INTRODUCTION

The subjects of this hearing are proposed amendments to existing rules of the Minnesota Pollution Control Agency (hereinafter "Agency"), specifically WPC 14, 15, 24 and 25. (These rules will be renumbered as part of this hearing to correspond with the Minnesota Code of Administrative Rules (MCAR) system, e.g., 6 MCAR §4.8014, but throughout this Statement the rules will be referred to under their old numbers, e.g., WPC 14.) The Agency is also proposing to repeal, in their entirety, a number of existing rules that have become outdated. These rules are proposed for amendment or repeal pursuant to the Agency's authority under Minn. Stat. §§115.03 and 115.44 (1978).

The amendments being proposed would create a new classification of waters of the State called Limited Resource Value Waters, would classify certain waters as Limited Resource Value Waters, and would establish water quality standards for these waters and effluent limitations for dischargers to these waters. In addition, some water quality standards for most classes of water are proposed for revision. The primary focus is on water quality standards for ammonia, chlorine, dissolved oxygen, and fecal coliform organisms.

This Statement discusses these and all other proposed changes to the rules but the discussion represents only a summary of the data and testimony relied on by the Agency to support the amendments. In conjunction with this Statement, the Agency has also prepared written testimony for most of its witnesses. These documents are available now for review at the offices of the Agency in Roseville. The Agency does not intend to read the written testimony at the hearing, although copies will be available for review.

The Agency has attached to this Statement a list of all the Exhibits the Agency intends to place into the record. These Exhibits are referenced throughout this Statement and the written testimony in support of specific amendments. Copies of these exhibits are available for review at the offices of the Agency in Roseville. A complete list of those people who will provide testimony, either written or oral, in support of the amendments is included below. The specific witnesses who will testify in support of a particular provision are listed again in this Statement after the discussion of each particular provision. Finally, a Glossary is included at the end of this Statement to provide definitions of words and phrases and abbreviations used throughout this Statement and the testimony and exhibits.

II. WITNESSES

The following people will provide testimony in support of the proposed amendments; with the general area of testimony indicated in parenthesis:

1. William Anderl, Minnesota Department of Health (Fecal coliform)

2. Gerald Blaha, Section of Surface and Groundwaters, Division of Water Quality, Minnesota Pollution Control Agency (Limited Resource Value Waters - Criteria, Standards and Assessment Procedure)

3. Dr. William Brungs, U.S. Environmental Protection Agency, Environmental Research Laboratory, Duluth, Minnesota (Chlorine and Dissolved Oxygen)

4. Randy Burnyeat, Permits Section, Division of Water Quality, Minnesota Pollution Control Agency (Pretreatment Program as it relates to the proposed repeal of the 5 mg/l total suspended solids limitation)

5. John Hensel, Facilities Section, Division of Water Quality, Minnesota Pollution Control Agency (Effect on Municipal Dischargers)

6. Marvin Hora, Section of Surface and Groundwaters Division of Water Quality, Minnesota Pollution Control Agency (Toxic Substances Program as it relates to the proposed repeal of the 5 mg/l total suspended solids limitation)

7. Paul Marsh, Section of Surface and Groundwaters, Division of Water Quality, Minnesota Pollution Control Agency (Toxic Substances and Chlorine)

8. David Maschwitz, Section of Surface and Groundwaters, Division of Water Quality, Minnesota Pollution Control Agency (Dissolved Oxygen and Ammonia)

9. John McGuire, Section of Surface and Groundwaters, Division of Water Quality, Minnesota Pollution Control Agency (Repeal of Rules)

10. Lanny Peissig, Section of Surface and Groundwaters, Division of Water Quality, Minnesota Pollution Control Agency (Limited Resource Value Waters and Total Suspended Solids)

11. Deborah Pile, Planning Section, Division of Water Quality, Minnesota Pollution Control Agency (Minnesota and Mississippi River Classification)

12. Steve Reed, Facilities Section, Division of Water Quality, Minnesota Pollution Control Agency (Effect on Industrial Dischargers)

13. Larry Sisk, U.S. Fish and Wildlife Service (Dissolved Oxygen, Chlorine, and Ammonia)

14. Dr. Robert Thurston, Fisheries Bioassay Laboratory, Montana State University, Bozeman, Montana (Ammonia)

15. Gordon Wegwart, Facilities Section, Division of Water Quality, Minnesota Pollution Control Agency (Effect on MWCC)

16. Jerry Winslow, Section of Surface and Groundwaters, Division of Water Quality, Minnesota Pollution Control Agency (Water Quality Models)

17. Minnesota Department of Natural Resources (John Enblom or John Skrypek) (Dissolved Oxygen)

In addition to the above witnesses, who have all prepared written testimony that is available now, the Agency anticipataes that the Minnesota Department of Health will provide comments on the rules, as will Region V of the United States Environmental Protection Agency. Also, a witness from the EPA lab in Cincinnati, Ohio, (probably Edwin Geldreich or Lee McCabe) will provide testimony in support of the fecal coliform standards.

III. NEED AND REASONABLENESS REQUIREMENT

Minn. Stat. §15.0412, Subd. 4 (1978) requires an agency to make an affirmative presentation of facts establishing the need for and the reasonableness of the rule or amendments proposed. In general terms what this statutory test requires is that an agency must set forth the reasons for its proposed action and its reasons must not be arbitrary or capricious. However, to the extent that need and reasonableness are separate tests, need has come to mean that there is a problem that exists that requires administrative attention and reasonableness means that the solution proposed by the agency is a proper one.

The Agency here in the discussion below has attempted to separate the need from the reasonableness for each of the specific proposed amendments. Need, however, is a broad test that does not easily lend itself to an evaluation of each provision proposed. In this broad sense the need for amendments to water quality rules arises from the fact that the rules have not been amended in over six years and it is appropriate to reevaluate the classifications and standards and limitations in the light of present knowledge. Technology has changed, new evidence has been gathered, and other factors require new analysis. While the Agency believes that these facts establish the need for amendments to the water quality rules, and the only analysis left to be made is whether the specific proposals are reasonable, the Agency has nevertheless addressed the question of the need of each provision to the extent that can be done.

IV. DISCUSSION

A. Background

It is important at the outset to describe the general format of WPC 14, 15, 24 and 25. WPC 14 and WPC 15 establish criteria for different classifications of water, establish water quality standards applicable to each classification, and establish effluent limits for dischargers. WPC 14 applies to intrastate waters and WPC 15 applies to interstate waters. Essentially, the language in both rules is identical.

Section B of WPC 14 and 15 identifies the different use classifications of waters. The present use classifications are (1) domestic consumption, (2) fisheries and recreation, (3) industrial consumption, (4) agricultural and wildlife, (5) navigation and waste disposal, and (6) other uses. The Agency has also proposed an additional classification, Class 7, which is Limited Resource Value Waters.

Section D of WPC 14 and 15 establishes the water quality standards for each classification of waters. Water quality standards are the minimum or maximum allowable concentrations of various water quality characteristics, such as dissolved oxygen or toxic pollutants.

Section C of WPC 14 and 15 establishes the effluent limitations that a discharger must meet. Effluent limitations are the maximum allowable concentrations of various pollultants which a source may discharge. Effluent limitations are set at levels necessary to achieve and maintain water quality standards.

Using the criteria set forth in WPC 14 and WPC 15, the Agency has placed the waters of the State into one or more of the established classifications. The results of this placement are found in WPC 24 for intrastate waters and in WPC 25 for interstate waters.

The Agency has proposed changes in use classifications, water quality standards, effluent limitations, and classification of certain waters, and the discussion below is generally structured around these concepts. Part B of this Statement deals with proposed amendments to water quality standards (ammonia, chlorine, dissolved oxygen, fecal coliform); Part D deals with effluent limitations (sections C.1, C.8, C.9, C.10, C.14, and C.6,); and Part E discusses the proposed reclassification of certain portions of the Mississippi and Minnesota Rivers.

The other Parts are as follows: Part C discusses all of the proposed amendments relating to Limited Resource Value Waters, including the use classification criteria, the water quality standards, the effluent limitations, and the classification of such waters. Part F discusses the proposed repeal of certain rules. The final Part, Part G, discusses the economic impacts of all the proposed amendments. (The economic impact of the proposed rules is a factor to be considered in determining the reasonableness of the rules; however, the economic discussion has been set out in a separate part for the sake of convenience.)

B. Water Quality Standards

Water quality standards are established for the protection of specific beneficial uses man makes of surface waters. For many pollutants, protection of the aquatic community is the most sensitive use, and protection of aquatic life will protect the water for other uses. Therefore, it is helpful to understand the rationale behind the derivation of water quality standards for the protection of aquatic life. The Agency has described this rationale in Exhibit 23, which is briefly summarized here.

In establishing a water quality standard for a particular pollutant to protect aquatic life, the idea is to protect the most sensitive resident species during its most sensitive life stage. While the most sensitive member of a resident aquatic community must be protected, not all organisms have been tested and our consideration must be limited to those for which data are available. The most sensitive species may not itself be a desirable fish species, but a valuable member of the ecological system. And the most sensitive life stage is often not the adult but the nymph, fry, embryo or some other stage. The identification of this most sensitive life stage of the most sensitive species must consider differences between acute (short-term) and chronic (long-term) effects, between coldwater and warmwater species, and between fishes and other aquatic biota.

It is also necessary, of course, to establish the concentration at which this most sensitive member of the aquatic community will be harmed by a particular pollutant. Field data is always valuable, but more often this concentration is determined through many laboratory bioassays, which are controlled tests to measure the effect of a particular substance, such as chlorine, on a living organism, such as a bluegill fish.

Bioassays may be classified on the basis of the duration of the test. An acute bioassay is of short duration, usually 1 to 4 days, and the standard measurement of effect is usually death of test organisms. The results of acute bioassay are often expressed as an LC50, the concentration or level of a water quality characteristic which is lethal to 50 percent of the test organisms in a specified period of time. Chronic bioassays are long-term tests, often over several life cycles of the test organism. Chronic bioassays are usually used to evaluate sublethal effects on the organism. The final results of chronic tests are often expressed as a MATC (Maximum Acceptable Toxicant Concentration) which is often considered to be a "safe" level of that toxicant for the species tested and under the described experimental conditions. By definition, the MATC (i.e., the threshold effect level) is the geometric mean of the highest toxicant concentration that has no adverse affect and the lowest concentration at which definite adverse effects on survival, growth, and reproduction are observed. Tests which yield both LC50 and MATC data can be used to determine application factors. An application factor is a number which can be used with acute toxicity data (i.e. LC50's) for a specific substance to estimate a safe concentration for chronic exposure to that substance. This allows utilization of the larger body of acute data compared with chronic data.

This background is helpful and it, and the more detailed discussion in Exhibit 23, should be kept in mind when reviewing the summary below and the testimony on the various water quality standards proposed for adoption.

The following discussion is a summary of the Agency's reasons and the evidence relied on to support the adoption of the proposed water quality standards - ammonia, chlorine, dissolved oxygen, and fecal coliform.

1. Ammonia - Proposed Minn. Rule WPC 14 D.2. and 15 D.2. (Class 2A, 2B and 2C waters)

a. Proposed Standard / Present Standard

	Proposed Standard	Present Standard
Class 2A	0.016 mg/l un-ionized ammonia (as N)	0.2 mg/l total ammonia (as N)
Class 2B	0.04 mg/l "	1.0 mg/l total ammonia (as N)
Class 2C	0.04 mg/l "	1.5 mg/l total ammonia (as N)

b. Need

Ammonia is present in many wastewater treatment plant effluents and is highly toxic to aquatic life. Therefore, the concentration of ammonia in waters must be controlled to protect the fisheries and recreational uses of waters. An ammonia standard is needed in order to protect aquatic life, including fish and their food organisms, from long-term or chronic effects due to the presence of ammonia in the waters of the state.

c. Reasonableness

Ammonia is a pungent, colorless gas containing nitrogen and hydrogen and is highly soluble in water. When ammonia is in solution with water, it exists in two chemical forms: the gaseous or un-ionized form (NH_3), and, the ionized form (NH_4^+). Total ammonia consists of the sum of the un-ionized and the ionized forms of ammonia. The portion of total ammonia which is in the un-ionized form at any time is controlled primarily by the pH and secondly by the temperature of the water. An increase in the pH results in an increase in the un-ionized form of ammonia. Likewise, an increase in temperature increases the un-ionized form of ammonia. Un-ionized ammonia is the form of ammonia which is the most toxic to aquatic life. Ionized ammonia is considered much less toxic than un-ionized ammonia.

The present ammonia standards are expressed in terms of total ammonia. Because the portion of toxic un-ionized ammonia within the total is greatly dependent on water quality characteristics, such as pH and temperature, a total ammonia standard is often too lenient or too stringent and is only correct when rather specific water conditions are met (a certain pH and temperature). Stating the proposed standard in terms of un-ionized ammonia, rather than total ammonia, is reasonable because: (1) un-ionized ammonia is the primary toxic form of ammonia; and, (2) stating the standard in terms of un-ionized ammonia will establish a standard which will be appropriate year round since it takes into account the natural fluctuations in ambient pH and temperature.

The proposed standards are based on an assessment of both acute and chronic data for important resident fish in Minnesota. The proposed standard for Class 2A waters is more stringent than the proposed standard for Class 2B & 2C waters because coldwater fish are more sensitive to ammonia toxicity than warmwater fish.

The proposed standard for Class 2A waters is based upon an assessment of the acute and chronic data for rainbow trout. Rainbow trout have been successfully introduced in many coldwater habitats in Minnesota, such as the Straight River (near Park Rapids), and are an important game fish species. The maximum acceptable toxicant concentration (MATC) estimated for this species is 0.0145 mg/l. The current U.S. Environmental Protection Agency recommended criteria is 0.016 mg/l. This value has also been accepted by other regulatory agencies. Therefore, the proposed standard of 0.016 mg/l is reasonable.

The proposed standard for Class 2B & 2C waters is based upon an assessment of the acute and chronic data for warmwater fish, and, in particular, studies in regard to the bluegill. The bluegill is a very common and important warmwater game fish in Minnesota, and, as has been shown for many fish species, the very young life stages (fry) are very sensitive to the toxic effects of ammonia. The maximum acceptable toxicant concentration (MATC) derived for this species (the LC50 times the application factor) is 0.04 mg/l un-ionized ammonia. Therefore, the proposed standard is reasonable.

Ammonia enters surface waters from several sources, including municipal wastewater discharges and industrial discharges. Effluent limits for individual dischargers will be established, as necessary, in order to meet the proposed ammonia water quality standards. (The proposed standard for Class 2A waters is comparable to the present standard during summer months. The proposed standard for Class 2B & 2C waters is generally more stringent than the present standard during summer months.) In many cases, no ammonia removal will be required of dischargers to continuously flowing waters. In other cases, an ammonia effluent limit may be necessary. This will be determined on the basis of Waste Load Allocation Studies. Dischargers to waters classified under Section C.8. (low flow streams not classified as Class 7) will, in general, be required to meet the following effluent limits in order to achieve the proposed standard of 0.04 mg/l:

Summer: 1 mg/l total ammonia

Winter: 4 mg/l total ammonia.

The proposed ammonia standard is not applicable to Class 7 waters; therefore, no ammonia removal will be required of dischargers to such waters unless necessary to protect downstream waters.

If ammonia removal is required, the technology is available to achieve this result. However, secondary wastewater treatment facilities are not generally capable of achieving adequate ammonia removal. For the purposes of estimating the costs of complying with the proposed ammonia standard, it was assumed that advanced treatment, by means of a two-stage biological treatment process, would be necessary if the effluent limit was less than 10 mg/l.

d. Witnesses

1. John Hensel
2. Steve Reed
3. Gordon Wegwart
4. David E. Maschwitz
5. Dr. Robert V. Thurston
6. Larry Sisk

e. Exhibits

Numbers 15 - 39.

2. Chlorine - Proposed Minn. Rule WPC 14 D.2 and 15 D.2 (Class 2A, 2B & 2C waters)

a.

Present Standard	Proposed Standard
None Specified	.003 mg/l (under conditions of conditions of continuous exposure)

b. Need

Chlorine is not a natural constituent of surface water. Rather, it is present mainly because of discharges of municipal wastewater, where chlorine is used as a disinfectant, or discharges of industrial cooling water, where chlorine is used as an anti-fouling agent.

Chlorine is toxic to aquatic life. A restriction on the amount of chlorine allowed in a waterbody is needed to protect aquatic life, including fish and their food organisms, from chronic poisoning due to total residual chlorine.

c. Reasonableness

When chlorine is used as a disinfectant or as an anti-fouling agent, it is administered as either a gas or as a salt. Chlorine reacts with water to form a weak acid. The free available chlorine (Cl_2, HOCl, and OCl^-) will react with nitrogen compounds in the water to form combined available chlorine. Total residual chlorine is a measure of both free available and combined available chlorine.

Depending upon the chemical composition of the water, some chlorine will react with other substances to form chlorinated compounds. These chlorinated compounds are not part of the total residual chlorine.

Until recently, it was believed that the residual chlorine in discharges was rapidly eliminated by the reduction of chlorine to chloride, which is relatively harmless to aquatic life. However, recent studies have shown that chlorine can persist for a period of hours to days and that the most important factor determining dissipation of residual chlorine is dilution, rather than reduction to chloride.

The proposed standard of 0.003 mg/l total residual chlorine is based upon an assessment of studies of the acute and chronic toxicity of total residual chlorine to aquatic life. The 96-hour LC50 values for total residual chlorine for the most sensitive freshwater fish species range between 0.040 and 0.080 mg/l. The most sensitive invertebrate species is even more susceptible to the acute toxicity of chlorine than the most sensitive fish species.

The maximum acceptable toxicant concentration (MATC) for freshwater fish varies from 0.015 mg/l total residual chlorine to 0.026 mg/l. Invertebrates appear to be even more sensitive than fish to chronic exposure to chlorine. A geometric mean MATC for invertebrates is 0.005 mg/l; however, sublethal effects on some species occur at lower levels. Thus, a water quality criteria for the protection of aquatic life must be less than 0.005 mg/l to provide adequate protection. The standard of 0.003 mg/l of total residual chlorine is reasonable in order to provide an adequate margin of safety.

Separate standards for warmwater and coldwater fisheries have not been proposed because data indicate that several warmwater species are as sensitive to chlorine as are the most sensitive coldwater species.

The proposed total residual chlorine standard is applicable only to conditions of continuous exposure. Continuous exposure is defined in reference to any effluent which contains total residual chlorine and is discharged for a total of more than two hours in any 24-hour period. This is consistent with federal guidelines. Thus, intermittent dischargers will not be impacted by the proposed standard. However, these intermittent dischargers will, at a minimum, have to comply with federal effluent guidelines and standards.

In order to meet the proposed chlorine standard, dischargers with continuous chlorination will have to dechlorinate their effluent. Dechlorination is technically feasible at a reasonable cost. Dechlorination can be accomplished by the addition of sulfur dioxide in the final step of the treatment process. The reaction of sulfur dioxide with total residual chlorine is almost instantaneous and produces essentially no residual chlorine. However, because this process depletes the oxygen in the wastewater, reaeration may be necessary in some instances.

Dechlorination can also be accomplished by treating the chlorinated effluent with activated carbon. In addition, there are other means of disinfecting wastewater, such as ozone, ultraviolet irradiation and bromine chloride. If such means are used, dechlorination would, of course, not be necessary.

Dechlorination of wastewater will only be required from May 1st - October 31st since this is the only time disinfection is required. (See Part B.4. of this Statement.) Dechlorination requirements will likely be applicable to discharges from all municipal mechanical wastewater treatment facilities except those to Class 7 waters. Dechlorination will not be required for ponds or land application wastewater treatment facilities. Some industrial dischargers will be required to dechlorinate as well.

The Agency is cognizant of the difficulties associated with the measurement of total residual chlorine at levels near that of the proposed standard. However, fish and other aquatic biota cannot adjust their sensitivity to chlorine to accommodate shortcomings in our analytical capabilities. There are two ways in which total residual chlorine can be satisfactorily monitored even at this very low level. First, sophisticated amperometric analytical equipment can measure the total residual chlorine in the receiving water at concentrations near the level of the proposed standard. This equipment is commercially available at a cost of approximately \$2000 - \$4000 per unit. Second, effluent concentrations of total residual chlorine could be monitored using less expensive amperometric equipment (\$700 - \$1000 per unit) with detection limits in the area of 0.020 mg/l. These effluent concentrations could then be used to calculate the receiving water concentration by application of an appropriate mass-balance equation.

d. Witnesses

1. Dr. William A. Brungs
2. John Hensel
3. Paul Marsh
4. Steve Reed
5. Gordon Wegwart
6. Larry Sisk

e. Exhibits

Numbers 37, 40 - 53.

3. Dissolved Oxygen: Proposed Minn. Rule WPC 14D.2 and 15D.2 - (Class 2A, 2B and 2C Waters)

a.

	Proposed Standard	Present Standard
Class 2A Waters	not less than 7 mg/l at all times (instantaneous minimum concentration)	not less than 7 mg/l from October 1st and continuing through May 31st and not less than 6 mg/l at other times

Class 2B Waters	Not less than 5 mg/l at all times (instantaneous minimum concentration)	Not less than 6 mg/l from April 1st through May 31st and not less than 5 mg/l at other times
Class 2C Waters	Not less than 5 mg/l at all times (instantaneous minimum concentration)	Not less than 5 mg/l from April 1 through November 30 and not less than 4 mg/l at other times

b. Need

Some level of dissolved oxygen must be present in freshwater to protect aquatic life. Data gathered since the existing standards were adopted in 1973 indicate that a reevaluation of the standard itself and of the method of determining compliance and of the times when the standard is applicable is warranted.

c. Reasonableness

Oxygen is unlike most chemical characteristics of water for which water quality standards are proposed in that oxygen must be present at some minimum concentration to sustain aquatic life. Other chemical characteristics such as ammonia and chlorine, on the other hand, are toxic to aquatic life and should not be present in excess of a maximum acceptable concentration.

The basic source of oxygen to a body of water is the atmosphere. However, the concentration of oxygen present at any given moment is often the net result of the oxygen producing process (photosynthesis) versus the oxygen consumptive process (respiration) within that body of water. Thus, during the daylight hours photosynthetic activity of algae and other aquatic plants usually raises the oxygen concentration of the water while, at night, with the cessation of photosynthesis, continuing respiration causes the oxygen concentration to decline.

The discharge of oxygen demanding municipal and industrial wastes into waterways can cause a depletion of oxygen as the organic material is broken down through oxygen consuming biological processes. Thus, low levels of dissolved oxygen are often indicative of excess organic loading to waters.

The basic rationale of the proposed dissolved oxygen standards is that, based on data available, the standards represent concentrations which will protect aquatic life from sublethal effects during prolonged exposure, will insure productivity, and will avoid undesirable shifts in fish communities. Oxygen requirements of aquatic organisms have been studied both in the field and in the laboratory and data from both are useful in deriving the proposed standard.

The proposed standard for Class 2A waters is 7 mg/l. Research has shown that a dissolved oxygen standard of 7 mg/l, which assures levels close to full oxygen saturation at the highest summer temperatures, will result in little or no foreseeable harm to aquatic life. This high level of protection is consistent with the importance attached to these valuable fisheries, such as Lake

Superior, the North Shore streams the Straight River (near Park Rapids), and the Whitewater River (east of Rochester).

The proposed standard for Class 2B and 2C waters is 5 mg/l, which is less stringent than the proposed standard for Class 2A waters. This is because coldwater fish such as trout are more sensitive to hypoxia (insufficient oxygen supply) than warmwater fish. The 5 mg/l standard for warmwater fisheries is reasonable for the following reasons:

1. growth and feeding efficiency of some juvenile fish are reduced at oxygen concentrations below 5 mg/l;

2. growth and survival of the larvae of several warmwater fish species are impacted by oxygen concentrations below 5 mg/l;

3. good quality mixed warmwater fish populations, including game fish, are most often associated with water containing 5 mg/l or more oxygen; and,

4. stress from other sources, such as toxicants, high temperature and disease, is aggravated by lower oxygen concentrations.

Therefore, a standard below 5 mg/l would result in some reduced growth and reproduction success and probable population or community shifts, and would provide little protection for aquatic life from unknown sublethal effects of lowered oxygen.

While a 5 mg/l standard may allow some limited impact on aquatic life, such impact will not be significant over the long term. Thus, the Agency deems it reasonable to adopt a 5 mg/l standard for both Class 2B and 2C waters.

The proposed standards are instantaneous minimum concentrations, rather than an average concentration as some have urged, for the following reasons:

1. Tests involving fluctuating levels of oxygen have shown that growth of fish is limited by the minimum dissolved oxygen concentration;

2. Harmfully low levels of dissolved oxygen could occur in waters exhibiting wide diurnal fluctuations; and

3. An average standard presents significant monitoring problems.

For similar reasons, the Agency is not proposing a seasonal variation in the standards, as presently exists.

In order to meet the proposed dissolved oxygen standards, municipal and industrial dischargers will have to limit the amount of organic material in their effluents. BOD (biochemical oxygen demand) is the measure of the organic matter in wastewater. (BOD and dissolved oxygen are interrelated because dissolved oxygen is consumed as organic matter is decomposed.) Dischargers will be assigned BOD_5 effluent limits ranging from 5 mg/l to 25 mg/l, depending upon the receiving water involved. Various treatment processes are available to achieve these BOD_5 effluent limits. To the extent dischargers will have to meet more stringent BOD_5 effluent limitations because of the proposed standards, it will be not so much because of the changes in the numerical standard but because most existing limitations were not calculated on the basis of instantaneous minimum concentrations.

d. Witnesses

1. David Maschwitz,
2. Dr. William A. Brungs
3. John Hensel
4. Gordon Wegwart
5. Steve Reed
6. Larry Sisk
7. John Enblom/John Skrypek

e. Exhibits

Numbers 25 -28, 37, 55 - 79.

4. Fecal Coliform: Proposed Minn. Rule 14 WPC D.1-7. and 15 D.1-7. (Classes 1-7.)

a.

Present Standard	Proposed Standard
Class 1A 1 most probable number per 100 milliliters	No change
Class 1B 10 most probable number per 100 milliliters	Repeal
Class 1C 200 most probable number per 100 milliliters	Repeal
Class 1D 200 most probable number per 100 milliters	Repeal
Class 2A 200 most probable number per 100 milliters as a monthly geometric mean based on not less than 5 samples per month, nor exceed 400 most probable number per 100 milliters in more than 10% of all samples during any month.	200 organisms per 100 milliters as a logarithmic mean measured in not less 5 samples in any calendar month, nor shall more than 10% of all samples taken during any calendar month individually exceed 400 organisms per 100 milliters. (Applies only between May 1 and October 31).

Class 2B 200 most probable number per 100 milliliters as a monthly geometric mean based on not less than 5 samples per month, nor equal or exceed 2000 most probable number per 100 milliliters in more than 10% of all samples during any month.	200 organisms per 100 milliliters as a logarithmic mean measured in not less than 5 samples in any calendar month, nor shall more than 10% of all samples taken during any calendar month individually exceed 400 organisms per 100 milliliters. (Applies only between May 1 and October 31).
Class 2C 200 most probable number per 100 milliliters as a geometric mean nor equal or exceed 2000 most probable number per 100 milliliters in more than 10% of the samples.	200 organisms per 100 milliliters as a logarithmic mean measured in not less than 5 samples in any calendar month, nor shall more than 10% of all samples taken during any calendar month individually exceed 400 organisms per 100 milliliters. (Applies only between May 1 and October 31).
Class 3A 200 most probable number per 100 milliliters	Repeal
Class 3B 200 most probable number per 100 milliliters	Repeal
Class 3C 200 most probable number per 100 milliliters	Repeal
Class 4A 200 most probable number per 100 milliliters	Repeal
Class 4B 200 most probable number per 100 milliliters	Repeal
Class 5 200 most probable number per 100 milliliters	Repeal
Class 6 None Specified	None

Class 7 None Specified	1,000 organisms per 100 milliliters. The stated value is not to be exceeded in any calendar month as determined by the logarithmic mean of a minimum of 5 samples, nor shall more than 10% of all samples taken during any calendar month individually exceed 2,000 organisms per 100 milliliters. (Applies only between May 1 and October 31).

b. Need

Sewage, stormwater and other discharges containing animal wastes may contain disease causing bacteria, viruses and parasites. Primary body contact with, or consumption of, water containing such organisms can cause various diseases in human beings and other animals. No single test has yet been developed which can detect all of these pathogens. However, the presence of fecal coliforms, a group of bacteria found in the feces of warm-blooded animals, has been shown to indicate the potential presence of such pathogens. Therefore, a fecal coliform organisms standard is needed as an indicator of pollution from animal wastes.

c. Reasonableness

The proposed changes in the fecal coliform standard are as follows: (1) seasonal disinfection, rather than year-round disinfection, will be permitted except for dischargers upstream of a potable water supply; (2) year-round disinfection will continue to be required of dischargers 25 miles or less upstream of a potable water supply; (3) the maximum number of allowable organisms has been decreased for Class 2B and 2C waters; (4) a fecal coliform standard has been established for Class 7 waters; (5) the testing requirement for fecal coliform has been simplified; and (6) the fecal coliform standard has been repealed for certain classes of water.

1. Seasonal Disinfection

Class 2 waters are to be protected for recreational uses. The proposed amendments continue the present standard of 200 organisms per 100 milliliters (see discussion below regarding the tests used to determine this number). However, the proposed amendments generally limit the application of this standard to May 1 through October 31, instead of the present year-round application of the standard. This is reasonable from a public health perspective because it is not necessary to protect for recreational uses in Minnesota in the winter. Also, seasonal disinfection will result in a cost savings in two ways: (1) the amount of money spent for chlorine or other disinfectants will be less; and (2) if chlorine is used as a disinfectant, only seasonal dechlorination will be required.

2. Protection of Drinking Water Supply

A second public health concern related to this standard is domestic consumption. Thus, the proposed amendments continue to apply the fecal coliform standard year round when the waters are located 25 miles or less upstream of a potable water supply. Even though water will generally be treated before it is used for domestic consumption, it is desirable that effluents discharged to water to be used as a potable water supply still be disinfected. This will provide multiple barriers; i.e. disinfection, natural purification and treatment.

The 25 mile limit is based upon a survey of the location of major dischargers upstream from municipal water intake sources in Minnesota and a survey of similar requirements in other states.

3. Change in Standard for Class 2B and 2C Waters

The present fecal coliform standard for Class 2B and 2C waters sets 2000 organisms as the upper limit allowable in 10% of all samples taken during any month. The proposed standard would change this upper limit to 400 organisms. This proposed change is consistent with the U.S. Environmental Protection Agency criteria for recreational waters. The upper limit of 400 organisms has been established because above this limit the potential health-threat to recreational users of the waters is unacceptable.

4. Class 7 Waters

Class 7 waters will not be used for recreation or domestic consumption. Thus, a stringent fecal coliform standard is not required. However, the proposed standard of 1000 organisms/100 milliliters is reasonable as it will protect for secondary body contact use and use of groundwater as a potable water supply. This will also protect wildlife and livestock which use such waters and will allow the water to be used for irrigation without causing a hazard to human or animals. This standard is the same as that recommended by the National Academy of Sciences to protect for such uses.

5. Test Requirements

The change from "most probable number" of organisms to the number of "organisms" is reasonable because it will explicitly allow a simpler test for the fecal coliform parameter. To determine the "most probable number" of fecal coliform, a fairly sophisticated test procedure is required. Many small municipalities do not have the expertise to perform this test. The number of fecal coliform "organisms", on the other hand, can be determined by a fairly simple test procedure. Results of the simpler test are comparable to those obtained by the more complex test.

Likewise, the change from "per month" to "any calendar month" is intended to simplify reporting requirements. Under the present standard, the average could be determined for any 30-day period. Under the proposed standard, the average would be determined for any calendar month, which will coincide with other reporting requirements and will provide consistency in reporting.

The change from "geometric" mean to "logarithmic" mean is not substantive. The results of both computations are the same. However, the change in language will be consistent with U.S. Environmental Protection Agency criteria.

6. Repeal of Standard for Classes 1B, 1C, 1D, 3, 4 and 5

It is reasonable to delete the fecal coliform standard for Classes 1B, 1C and 1D, 3, 4, and 5, since all surface water is presently proposed to be classified as either Class 2 or Class 7. Thus, one of the proposed standards will be applicable to all surface waters.

d. Witnesses

1. William Anderl

2. John Hensel

3. Gordon Wegwart

e. Exhibits

Numbers 28, 37, 80, 117 - 121.

C. Limited Resource Value Waters:
Proposed Minn. Rule WPC 14 B.7., C.6 and 16., and D.7, WPC 15 B.7, C.6 and 16 and D.7., WPC 24 & 25, Supplement 1.

1. Need

There are a number of surface water bodies in the State of Minnesota that will never meet national water quality goals of being fishable and swimmable. These waters are generally those where, because of natural conditions or irreversible man-induced impacts, achievement of these national goals is perhaps impossible, and at least inordinately expensive. Such waters are those, for example, with naturally occurring low flow conditions or those that have been irretrievably modified by channelization or other man-made hydrological or structural alteration. Such characteristics, whether described by nature or imposed by man, essentially preclude the use of such waters for the propogation and maintenance of fish and limit the recreational opportunities for man.

It is necessary, therefore, to identify these waters and establish reasonable water quality standards for them. These water quality standards can then be used to determine the restrictions that must be placed on dischargers to these waters.

2. Reasonableness

a. Criteria - WPC 14 B.7 and 15 B.7

Once it is recognized that certain bodies of water have limited value as a water resource for fishing and swimming, it is necessary to develop criteria to identify these waters. The two criteria relied on by the Agency are a limited value in fact and a restricted quantity of water. These are found in Section B.7. The restricted quantity of water is a reasonable and obvious criterion. Certain bodies of water that have little or no flow at certain times of the year are the ones that are of limited value for fishing and swimming. The Agency has selected intermittent flow and flows of less than 1 cubic feet per second (cfs) at the once in ten year, seven-day low flow (7Q10) as criteria in defining the quantity of water. The use of these criteria allows for a case-by-case analysis while the 1 cfs cutoff limit at the 7Q10 provides a definitive standard that allows for an automatic fisheries and recreation use classification for those waters that equal or exceed the limit. A flow of 1 cfs was chosen because those waters with a higher 7Q10 have a potential for fisheries or recreational uses.

However, while the quantity of water may often be decisive, in that small quantities of water may preclude swimming and fishing, it is also important to make a determination whether the uses of the water actually are limited. Therefore, the second part of the test is whether the water does indeed have a limited value. In this regard Section B.7.c. provides that, in order to be classified a Limited Resource Value Water, the water must have limited recreational opportunities. The test sounds like a subjective one but the factors that go into this decision - like flow and habitat and human activity - are objective considerations that can be evaluated and measured. Indeed, Section B.7. provides that in order to have limited value, the use of a water for fishing and swimming must be limited by naturally occurring phenomena or man-induced alterations. These criteria are not really a separate test for limited recreational opportunities but instead are the factors that lead to the conclusion that these opportunities are limited.

b. Classification - Supplement 1 to WPC 24 and WPC 25

Supplement 1 to WPC 24 lists 180 intrastate bodies of water, or portions of certain intrastate waters, that exhibit limited value and intermittent or low flows. Supplement 1 to WPC 25 lists 7 interstate bodies of waters that exhibit the same characteristics.

Each of these bodies of water was individually assessed from data gathered during an on-site investigation of these waters by Agency staff members. The Agency believes that these assessments support the designation of these waters as Limited Resource Value Waters.

c. Water Quality Standards - WPC 14 D.7. and 15 D.7.

While it is conceded that Limited Resource Value Waters, by definition, will not attain national water quality goals of being fishable and swimmable, these waters must be protected to allow secondary body contact use, to preserve the groundwater for use as a potable water supply, and to maintain the aesthetic qualities of the water. Each of these is a reasonable goal that is consistent with state and federal policies. Therefore, in order to protect these waters for such uses, it is appropriate to establish water quality standards for these Class 7 Limited Resource Value Waters. Also, the water quality standards must be adequate to protect downstream waters that are fishable and swimmable. These water quality standards are set forth in Section D.7. The justification for the water quality standards can be summarized as follows:

1. Fecal Coliform. The 1000 organisms per 100 milliliters standard is as high a standard as the Agency believes can be

permitted and still protect the groundwater and allow secondary body contact use. Also, this standard will protect wildlife and livestock which use such waters and will allow the water to be used for irrigation purposes without presenting a hazard to man or animals from consumption of the crops. This is based on work by the National Academy of Sciences and others.

2. pH. The standard of 6.0 - 9.0 is believed to be protective of the above-stated uses. Moreover, this standard is readily achievable by dischargers to these waters.

3. Dissolved Oxygen. Dissolved oxygen is the primary factor that determines whether biological changes are brought about by aerobic or by anaerobic organisms. The staff believes that a 1 milligram per liter standard is adequate to provide aerobic conditions to avoid any obnoxious odor problems during biological oxidation of organic and inorganic matter. In the event that 1 milligram per liter of dissolved oxygen will not avoid anaerobic conditions, a higher concentration will have to be maintained to avoid odors or other putrid conditions. The standard is an instantaneous minimum because any fluctuations below the standard could cause anaerobic conditions.

4. Unspecified Substances. This standard is directed mainly at toxic and corrosive substances. It is simply a recognition that pollutants cannot be discharged to a Class 7 Limited Resource Value Water that would jeopardize one of the possible uses of the water, including protection of the groundwater.

d. Effluent Limitations - WPC 14 C.6. and C.16 and WPC 15 C.6. and C.16.

The effluent llimitations for a discharger to Class 7 Limited Resource Value Waters will be determined through the application of Sections C.6 and C.16. Dischargers to Class 7 Limited Resource Value Waters are generally exempted from the more stringent BOD_5 limitation of 5 mg/l set in Section C.8. for dischargers to other low flow streams because this limitation is not required to meet the water quality standards set for Class 7 waters.

The only specific effluent limitation set in Section C.16 is a 15 mg/l BOD_5 limitation. BOD (biochemical oxygen demand) is a measure of the organic matter in wastewater. BOD and DO (dissolved oxygen) are interrelated because DO is consumed as organic matter is decomposed. The 15 mg/l BOD_5 limitation is being proposed because the Agency has determined that this limitation is necessary to ensure that the 1 mg/l dissolved oxygen water quality standard is not violated. This 15 mg/l limitation was derived from the use of three mathematical models that were calibrated and verified by the Agency for three streams in Minnesota at low flow conditions. It is believed that these models predict the reaction of small Minnesota streams to municipal wastewater discharges.

The rest of the effluent limitations for dischargers to Class 7 Limited Resource Value Waters will be derived pursuant to the requirements of Section C.6. However, Section C.6 will not require a discharger to a Class 7 Limited Resource Value Water to meet an effluent limitation for chlorine or ammonia, for example, to protect aquatic life, because of Section C.6.

Subsections C.16.b. and C.16.c. essentially provide for more or less stringent effluent limitations as are necessary or adequate to protect water quality. It is reasonable to allow less stringent effluent limitations for persons who can restrict their discharge to times when the flow is high enough to maintain water quality standards and to require more stringent limitations when needed to preserve water quality in higher resource waters downstream from the discharge. The only limitation that will be relaxed because of the operation of Subsection C.16.b. is the BOD_5 limitation, and thus allow some dischargers to Class 7 Limited Resource Value Waters to meet the 25 mg/l limitation.

Whenever these subsections are utilized to establish effluent limitations for a discharger to a Limited Resource Value Water, all procedural safeguards will be afforded both the discharger and the public before those decisions are made.

3. Witnesses

   a. Gerald Blaha

   b. Lanny Peissig

   c. Jerry Winslow

   d. Bill Anderl

4. Exhibits

   Numbers 37, 66, 81 - 85, 93 - 99, 119.

D. Effluent Limitations

1. Total Suspended Solids Effluent Limitation: Proposed Minn. Rule WPC 14 C.8 and 15 C.8.

a.

Present Standard	Proposed Standard
Total Suspended Solids - 5 mg/l	Total Suspended Solids - 30 mg/l

b. Need & Reasonableness

Section C.8. establishes the effluent standards for low flow streams, which are not classified as Limited Resource Value Waters. Thus, the present standards are 5 mg/l BOD_5 and 5 mg/l total suspended solids. No change is being proposed in the BOD_5 standard; however, as noted above, the Agency has proposed to repeal the 5 mg/l total suspended solids standard which would, in effect, make the standard 30 mg/l, pursuant to Section C.6.

Repeal of the 5 mg/l total suspended solids standard is reasonable for the following reasons:

(1) There is no evidence that suspended solids concentrations as high as 25 mg/l harm aquatic life, and a discharger meeting a 30 mg/l limitation should not cause the concentration in the receiving water to exceed 30 mg/l.

(2) A wastewater treatment facility designed to meet 5 mg/l BOD_5 will not necessarily meet 5 mg/l total suspended solids limit;

(3) The 5 mg/l total suspended solids limit is not a cost effective means of removing toxic materials from the effluent. Pretreatment (removing toxic substances at their source) is generally more cost effective.

The present 5 mg/l total suspended solids requirement is not necessary to protect the water quality of low flow streams. The proposed 30 mg/l standard, applicable to all other bodies of water, will adequately protect water quality at a lesser cost.

c. Witnesses

1. Lanny Peissig
2. John Hensel
3. Randy Burnyeat
4. Marvin Hora

d. Exhibits

Number 105, 25 and 28.

2. Proposed Amendments to WPC 14 C.9. and 15 C.9.

a. Need and Reasonableness

The present provision provides that, after a public hearing, more stringent effluent limitations may be imposed on a discharger as necessary to meet water quality standards. The proposed language for Section C.9. does not change the substantive intent of this provision but only clarifies that a discharger may be required to meet more stringent effluent limitations than those specified in other sections of the rule if more stringent effluent limitations are necessary to meet water quality standards. This section does not establish the conditions under which more stringent limitations will be found to be necessary but provides that an opportunity for a public hearing will be afforded the discharger before any more stringent effluent limitations can be set.

b. Witness

Lanny Peissig

3. Proposed Amendments to WPC 14 C.10. and 15 C.10.

a. Need and Reasonableness

The present provision requires a common level of treatment for all sources discharging to the same receiving water. The Agency has become aware that this section no longer provides an equitable method of allocating waste loads, and thus is proposing to remove the equal treatment language. In lieu of equal treatment, under the new language effluent limitations will be developed for various dischargers after consideration of their relative size, impact on water quality, and economic status.

b. Witness

Lanny Peissig

4. Proposed Amendments to WPC 14 C.14. and 15 C.14

a. Need and Reasonableness

The purpose of section C.14. is to recognize that toxic substances cannot be discharged into the waters of the State such that the resulting concentration in the receiving water is harmful to aquatic life. Section C.14. does not identify toxic substances or establish permissible levels, but merely establishes a procedure to follow to establish specific water quality standards at a later date. This was the purpose in 1973 when the provision was adopted and remains the purpose under the new language. The new language merely updates the rule.

One way in which the proposed amendments update the provision is to replace the reference to the 1968 Federal Water Pollution Control Administration (predecessor of EPA) recommendations for water quality criteria (Green Book) with the more recent 1976 EPA recommendations (Red Book). The new language also clarifies that the EPA recommendations are important but not necessarily decisive in establishing water quality standards for toxic substances. All pertinent information will be considered.

Finally, the proposed changes strike the words "more stringent" in the sentence about using application factors because an application factor may be more stringent or less stringent than the standard factor of 1/10. If the Agency determines that another application factor besides 1/10 is justified by available scientific evidence, there is no reason to compare it with the standard 1/10 before deciding whether to use it.

b. Witness

Paul Marsh

c. Exhibits

Exhibits 23,37,54, and 66.

5. Proposed Amendments to WPC 14 C.1. and C.6. and 15 C.1. and C.6.

a. Need and Reasonableness

The Agency has proposed to repeal the requirement in Section C.6. which prohibits any pathogenic organisms in wastewater. This repeal has been proposed because, since there are so many types of pathogenic organisms, it is impractical to test for them all. Instead, it is more reasonable to use fecal coliforms as an indicator of the potential presence of pathogenic organisms.

The Agency has proposed to delete the following language from Section C.1:

"No treated sewage, or industrial waste or other wastes containing viable pathogenic organisms, shall be discharged into intrastate [interstate] waters of the state without effective disinfection."

The repeal has been proposed to make Section C.1 consistent with the proposed amendments which would only require seasonal disinfection of most dischargers and, also, for the reason stated above in regard to Section C.6.

b. Witness

William Anderl

c. Exhibit

Number 118.

E. Repeal of WPC 2, 3, 5-13, 16-21, 23, 26, 29, 31, 32

1. Need and Reasonableness

All the rules that are proposed for repeal were adopted prior to the last major revisions to WPC 14, 15, 24, and 25 in 1973. In fact, all but four of these rules were adopted in the 1960's, some by the predecessor to the Minnesota Pollution Control Agency, the Water Pollution Control Commission.

The Agency is proposing to repeal all these rules because WPC 14, 15, 24, and 25 are generally more stringent than the requirements of these older rules. In the few instances where a more stringent provision is contained in one of these older rules, the Agency believes that the more stringent provision is no longer needed and the water involved is adequately protected by the existing rules.

2. Witness

John McGuire

F. Reclassification of Certain Portions of the Minnesota and Mississippi Rivers within the Metropolitan Area-WPC 25

1. Present and Proposed Standards

At the present time the Minnesota River is classified as follows:

Reach	Classification
Big Stone Lake outlet to Granite Falls	1C, 2B, 3B
Granite Falls to Mankato	2B, 3B
Mankato to Carver Rapids	2B, 3B
Carver Rapids to Mouth	2C, 3B

The proposed reclassification is as follows:

Reach	Classification
Mankato to River Mile 22 (head of 9 foot navigation channel)	2B, 3B
River Mile 22 to mouth	2C, 3B

At the present time, the Lower Mississippi River is classified as follows:

Reach	Classification
Outlet of Metro Wastewater Treatment Works in St. Paul to Lock & Dam No. 2 at Hastings	2C, 3B
Lock & Dam No. 2 at Hastings to Iowa Border	2B, 3B

The proposed reclassification is as follows:

Reach	Classification
Outlet of Metro Wastewater Treatment Works in St. Paul to River Mile 830 (Rock Island RR Bridge)	2C, 3B
River Mile 830 to Iowa Border	2B, 3B

2. Need

River segment classifications must accurately reflect the appropriate uses of those segments.

3. Reasonableness

The proposed reclassification of the Minnesota River would upgrade the stretch of the River from Carver Rapids to Shakopee (River Mile 22) from a 2C classification to 2B classification. The proposed reclassification of the Lower Mississippi River would upgrade the stretch of the River from the Rock Island Railroad Bridge (River Mile 830) to Lock & Dam No. 2 at Hastings (River Mile 815) from a 2C classification to 2B classification.

The reclassifications were proposed by the MPCA in response to the recommendations of the Metropolitan Area Advisory Committee ("MAAC") and are based on the reports prepared by MAAC.

4. Witnesses

Deborah R. Pile

5. Exhibits

Numbers 86 - 92.

G. Economics

1. Discussion

The Agency recognizes that the proposed amendments will have an economic impact upon municipalities and industries that discharge wastewater to waters of the State. Some communities and industries will not be affected by the amendments. Some will save money, both capital expenditures and operating and maintenance expenses, and some communities and industries that are affected will incur additional costs to comply with the new standards.

The Agency has estimated these anticipated costs and savings. Basically, the approach used to do this was to first group every discharger into one of the following four categories depending on the body of water discharged to:

(1) Dischargers to low flow or intermittent waterways not classified as Limited Resource Value Waters;

(2) Dischargers to continuous flow waterways for which a Waste Load Allocation Study has not been done;

(3) Dischargers to waterways for which a Waste Load Allocation Study has been done;

(4) Dischargers to waterways which will be classified as Limited Resource Value Waters under the amendments.

The next step was to estimate what change in level of treatment would result from the proposed changes. This required an identification of the amendments that would require changes in treatment, and these are:

(1) Limited Resource Value Water Classification;

(2) the proposed deletion of the 5 mg/l total suspended solids limitation for low flow or intermittent waterways;

(3) the proposed ammonia water quality standard;

(4) the proposed dissolved oxygen standard; and

(5) the proposed seasonal disinfection requirement to meet the fecal coliform standard and the proposed total residual chlorine standard.

With these changes in mind, the Agency determined the present and proposed methods of treatment for each treatment plant in the State. In determining the proposed methods of treatment, the Agency used literature sources and the operational records and reports for each plant. In addition, the Agency discussed this work with a group of Minnesota consulting engineers.

Next, the costs were estimated for unit processes associated with changes in the levels of treatment required to meet the new standards for a wide range of treatment plant sizes. Cities and industries that will be affected were individually identified, and costs or savings were calculated for each depending on the changes in treatment required.

It should also be noted that industries which discharge to municipal wastewater treatment facilities may also be impacted by industrial cost recovery requirements and user charges.

The costs and savings can be summarized as follows:

a. Limited Resource Value Waters

(1) Outstate Municipalities

There are 99 municipalities that are located on waters that will be reclassified to Limited Resource Value Waters. Of these, 41 will not continuously discharge to receiving waters and will not be affected by the reclassification; no savings or costs will be incurred by these communities because of the amendments. The remaining 58 communities will have less stringent effluent limitations to meet and will realize a cost savings.

The cost savings realized by these 58 communities will be at least $18,560,000 in capital expenditures and $1,306,000 in annual operating and maintenance (O&M) expenses. This savings is realized because these communities will not be required to install second stage biological treatment, although filters will probably be required, in addition to conventional secondary treatment, to meet the 15 mg/l BOD_5 limitation.

(2) Industrial

There are 24 industries that presently discharge to proposed Limited Resource Value Waters. Many of these industries will utilize land appplication or aerated ponds with controlled discharge and will not be affected economically by the proposed change in classification. However, those industries that will be relieved of meeting the more stringent standards of Section C.8 of WPC 14 and 15 will see an economic savings, although no amount has been estimated.

b. Total Suspended Solids Effluent Limitation

The change from a 5 mg/l total suspended solids limitation to a 30 mg/l limitation for dischargers to low flow streams will not result in any direct savings for these dischargers because plants will still have to be designed to meet the 5 mg/l BOD_5 limitation. However, since plants designed to meet the 5/5 limitation are not always able to meet the 5 total suspended solids limitation consistently, the change in the limitation will relieve these dischargers of being in a position of noncompliance.

c. Ammonia

(1) Outstate Municipalities

There are 80 municipalities that are required to provide nitrification facilities to achieve effluent limitations necessary to meet both the existing and the proposed ammonia water quality standard. These facilities are projected to cost $53,300,000 with annual O&M costs of $2,570,000.

However, only one community - New Ulm - is estimated to have increased treatment costs because of the proposed standards. That increased cost is $2,100,000 capital and $76,000 annual O&M. In addition, it is uncertain whether five dischargers (Faribault, Fergus Falls, Mankato, Moorhead and Northfield) would ever have been assigned an ammonia effluent limitation based on the percent standard. The potential cost increase attributable to these dischargers to meet the proposed ammonia standard would be $8,300,000 for capital costs and $297,000 for annual O&M costs.

(2) MWCC

The Metropolitan Waste Control Commission (MWCC) is presently facing $47,000,000 in costs to meet the existing standards at the Pig's Eye Metro Plant on the Mississippi River. The new ammonia standard is projected to require an additional capital expenditure of $54,800,000 and an additional annual O&M expense of $3,000,000 at the Metro Plant.

MWCC will also incur additional expenses to meet the ammonia standard at its Blue Lake and Seneca Plants on the Minnesota River. Those increased expenses are $7,100,000 capital and $50,000 annual O&M at Blue Lake and $6,000,000 capital and $30,000 annual O&M at Seneca. No additional expenses are expected at other MWCC facilities.

(3) Industrial

There are 18 industrial dischargers in the State who have potential significant ammonia discharges, and these were investigated to determine the economic impact of the proposed ammonia standard. These industries are canneries, food processers, meat packers, tanneries, rendering plants, dairies, oil refineries, and chemical processers. Other industries were not evaluated to any extent because no economic impact is expected.

Because of the use of land disposal techniques, of requirements to meet Best Practicable Treatment, and of the dilution available in receiving waters, no significant impacts on most industrial dischargers are projected from the change in the ammonia standard. Only one industrial discharger - Armour and Company, Cold Spring -is expected to incur additional costs, \$610,000 capital for nitrification facilities and \$30,000 per year for O&M.

(4) Summary

The following table summarizes the anticipated increased costs because of the change in the ammonia standard.

	Capital	O&M/Year
New Ulm	\$2,100,000	\$76,000
Other (Potential)	\$8,300,000	\$297,000
MWCC		

	Capital	O&M/Year
Metro Plant	$54,800,000	$3,000,000
Blue Lake	$ 7,100,000	$50,000
Seneca	$ 6,000,000	$30,000
Armour & Company	$ 610,000	$30,000
TOTAL	$78,910,000	$3,483,000

d. Dissolved Oxygen

(1) Outstate Municipalities

The only outstate municipalities that will be affected by the change in dissolved oxygen (DO) standards are those for which Waste Load Allocation Studies have been done to establish effluent limitations for specific dischargers. There are seven of these communities. Three of these communities have needs of $8,000,000 to comply with either the existing or proposed standard. The remaining four communities, Austin, Fairbault, Mankato and Moorhead, will have increased needs of $7,400,000 for capital expenditures and increased O&M costs of $486,000 per year to comply with the proposed standards.

(2) MWCC

In order to meet the proposed standard, the MWCC has proposed to install final effluent filters at the Pig's Eye Metro plant to remove oxygen demanding organic material at a cost of $73,000,000. The O&M costs of the filters is $1,400,000 per year.

No increased costs are expected at any of the other plants operated by the MWCC because of the change in the dissolved oxygen standard.

(3) Industrial

There are no economic impacts expected for industrial dischargers because of the change in the dissolved oxygen standard.

(4) Summary

The following table summarizes the anticipated increased costs because of the change in the dissolved oxygen standard.

Facility	Capital	O&M/year
Austin, Fairbault Mankato & Moorhead	$7,400,000	$486,000
MWCC		
Metro Plant	$73,000,000	$1,400,000
Industrial	-0-	-0-
Total	$80,400,000	$1,886,000

e. Chlorine and Fecal Coliform

(1) Outstate Municipalities

There are 145 municipalities that will have to install dechlorination facilities in order to meet the chlorine standard. The capital cost will be $3,990,000 and the O&M will be $574,000 per year.

The change to seasonal disinfection will result in cost savings of $1,460,000 per year.

(2) MWCC

The MWCC has proposed to convert the Pig's Eye Metro Plant from chlorine to bromine chloride for disinfection. Thus, the MWCC will not have to dechlorinate its effluent to meet the chlorine standard. The capital costs to do this are estimated by the MWCC to be $265,000 and additional O&M costs are estimated to be $425,000 per year.

The change in the fecal coliform standard to apply only in the summer will save MWCC $338,000 per year.

All other MWCC plants discharge to waters to which the chlorine standard applies and will be required to dechlorinate. The capital cost is anticipated to be $975,000 and the O&M $115,750 per year.

The change in the fecal coliform standard will result in a savings of $207,000 per year.

(3) Industrial

Industrial dischargers who use chlorine for disinfection and for prevention of biofouling in cooling systems will have to dechlorinate if they chlorinate continuously (i.e. more that two hours in any 24 hour period). Power plants usually do not chlorinate more than two hours per day.

The Agency has determined that there are 10 canneries and one other industrial sources that will have to dechlorinate. The capital cost for the 10 canneries is projected to be $201,000 and the O&M is projected to be $11,600 annually. The other industrial source -Armour and Company at Cold Spring - will incur $20,000 in capital expenditures for dechlorination facilities and $3,800 in annual O&M expenses. In addition, some 31 dischargers of industrial cooling water may be required to dechlorinate. This would result in capital costs of $465,000 and annual O&M of $99,200.

(4) Summary

The following table summarizes the anticipated costs and savings because of the chlorine standard and the change in the fecal coliform standard.

	Dechlorination Costs		Seasonal Disinfection
	Capital	O&M/Yr	(Savings)
Outstate Municipalities	$3,990,000	$574,000	+$1,460,000
MWCC			
Metro Plant	$ 265,000	$425,000	+$ 338,000
Other Plants	$ 975,000	$115,750	+$ 207,000
Industrial			
Canneries	$ 201,000	$ 11,600	-----
Armour & Company	$ 20,000	$ 3,800	-----
Industrial Cooling Water Discharges	$ 465,000	$ 99,200	-----
TOTAL	$5,916,000	$1,229,350	+ $2,005,000

f. Total

The maximum estimated total costs and the minimum estimated total savings in regard to the proposed amendments are as follows (costs = -; savings = +).

	OUTSTATE		MWCC		INDUSTRIAL		TOTAL	
	Capital	O&M $/yr	Capital	O&M $/yr	Capital	O&M $/yr	Capital	O&M $/yr
Limited Resource Value Waters	+18,560,000	+1,306,000	---	---	not est	not est	+18,560,000	+1,306,000
Ammonia	-10,400,000	-373,000	-67,900,000	-3,000,000	-610,000	-30,000	-78,910,000	-3,403,000
Dissolved Oxygen	-7,400,000	-486,000	-73,000,000	-1,400,000	none	none	-80,400,000	-1,886,000
Chlorine	-3,990,000	-574,000	-1,240,000	-540,750	-686,000	-114,600	-5,916,000	-1,229,350
Fecal Coliform	---	+1,460,000	---	+545,000	---	---	---	+2,005,000
TOTAL	-3,230,000	+1,333,000	-142,140,000	-4,395,750	-1,296,000	-144,600	-146,666,000	-3,207,350

g. Grants

It should be pointed out that to the extent a municipality incurs capital expenditures to meet these new standards in the operation of its sewage treatment plant, under present law 90 percent or more of these capital expenditures will be eligible for state and federal funding. Also, these expenses will not be incurred immediately upon adoption of new standards but will be spread out over a period of years and no major expenses are likely within the first couple of years after adoption.

2. Witnesses

John Hensel
Gordon Wegwart
Steve Reed

3. Exhibits

Numbers 100 - 116.

7050.0227 SPECIFIC WATER QUALITY STANDARDS FOR CLASS 7 WATERS OF THE STATE; LIMITED RESOURCE VALUE WATERS.

Subpart 1. **General.** The numeric and narrative water quality standards in this part prescribe the qualities or properties of the waters of the state that have limited resource value designated public uses and benefits. If the standards in this part are exceeded in waters of the state that have the Class 7 designation, it is considered indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses.

Subp. 2. **Class 7 waters; limited resource value waters.** The quality of Class 7 waters of the state shall be such as to protect aesthetic qualities, secondary body contact use, and groundwater for use as a potable water supply. Standards for substances, characteristics, or pollutants given below shall not be exceeded in the waters:

Substance, Characteristic, or Pollutant	Class 7 Standard
Escherichia (E.) coli	Not to exceed 630 organisms per 100 milliliters as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than ten percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 milliliters. The standard applies only between May 1 and October 31.
Oxygen, dissolved	At concentrations which will avoid odors or putrid conditions in the receiving water or at concentrations at not less than 1 mg/L (daily average) provided that measurable concentrations are present at all times.
pH, minimum value	6.0
pH, maximum value	9.0
Toxic pollutants	Toxic pollutants shall not be allowed in such quantities or concentrations that will impair the specified uses.

Statutory Authority: *MS s 115.03; 115.44*

History: *18 SR 2195; 24 SR 1105; 32 SR 1699*

Published Electronically: *April 1, 2008*

7050.0460 WATERS SPECIFICALLY CLASSIFIED; EXPLANATION OF LISTINGS IN PART 7050.0470.

Subpart 1. **Explanation of listings.** The waters of the state listed in part 7050.0470 are classified as specified. The specific stretch of watercourse or the location of a water body is described by township, range, and section. Any community listed in part 7050.0470 is the community nearest the water classified, and is included solely to assist in identifying the water. Most waters of the state are not specifically listed in part 7050.0470. See parts 7050.0425 and 7050.0430 for the classifications of waters not listed.

Subp. 2. **Outstanding international waters.** The waters listed in part 7050.0470, subpart 1, that are not designated as outstanding resource value waters or classified as Class 7 waters are designated as outstanding international resource waters under part 7052.0300, subpart 3. Unlisted waters classified in part 7050.0430 and unlisted wetlands classified in part 7050.0425 that are located in the Lake Superior Basin are also designated as outstanding international resource waters under part 7052.0300, subpart 3.

Subp. 3. **Abbreviations and symbols.** The listings in part 7050.0470 include the following abbreviations and symbols:

T., R., S. means township, range, and section, respectively.

An asterisk (*) preceding the name of the water body means the water body is an outstanding resource value water.

[month/day/year/letter code] following the name of the outstanding resource value water in brackets is the effective date the water resource was designated as an outstanding resource value water. The letter code (P or R) indicates the applicable discharge restrictions in part 7050.0180, subpart 3 or 6. The letter code P corresponds to the prohibited discharges provision in part 7050.0180, subpart 3. The letter code R corresponds to the restricted discharges provision in part 7050.0180, subpart 6.

[WR] following the name of the water body means the water body is designated as a wild rice water in part 7050.0470, subpart 1.

Class 2Bd waters are Class 2B waters also protected for domestic consumption purposes (Class 1). Applicable standards for Class 2Bd waters are listed in part 7050.0222, subparts 3 and 3a.

Statutory Authority: *MS s 115.03; 115.44*

History: *9 SR 914; 12 SR 1810; 15 SR 1057; 18 SR 2195; 22 SR 1466; 32 SR 1699*

Published Electronically: *April 1, 2008*

7052.0100 WATER QUALITY STANDARDS.

Subpart 1. **Applicability.**

A. The ambient water quality standards in subparts 2 to 6 are Class 2 standards for the protection of aquatic life, human health, and wildlife from the GLI pollutants. The numeric standard for a GLI pollutant includes the CS, MS, and FAV. Some pollutants do not have an MS or an FAV because of insufficient data. For these pollutants, the CS is the numeric standard. Additional standards applicable to the surface waters of the state in the Lake Superior Basin are found in chapter 7050, including standards applicable to drinking water sources, which are listed in parts 7050.0220 and 7050.0221.

B. Some of the GLI pollutants listed in subparts 2 to 6 have both aquatic life and human health standards and four of the GLI pollutants have wildlife standards, as provided in tables 1 to 4 of the GLI Guidance. These standards are listed in subparts 2 to 6 to facilitate implementation of the standards under parts 7052.0200, subpart 3, and 7052.0210, subpart 1. The most stringent chronic aquatic life, human health, or wildlife standard listed is the applicable standard except when a less stringent chronic or maximum standard applies when setting an effluent limitation under part 7052.0200, subpart 3. For any aquatic life, human health, or wildlife chronic standard, a blank space in subparts 2 to 5 means no GLI standard is available and the most stringent listed chronic standard is applicable. For the aquatic life MS and FAV, blank spaces mean the GLI guidance lists no MS or FAV, and part 7050.0222 may contain an applicable MS or FAV.

C. The definitions and methods for human health-based chronic standards and site-specific chronic criteria in parts 7050.0217 to 7050.0219 are incorporated by reference and are further described in part 7052.0110, subpart 4.

D. The Class 2A human health-based chronic standards listed in chapter 7050 are incorporated by reference as modified by the procedures in part 7052.0110, subpart 3.

E. The *Escherichia (E.) coli* water quality standards in Code of Federal Regulations, title 40, section 131.41, Table (c)(1), that apply to coastal recreation waters are incorporated by reference as:

(1) *E. coli* bacteria must not exceed 126 organisms per 100 milliliters, as a geometric mean of not less than five samples representative of conditions during any calendar month; or

(2) *E. coli* bacteria must not exceed 235 organisms per 100 milliliters in more than ten percent of all the individual samples taken during any calendar month.

The *E. coli* standard under this item applies only between April 1 and October 31.

F. Standards for metals are expressed as total metal but must be implemented as dissolved metal standards. Conversion factors for converting total to dissolved metal standards are listed in part 7052.0360, and applied under part 7052.0200, subpart 4. The conversion factor for metals not listed in part 7052.0360 is one. Standards for GLI pollutants followed by (TH) or (pH) vary with total hardness or pH. The formulas for these standards are found in subpart 6.

G. The CS and MS are averaged over the following durations:

(1) the MS is a one-day average;

(2) the CS, based on toxicity to aquatic life, is a four-day average; and

(3) the CS applied in water, based on human health or wildlife toxicity, is a 30-day average.

Subp. 2. **Water quality standards applicable to Lake Superior; Class 2A.**

Substance	Units	Aquatic Life Chronic Standard	Aquatic Life Maximum Standard	Aquatic Life Final Acute Value	Human Health Chronic Standard	Wildlife Chronic Standard	Applicable Chronic Standard
Arsenic, total	ug/l	148	340	680	2†		2
Benzene	ug/l				10		10
Cadmium, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Chlordane	pg/l				40		40
Chlorobenzene	ug/l	10†	423†	846†	278		10
Chromium III, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Chromium VI, total	ug/l	11	16	32			11
Copper, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Cyanide, free	ug/l	5.2	22	44	596		5.2
DDT	pg/l				25	11	11

Dieldrin	pg/l	56000	240000	480000	1.2		1.2
2,4-Dimethylphenol	ug/l	21	137	274	368		21
2,4-Dinitrophenol	ug/l	71	379	758	53		53
Endrin	ug/l	0.036	0.086	0.17	0.0039†		0.0039
Hexachlorobenzene	pg/l				74		74
Hexachloroethane	ug/l				1.0		1.0
Lindane	ug/l		0.95	1.9	0.08		0.08
Mercury, total	ug/l	0.91	1.7	3.4	0.00153	0.0013	0.0013
Methylene Chloride	ug/l				46		46
Nickel, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Parathion	ug/l	0.013	0.065	0.13			0.013
PCBs (class)	pg/l				4.5	122	4.5
Pentachlorophenol (pH)	ug/l		subp 6	subp 6	0.93†		0.93
Selenium, total	ug/l	5.0	20†	40†			5.0
2,3,7,8-TCDD	pg/l				0.0014	0.0031	0.0014
Toluene	ug/l	253†	1352†	2703†	3725		253
Toxaphene	pg/l				11		11
Trichloroethylene	ug/l				22		22
Zinc, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6

†this standard or FAV was derived under chapter 7050.

Subp. 3. **Water quality standards applicable to Class 2A waters other than Lake Superior.**

Substance	Units	Aquatic Life Chronic Standard	Aquatic Life Maximum Standard	Aquatic Life Final Acute Value	Human Health Chronic Standard	Wildlife Chronic Standard	Applicable Chronic Standard
Arsenic, total	ug/l	148	340	680	2†		2
Benzene	ug/l				11		11
Cadmium, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Chlordane	pg/l				56		56
Chlorobenzene	ug/l	10†	423†	846†	324		10
Chromium III, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Chromium VI, total	ug/l	11	16	32			11
Copper, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Cyanide, free	ug/l	5.2	22	44	596		5.2
DDT	pg/l				35	11	11
Dieldrin	pg/l	56000	240000	480000	1.6		1.6
2,4-Dimethylphenol	ug/l	21	137	274	391		21
2,4-Dinitrophenol	ug/l	71	379	758	53		53
Endrin	ug/l	0.036	0.086	0.17	0.0039†		0.0039
Hexachlorobenzene	pg/l				105		105

Hexachloroethane	ug/l				1.5		1.5
Lindane	ug/l		0.95	1.9	0.11		0.11
Mercury, total	ug/l	0.91	1.7	3.4	0.00153	0.0013	0.0013
Methylene Chloride	ug/l				46		46
Nickel, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Parathion	ug/l	0.013	0.065	0.13			0.013
PCBs (class)	pg/l				6.3	122	6.3
Pentachlorophenol (pH)	ug/l		subp 6	subp 6	0.93†		0.93
Selenium, total	ug/l	5.0	20†	40†			5.0
2,3,7,8-TCDD	pg/l				0.0020	0.0031	0.0020
Toluene	ug/l	253†	1352†	2703†	4214		253
Toxaphene	pg/l				15		15
Trichloroethylene	ug/l				24		24
Zinc, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6

†this standard or FAV was derived under chapter 7050.

Subp. 4. **Water quality standards applicable to Class 2Bd waters.**

Substance	Units	Aquatic Life Chronic Standard	Aquatic Life Maximum Standard	Aquatic Life Final Acute Value	Human Health Chronic Standard	Wildlife Chronic Standard	Applicable Chronic Standard
Arsenic, total	ug/l	148	340	680	2†		2

Benzene	ug/l				12		12
Cadmium, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Chlordane	pg/l				225		225
Chlorobenzene	ug/l	10†	423†	846†	461		10
Chromium III, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Chromium VI, total	ug/l	11	16	32			11
Copper, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Cyanide, free	ug/l	5.2	22	44	596		5.2
DDT	pg/l				142	11	11
Dieldrin	pg/l	56000	240000	480000	6.5		6.5
2,4-Dimethylphenol	ug/l	21	137	274	441		21
2,4-Dinitrophenol	ug/l	71	379	758	55		55
Endrin	ug/l	0.036	0.086	0.17	0.016†		0.016
Hexachlorobenzene	pg/l				418		418
Hexachloroethane	ug/l				5.0		5.0
Lindane	ug/l		0.95	1.9	0.43		0.43
Mercury, total	ug/l	0.91	1.7	3.4	0.00153	0.0013	0.0013
Methylene Chloride	ug/l				47		47
Nickel, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Parathion	ug/l	0.013	0.065	0.13			0.013

PCBs (class)	pg/l				25.2	122	25.2
Pentachlorophenol (pH)	ug/l		subp 6	subp 6	1.9†		1.9
Selenium, total	ug/l	5.0	20†	40†			5.0
2,3,7,8-TCDD	pg/l				0.0080	0.0031	0.0031
Toluene	ug/l	253†	1352†	2703†	5517		253
Toxaphene	pg/l				62		62
Trichloroethylene	ug/l				29		29
Zinc, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6

†this standard or FAV was derived under chapter 7050.

Subp. 5. **Water quality standards applicable to Class 2B, 2C, and 2D waters.**

Substance	Units	Aquatic Life Chronic Standard	Aquatic Life Maximum Standard	Aquatic Life Final Acute Value	Human Health Chronic Standard	Wildlife Chronic Standard	Applicable Chronic Standard
Arsenic, total	ug/l	148	340	680	53†		53
Benzene	ug/l	114†	4487†	8974†	237		114
Cadmium, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Chlordane	pg/l				225		225
Chlorobenzene	ug/l	10†	423†	846†	2916		10
Chromium III, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6

Chromium VI, total	ug/l	11	16	32			11
Copper, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Cyanide, free	ug/l	5.2	22	44	30240		5.2
DDT	pg/l				142	11	11
Dieldrin	pg/l	56000	240000	480000	6.5		6.5
2,4-Dimethylphenol	ug/l	21	137	274	7182		21
2,4-Dinitrophenol	ug/l	71	379	758	1982		71
Endrin	ug/l	0.036	0.086	0.17	0.016†		0.016
Hexachlorobenzene	pg/l				419		419
Hexachloroethane	ug/l				6.2		6.2
Lindane	ug/l		0.95	1.9	0.46		0.46
Mercury, total	ug/l	0.91	1.7	3.4	0.00153	0.0013	0.0013
Methylene Chloride	ug/l	1561†	9600†	19200†	1994		1561
Nickel, total (TH)	ug/l	subp 6	subp 6	subp 6			subp 6
Parathion	ug/l	0.013	0.065	0.13			.013
PCBs (class)	pg/l				25.2	122	25.2
Pentachlorophenol (pH)	ug/l	subp 6	subp 6	subp 6	5.5†		subp 6
Selenium, total	ug/l	5.0	20†	40†			5.0
2,3,7,8-TCDD	pg/l				0.0080	0.0031	0.0031
Toluene	ug/l	253†	1352†	2703†	45679		253

Toxaphene	pg/l				62	62
Trichloroethylene	ug/l				330	330
Zinc, total (TH)	ug/l	subp 6	subp 6	subp 6		subp 6

†this standard or FAV was derived under chapter 7050.

Subp. 6. **Water quality standards that vary with water quality characteristics.**

A. Class 2 standards that vary with total hardness (TH) applicable to all surface waters of the state in the Lake Superior Basin are listed in this subpart. Total hardness is the sum of the calcium and magnesium concentrations expressed as calcium carbonate in mg/l. For ambient or effluent total hardness values greater than 400 mg/l, 400 mg/l must be used in the calculation of the standard. Exp. is the base e exponential function.

		Example standards at hardness of:				
Cadmium, total	Formula, results in ug/l	50	100	200	300	400
Chronic standard	exp.(0.7852[ln (TH mg/l)]-2.715)	1.4	2.5	4.2	5.8	7.3
Maximum standard	exp.(1.128[ln (TH mg/l)]-3.6867)	2.1	4.5	9.9	16	22
Final acute value	exp.(1.128[ln (TH mg/l)]-2.9935)	4.1	9.0	20	31	43

		Example standards at hardness of:				
Chromium III, total	Formula, results in ug/l	50	100	200	300	400
Chronic standard	exp.(0.819[ln (TH mg/l)]+0.6848)	49	86	152	212	268
Maximum standard	exp.(0.819[ln (TH mg/l)]+3.7256)	1022	1803	3181	4434	5612
Final acute value	exp.(0.819[ln (TH mg/l)]+4.4187)	2044	3606	6362	8867	11223

		Example standards at hardness of:				
Copper, total	Formula, results in ug/l	50	100	200	300	400

Chronic standard	exp.(0.8545[ln (TH mg/l)]-1.702)	5.2	9.3	17	24	30
Maximum standard	exp.(0.9422[ln (TH mg/l)]-1.700)	7.3	14	27	39	52
Final acute value	exp.(0.9422[ln (TH mg/l)]-1.0069)	15	28	54	79	103

		Example standards at hardness of:				
Nickel, total	Formula, results in ug/l	50	100	200	300	400
Chronic standard	exp.(0.846[ln (TH mg/l)]+0.0584)	29	52	94	132	169
Maximum standard	exp.(0.846[ln (TH mg/l)]+2.255)	261	469	843	1188	1516
Final acute value	exp.(0.846[ln (TH mg/l)]+2.9481)	522	938	1687	2377	3032

		Example standards at hardness of:				
Zinc, total	Formula, results in ug/l	50	100	200	300	400
Chronic standard	exp.(0.8473[ln (TH mg/l)]+0.884)	67	120	216	304	388
Maximum standard	exp.(0.8473[ln (TH mg/l)]+0.884)	67	120	216	304	388
Final acute value	exp.(0.8473[ln (TH mg/l)]+1.5772)	133	240	431	608	776

B. Standards that vary with pH applicable to Lake Superior, other Class 2A and 2Bd waters in the Lake Superior Basin are listed in this subpart. Exp. is the base e exponential function.

		Example standards at pH of:				
Pentachlorophenol	Formula, results in ug/l	6.5	7.0	7.5	8.0	8.5
Maximum standard	exp.(1.005[pH]-4.869)	5.3	8.7	14	24	39
Final acute value	exp.(1.005[pH]-4.175)	11	17	29	48	79

C. Standards that vary with pH applicable to Class 2B, 2C, and 2D waters in the Lake Superior Basin are listed in this subpart. Exp. is the base e exponential function.

		Example standards at pH of:				
Pentachlorophenol	Formula, results in ug/l	6.5	7.0	7.5	8.0	8.5
Chronic standard	exp.(1.005[pH]-5.134) not to exceed 5.5 ug/l	4.0	5.5	5.5	5.5	5.5
Maximum standard	exp.(1.005[pH]-4.869)	5.3	8.7	14	24	39
Final acute value	exp.(1.005[pH]-4.175)	11	17	29	48	79

Statutory Authority: *MS s 115.03; 115.44*

History: *22 SR 1466; 39 SR 1344*

Published Electronically: *March 24, 2015*

7052.0110 METHODOLOGIES FOR DEVELOPMENT OF STANDARDS AND CRITERIA, AND BIOACCUMULATION FACTORS.

Subpart 1. **Applicability.** This part identifies the methods that must be used to develop aquatic life and wildlife-based Tier I and Tier II standards and criteria and human health-based chronic standards and criteria. Subparts 3 and 4 also list exceptions to some of the assumptions used in the GLI Guidance methods. These exceptions are based on Minnesota-specific data.

Subp. 2. **Aquatic life.** All Tier I and Tier II aquatic life standards were developed and all criteria must be developed using the methodologies provided by Code of Federal Regulations, title 40, part 132, Appendix A, entitled "Great Lakes Water Quality Initiative Methodologies for Development of Aquatic Life Criteria and Values," as amended through March 12, 1997, which is adopted and incorporated by reference in part 7052.0015, item A.

Subp. 3. **Bioaccumulation factors.** Bioaccumulation factors (BAFs) for calculating human health and wildlife standards were developed and BAFs for calculating criteria must be developed using the methodology provided by Code of Federal Regulations, title 40, part 132, Appendix B, entitled "Great Lakes Water Quality Methodology for Deriving Bioaccumulation Factors," as amended through March 12, 1997, which is adopted and incorporated by reference in part 7052.0015, item B, except that for human health standards and criteria, the baseline BAF is multiplied by the following lipid fractions which apply to fish in both trophic levels 3 (TL_3) and 4 (TL_4), except as noted in item C:

A. 0.085 for Lake Superior;

B. 0.06 for Class 2A waters other than Lake Superior; and

C. 0.015 for TL_4 and 0.020 for TL_3 for Class 2B, 2Bd, 2C, and 2D waters.

Subp. 4. **Human health.**

A. Human health standards listed in part 7052.0100 for benzene, chlordane, chlorobenzene, cyanide (free), DDT, dieldrin, 2,4-dimethylphenol, 2,4-dinitrophenol, hexachlorobenzene, hexachloroethane, lindane, mercury (total), methylene chloride, PCBs, 2,3,7,8-TCDD, toluene, and trichloroethylene were developed using the Tier I methodology provided by Code of Federal Regulations, title 40, part 132, Appendix C, entitled "Great Lakes Water Quality Initiative Methodology for Development of Human Health Criteria and Values," as amended through March 12, 1997, which is adopted and incorporated by reference in part 7052.0015, item C, except that the daily human consumption of fish caught in the Lake Superior Basin is assumed to be 0.030 kg/day (0.0072 kg/day for TL_3 fish plus 0.0228 kg/day for TL_4 fish).

B. Changes to the standards established for the pollutants in item A or additional human health-based chronic standards or site-specific chronic criteria must be based on the algorithms and methods in parts 7050.0217 to 7050.0219, with site-specific consideration as provided in part 7052.0270, except the bioaccumulation factor methods in part 7052.0110, subpart 3, must be used in place of those listed in part 7050.0219, subpart 6.

C. Concentrations of noncarcinogenic or nonlinear carcinogenic (NLC) chemicals in water or fish tissue from point or nonpoint sources, singly or in mixtures, must be below levels expected to produce known adverse effects. This is accomplished through the application of an additive noncancer health risk index using common health risk index endpoints or health endpoints as described in part 7050.0222, subpart 7, item D. Concentrations of carcinogenic chemicals from point or nonpoint sources, singly or in mixtures, must not exceed an incremental or additional excess risk level of one in 100,000 (10^{-5}) in surface waters. The combined risk from mixtures of linear carcinogens (C) is determined as described in part 7050.0222, subpart 7, item E.

Subp. 5. **Wildlife.** All Tier I wildlife standards were developed and all Tier I criteria must be developed using the methodology provided by Code of Federal Regulations, title 40, part 132, Appendix D, entitled "Great Lakes Water Quality Initiative Methodology for the Development of Wildlife Criteria," as amended through March 12, 1997, which is adopted and incorporated by reference in part 7052.0015, item D.

Statutory Authority: *MS s 115.03; 115.44*

History: *22 SR 1466; 39 SR 1344*

Published Electronically: *March 24, 2015*

Minnesota Pollution Control Agency

Environmental Analysis and Outcomes Division

STATEMENT OF NEED AND REASONABLENESS

In the Matter of Proposed Revisions of Minnesota Rules ch.7050, Relating to Nondegradation and minor supporting changes to Minnesota Rules chs. 7052 and 7001

Repeal of Minnesota Rules 7050.0180 (Nondegradation for Outstanding Resource Value Waters) and Minnesota Rules 7050.0185 (Nondegradation for All Waters);

Proposed Addition of New Rules, Minnesota Rules 7050.0250 through 7050.0335 (Antidegradation)

wq-rule3-60d

Revisor No.: 4030
OAH # 19-2200-32243

Availability of Rulemaking Documents

Upon request, this Statement of Need and Reasonableness (SONAR)
can be made available in an alternative format, such as large print, Braille, or audio.

To make a request, contact Carol Nankivel at the Minnesota Pollution Control Agency (MPCA),
Resource Management and Assistance Division,
520 Lafayette Road North, St. Paul, MN 55155-4194;
telephone 651-757-2597;
or e-mail carol.nankivel@state.mn.us.
TTY users may call the MPCA at 651-282-5332 or 800-657-3864.

The MPCA will make the *State Register* notice and the proposed rule
available during the public comment period on the MPCA's Public Notices website:

https://www.pca.state.mn.us/public-notices

Notice Regarding the Excerpted Language in this SONAR

The MPCA has excerpted language from the proposed rules and included those excerpts in this SONAR. However, there may be slight discrepancies between the excerpted language and the rules as they are proposed. The MPCA intends that the rule language that is published in the *State Register* at the time the rules are formally proposed is the rule language that is justified in this SONAR.

Notice Regarding Hyperlinked Documents

Throughout this SONAR the MPCA has provided, for the convenience of the reader, links to webpages where cited documents can be viewed. However, because of the transient nature of web pages, the links to webpages are not the official citation. The MPCA intends that the documents submitted into the rulemaking record are the print copies of the documents identified in the list of Exhibits.

Table of contents

Sub-Attachments

List of tables

Acronyms or abbreviations

Army Corp of Engineers	ACE
Administrative Rules of South Dakota	ARSD
Bioaccumulative chemical of concern	BCC
Best management practice	BMP
Biochemical oxygen demand	BOD
Chapter	Ch.
Clean Water Act (i.e., Federal Water Pollution Control Act, 33 U.S.C. § 1251 et seq (Clean Water Act) (1972, as amended)	CWA
Code of Federal Regulations	CFR
Environmental Impact Statement	EIS
Environmental Protection Agency	EPA
Hydrologic Unit Code	HUC
Illinois	IL
Indiana	IN
Indices of Biological Integrity	IBI
Iowa	IA
Low impact development	LID
Maximum extent practicable	MEP
Michigan	MI
milligrams per liter	mg/L
Minimal impact design standards	MIDS
Minnesota	MN
Minnesota Board of Water and Soil Resources	MBWSR
Minnesota Center for Environmental Advocacy	MCEA
Minnesota Code of Administrative Rules	MCAR
Minnesota Department of Agriculture	MDA
Minnesota Department of Health	MDH
Minnesota Department of Natural Resources	MDNR
Minnesota Pollution Control Agency	MPCA
Minnesota Rule	Minn. R.
Minnesota Statute	Minn. Stat.
Municipal separate storm sewer system	MS4
National Pollutant Discharge Elimination System	NPDES
North Dakota	ND
Ohio	OH
Outstanding national resource water	ONRW
Outstanding resource value water	ORVW
Overriding public interest	OPI
Public Facilities Authority	PFA
Public Interest Review	PIR
Request for comment	RFC
Scientific and natural areas	SNA
Statement of Need and Reasonableness	SONAR
Subdivision	Subd.

Subpart	Subp.
Total maximum daily load	TMDL
Total Phosphorus	TP
Total Suspended Solids	TSS
United States Code	U.S.C.
Wisconsin	WI
Water Pollution Control (Minnesota Regulations)	WPC
Wastewater treatment plant	WWTP

1. Introduction

A. Executive summary

The objective of the Clean Water Act (CWA) is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." In order to achieve this objective states and authorized tribes develop water quality standards that consist of three elements:

- designated beneficial uses establish water quality goals;
- water quality criteria define the minimum conditions necessary to achieve the goals;
- antidegradation policies specify the framework used in making decisions regarding changes in water quality

Federal regulations require states and authorized tribes to adopt antidegradation policies and develop implementation methods that, at a minimum, reflect federal policy found in 40 CFR § 131.12. The policy specifies three levels, or Tiers, of protection.

- Tier 1 requires existing uses and the water quality necessary to support those uses to be maintained and protected. Existing uses are those that actually occurred on or after November 28, 1975.
- Tier 2 protects high water quality which is the quality that exceeds levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and on the water. High water quality may be lowered only when:
  - it is necessary (Can degradation reasonably be avoided or minimized?);
  - it is important (Do the economic or social benefits outweigh the lowering of water quality?);
  - there is assurance that the highest statutory and regulatory requirements for point sources and best management practices (BMPs) for non-point sources are achieved;
  - there is an opportunity for public participation and intergovernmental cooperation in decisions to lower high water quality

  This Tier provides for the protection of existing water quality, not just the designated beneficial use.
- Tier 3 requires the maintenance and protection of water quality necessary to preserve specific water resources of outstanding value.

Antidegradation requirements are generally implemented through the issuance and enforcement of water quality control documents (e.g., National Pollution Discharge Elimination System (NPDES) permits), 401 certifications of federal licenses and permits).

The Minnesota Pollution Control Agency (MPCA) proposes replacing the existing nondegradation rules found in Minnesota Rules Chapter (Minn. R. ch.) 7050 with new antidegradation[1] rules. The last major revisions to these rules were made in 1988. Since that

[1] "*Nondegradation*" is the term currently used in the state rules, MPCA permits and guidance documents. However, the federal equivalent of "*nondegradation*" is "*antidegradation*" and in this rulemaking, MPCA is transitioning to the use of this term. In this Statement of Need and Reasonableness (SONAR) the MPCA will refer to "*antidegradation*" except where it is making a specific reference to nondegradation in the existing rules, permits and guidance. The need and reasonableness of the proposed change in terms is addressed in Section 5.

time, there have been significant changes to federal water quality regulations and Environmental Protection Agency (EPA) guidance regarding the implementation of antidegradation policy. In addition, the ability to accurately assess water quality and implement effective pollution controls has significantly improved since the last major rule revision.

The proposed rules:

- provide procedures for activities subject to antidegradation requirements
- clarify the information needed of applicants and sequence of MPCA actions taken to make antidegradation determinations
- identify the factors the MPCA considers in conducting reviews
- establish a process for determining the water quality baseline
- provide a framework to protect high quality waters
- meet federal antidegradation regulations

The proposed rules do not:

- expand the scope of activities currently subject to the nondegradation rules
- create new regulatory authority where it did not previously exist
- alter, other than housekeeping changes, nondegradation provisions found in Minn. R. ch. 7052 (Lake Superior Basin Water Standards) or Minn. R. ch. 7060 (Underground Waters)

The proposed rules provide the following improvements:

1. **Definitions of important terms**

   The proposed rules define key terms to provide greater clarity, not only for the rules themselves but also their subsequent implementation.

2. **Two sets of antidegradation standards**

   The proposed rules contain two sets of antidegradation standards described below.

   Standards when changes in existing water quality are reasonably quantifiable
   The types of activities subject to these standards include individual wastewater, industrial stormwater and construction stormwater NPDES permits, and activities requiring CWA section 401 certifications for individual federal licenses and permits. Each of these control documents regulates activities that have the potential to affect individual or a limited number of surface waters, the identity of which are known at the time the activity is proposed.

   Standards when changes in existing water quality are not reasonably quantifiable
   The types of activities subject to these standards include individual NPDES permits for municipal stormwater activities and general authorizations (i.e., general NPDES permits and CWA section 401 certifications of general federal licenses and permits). These types of activities may affect numerous surface waters, the identity of which are not known when the control document is issued.

Each set of standards meet the federal regulatory requirements for:

- the maintenance and protection of existing uses;
- unnecessary degradation of high water quality;
- maintenance and protection of outstanding resources (i.e., outstanding resource value waters (ORVWs));
- protection against potential water quality impairments associated with thermal discharges

3. Change in baseline date for measuring increased loading to high water quality

The current rules' baseline date for increased loading to non-ORVWs is January 1, 1988. The proposed rules' baseline date for loadings to high water quality (other than for water quality necessary to maintain exceptional ORVW characteristics[2]) is the effective date of the most-recently issued control document[3]. This is reasonable because the MPCA may make antidegradation determinations that allow for limited degradation deemed necessary to accommodate important economic or social development. The proposed rules ensure that entities interested in these determinations are allowed to participate in the decision to lower high water quality and that beneficial uses are fully protected.

4. Implementation procedures specific to regulated activities subject to antidegradation requirements

The process for issuing control documents is the mechanism through which antidegradation requirements are implemented. Because the activities to which antidegradation requirements apply vary, the proposed rules include implementation procedures for specific types of control documents. The implementation procedures clearly define the roles and responsibilities of the MPCA, the regulated community, and the public or other regulatory agencies interested in water quality protection.

5. Exemptions from procedures

The proposed rules provide exemptions from antidegradation procedures for activities impacting Class 7 waters and for temporary and limited impacts.

6. Removal of the significance threshold

Under the current rules, nondegradation review for discharges to waters other than ORVWs is only required for new or expanded significant discharges. Significant discharges are those that would 1) increase flow rates to waters (other than Class 7 waters) by greater than 200,000 gallons per day or 2) increase the concentration of a toxic pollutant to a level greater than 1% over that consistently attained by January 1, 1988. As explained in greater detail in Section 4.B.3., these significance tests are inadequate because they are not based on the consumption of assimilative capacity. The proposed rules do not contain any significance thresholds as a basis for determining the need for antidegradation review for reasons described in Section 5.G.1.

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[2] The baseline date necessary to maintain exceptional ORVW characteristics remains the date that the ORVW was designated. The proposed rules allow modifying that baseline to reflect decreased loadings.

[3] Control documents are authorizations issued by the MPCA commissioner that specify water pollution control conditions under which regulated activities are allowed to operate.

To ensure the proposed rules' reasonableness and subsequent effectiveness, the MPCA has:

- Extensively sought input from stakeholders including the regulated community, other regulatory agencies, including Region 5 of the EPA, and the public (Attachment 1 provides a list of meetings with and communications to interested parties regarding the rulemaking).
- Considered implementation issues with various internal permitting programs.
- Reviewed other states' antidegradation rules and implementation procedures.
- Reviewed court rulings, both in Minnesota and throughout the nation.

The results of these efforts are proposed rules that clearly align with the federal antidegradation regulatory requirements, and provide fair and transparent implementation procedures for regulated activities subject to water quality standards, including antidegradation requirements. Adoption and implementation of the proposed rules will reduce the risk of project delays and associated costs due to permitting delays or legal challenges. Most importantly, the proposed rules will benefit Minnesotans by providing a balanced approach for the protection of water quality and sustainable economic development.

B. Statement of need and reasonableness content

Minnesota's rulemaking process requires the MPCA to explain the facts establishing the need for and reasonableness of the rules being proposed, and to address specific procedural requirements. In this Statement of Need and Reasonableness (SONAR), the MPCA is making its affirmative presentation of facts on the need for and reasonableness of the proposed rules. The SONAR also provides the MPCA's documentation of how it has met the procedural requirements up to this point in rulemaking.

This SONAR is arranged so that the discussion of the need for and reasonableness of the proposed rules is presented first, followed by the discussion of how the MPCA has met the requirements of relevant Minnesota statutes and policies.

Referenced sources used in the development of the proposed rules and information that the MPCA considers to be especially pertinent to the proposed rules are identified as exhibits and listed in Section 11. Referenced current Minnesota Statutes (Minn. Stat.) and Minn. R. are not listed as exhibits because they are readily available. The following statutes and rules are the exception and are listed as exhibits because of their importance to this rulemaking.

- Minn. Stat. § 115.03 and Minn. Stat. § 115.44 are cited as exhibits because of their importance in providing the MPCA the statutory authority to conduct this rulemaking.
- Minn. R. 7050.0180 and Minn. R. 7050.0185 are cited as exhibits because of their importance as current rules proposed to be repealed.

  The following documents are referenced extensively throughout the SONAR. The exhibit number for each document is found only the first time it is referenced. This was done for ease of reading.
- Minn. R. 7050.0180 (Nondegradation for outstanding resource value waters.) (Exhibit 2)
- Minn. R. 7050.0185 (Nondegradation for all waters.) (Exhibit 3)

- Federal Water Pollution Control Act, 33 U.S.C. § 1251 (Clean Water Act section 101) (1972, as amended) (Exhibit 12)
- Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36741 (1998) (Exhibit 14)
- 40 Code of Federal Regulations (CFR) § 131.12 (Antidegradation policy and implementation methods) (Exhibit 20)
- Water Quality Standards Handbook, Second Edition, Chapter 4, U.S. EPA (1994), (Exhibit 21)
- Federal Water Pollution Control Act, 33 U.S.C. § 1342 (CWA section 402) (1972, as amended) (Exhibit 61)
- Federal Water Pollution Control Act, 33 U.S.C. § 1341 (CWA section 401) (1972, as amended) (Exhibit 62)
- Federal Water Pollution Control Act, 33 U.S.C. § 1344 (CWA section 404) (1972, as amended) (Exhibit 69)

Supplemental supporting information is presented as attachments at the end of the SONAR. Exhibits and attachments are also available to the public on the MPCA's nondegradation webpage (http://www.pca.state.mn.us/index.php/water/water-permits-and-rules/water-rulemaking/nondegradation-rulemaking.html).

C. Rule development history

1. Early stages

Initial consideration of this rulemaking began in 2002 when the Minnesota Court of Appeals remanded the NPDES general permit for Municipal Separate Storm Sewer Systems (MS4s) to the MPCA to address nondegradation issues. The MPCA addressed the court's concerns and issued a revised general permit in 2006. In 2007, the MPCA received a petition for rulemaking (Exhibit 1)[1] identifying concerns with the state's existing nondegradation rules (Minn. R. 7050.0180 (Exhibit 2)[2] and Minn. R. 7050.0185 (Exhibit 3)[3]) and requesting that the MPCA conduct rulemaking to address those concerns. The MPCA contracted with the consulting firm Tetra Tech, Inc. (Pasadena, California) to assist with developing background information for the rulemaking. To this end, Tetra Tech, Inc. provided the following three memorandums:

- Technical Memorandum #1: Nondegradation Loading Assessment Evaluation and Recommendations for Selected Municipal Separate Storm Sewer Systems, Tetra Tech, Inc. (August 20, 2007) (Exhibit 4)[4];
- Technical Memorandum #2: Overview of State, Federal, and Judicial Guidance on Antidegradation, Tetra Tech, Inc. (August 20, 2007) (Exhibit 5)[5];
- Technical Memorandum # 3: Recommendations for Nondegradation Rulemaking, Tetra Tech, Inc. (August 20, 2007) (Exhibit 6)[6].

2. Stakeholder engagement

Following the completion of that contract, the MPCA conducted an extensive, year-long (June, 2008 to June, 2009) series of stakeholder meetings to obtain broad input on a number of fundamental topics relating to antidegradation. Those stakeholder meetings included participation from industry, agriculture, environmental interests and representatives of federal, state and local government and were essential in the development of the proposed rules. The MPCA responded to questions raised in these meetings by posting a response entitled Responses to Questions Raised in the Written Comments Received from Stakeholders Attending the Nondegradation Rulemaking Stakeholder Meetings, MPCA (2009) (Exhibit 7)[7] on October 6, 2009 on the MPCA's antidegradation webpage. Following the initial round of stakeholder meetings, the MPCA continued its dialogue with external stakeholders, internal programs, and state and federal agencies. On July 13, 2010, the MPCA posted a document entitled Proposed Antidegradation Rule and Implementation Changes, MPCA (2010) (Exhibit 8)[8] on the rulemaking webpage. Interested parties were invited to review and comment on this document, which provided an outline of MPCA's intentions regarding specific issues related to antidegradation. Subsequently two draft rules – Draft Antidegradation Rule, MPCA (2011) (Exhibit 9)[9] and Proposed Permanent Rules Relating to Antidegradation of State Waters, MPCA (2012) (Exhibit 10)[10] – were posted on the rulemaking webpage in May, 2011, and September, 2012, respectively. Again, interested parties were invited to comment and the MPCA revised the rules in response. Draft Proposed Antidegradation Rules, 6/02/2014 (Exhibit 11)[11], which are very similar to those published for comment in the *State Register*, were posted on the rulemaking webpage on June 2, 2014.

2. Background

To provide context to the proposed rules it is important to have a basic understanding of antidegradation policy and its history in Minnesota Rules.

A. What is antidegradation policy?

The objective of the Clean Water Act (CWA) is to "*restore and maintain the chemical, physical, and biological integrity of the Nation's waters.*" Federal Water Pollution Control Act, 33 U.S.C. § 1251 (CWA section 101(a)) (Exhibit 12)[12]. In order to achieve this objective, section 303 of the CWA (Exhibit 13)[13] requires states and authorized tribes to develop water quality standards. Water quality standards consist of three basic elements: designated beneficial uses, criteria necessary to meet those uses and antidegradation policy. As described by the EPA:

> *Designated uses establish the water quality goals for the water body, water quality criteria define the minimum conditions necessary to achieve the goals and the antidegradation policy specifies the framework to be used in making decisions regarding changes in water quality.* Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36741 (1998) (Exhibit 14)[14], pp. 36779-80 (emphasis added)

The federal antidegradation policy has its roots in the Water Quality Act of 1965, which stated in its declaration of policy:

> *The purpose of this Act is to enhance the quality and value of our water resources and to establish national policy for the* ***prevention****, control, and abatement of water pollution.* Public Law 89-234 (1965) (Exhibit 15)[15], (emphasis added)

The Secretary for the Department of the Interior, Stewart Udall, further defined federal antidegradation policy in 1968 by stating that the water quality standards of each state were to include a statement similar to the following:

Waters whose existing quality is better than the established standards as of the date on which such standards become effective will be maintained at their existing high quality. These and other waters of a State will not be lowered in water quality unless and until it has been affirmatively demonstrated to the State water pollution control agency and the Department of the Interior that such change is justifiable as a result of necessary economic or social development and will not interfere with or become injurious to any assigned uses made of, or presently possible in, such waters. This will require that any industrial, public or private project or development which would constitute a new source of pollution or an increased source of pollution to high quality waters will be required, as part of the initial project design, to provide the highest and best degree of waste treatment available under existing technology, and, since these are also Federal standards, these waste treatment requirements will be developed cooperatively. Compendium of Department of the Interior Statements on Non-degradation of Interstate Waters, U.S. Department of the Interior, Federal Water Pollution Control Administration, Office of the Secretary, 1968, pp. 1-2 (Exhibit 16)[16]

In 1975, the EPA promulgated its first water quality standards regulations in the *Federal Register* (Exhibit 17)[17]. These standards, codified at 40 CFR § 130.17 (Exhibit 18)[18] in 1976, required states to develop and adopt antidegradation policy and identify implementation procedures. The federal antidegradation policy was refined and re-promulgated in 1983 (Exhibit 19)[19] and later in 2015 to its current form:

(a) The State shall develop and adopt a statewide antidegradation policy. The antidegradation policy shall, at a minimum, be consistent with the following:

(1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

(2) Where the quality of the waters exceeds levels necessary to support the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.

(i) The State may identify waters for the protections described in paragraph (a)(2) of this section on a parameter-by-parameter basis or on a water body-by-water body basis. Where the State identifies waters for antidegradation protection on a water body-by-water body basis, the State shall provide an opportunity for public involvement in any decisions about whether the protections described in paragraph (a)(2) of this section will be afforded to a water body, and the factors considered when making those decisions. Further, the State shall not exclude a water body from the protections described in paragraph (a)(2) of this section solely because water quality does not exceed levels necessary to support all of the uses specified in section 101(a)(2) of the Act.

(ii) Before allowing any lowering of high water quality, pursuant to paragraph (a)(2) of this section, the State shall find, after an analysis of alternatives, that such a lowering is necessary to accommodate important economic or social development in the area in which the waters are located. The analysis of alternatives shall evaluate a range of practicable alternatives that would prevent or lessen the degradation associated with the proposed activity. When the analysis of alternatives identifies one or more practicable alternatives, the State shall only find that a lowering is necessary if one such alternative is selected for implementation.

(3) Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

(4) In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with section 316 of the Act.

(b) The State shall develop methods for implementing the antidegradation policy that are, at a minimum, consistent with the State's policy and with paragraph (a) of this section. The State shall provide an opportunity for public involvement during the development and any subsequent revisions of the implementation methods, and shall make the methods available to the public. 40 CFR § 131.12 (Exhibit 20)[20]

The first three elements of the federal antidegradation regulations (i.e., 40 CFR § 131.12(a)(1), 131.12(a)(2) and 131.12(a)(3)) are referred to as the three levels or Tiers of antidegradation protection.[4] Briefly:

- Tier 1 protection requires the maintenance of existing uses;

[4] These Tiers are often referenced in the remaining text of the SONAR as Tier 1, Tier 2 and Tier 3.

- Tier 2 protection prohibits the lowering of high water quality unless specific conditions are met;
- Tier 3 protection requires the water quality of outstanding resource waters to be maintained

In regards to Tier 2 protection, EPA guidance states:

> *Antidegradation is not a "no growth" rule and was never designed or intended to be such. It is a policy that allows public decisions to be made on important environmental actions. Where the State intends to provide for development, it may decide under this section, after satisfying the requirements for intergovernmental coordination and public participation, that some lowering of water quality in "high-quality waters" is necessary to accommodate important economic or social development.* Water Quality Standards Handbook, Second Edition, Chapter 4, U.S. EPA (1994), pp. 7-8 (Exhibit 21)[21]

To summarize, antidegradation provisions are a decision-making process a state or authorized tribe uses to determine whether and to what extent water quality may be lowered. The EPA succinctly describes antidegradation this way:

> *Antidegradation plays a critical role in allowing States and Tribes to maintain and protect the finite public resource of clean water and ensure that decisions to allow reductions in water quality are made in a public manner and serve the public good.* Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36741 (1998), p. 36780

B. History of Minnesota's nondegradation rules

Minnesota's first water quality standards were adopted into Water Pollution Control (WPC) regulations (WPC 1 (Exhibit 22)[22], WPC 2 (Exhibit 23)[23] and WPC 3 (Exhibit 24)[24]) in 1963 to protect segments of the Mississippi River and associated tributaries. Between 1963 and 1966, additional water quality standards were adopted to protect other individual water bodies. The first state-wide water quality standards protecting intrastate waters and interstate waters were adopted into rule in 1967 (WPC 14 (Exhibit 25)[25] and WPC 15 (Exhibits 26[26] and 27[27]), respectively).

Although not entitled "nondegradation," nondegradation-like policy language first appeared in rules governing intrastate waters in 1969:

> *Waters which are of quality better than the established standards will be maintained at high quality unless a determination is made by the State that a change is justifiable as a result of necessary economic or social development and will not preclude appropriate beneficial present and future uses of the waters. Any project or development which would constitute a source of pollution to high quality waters will be required to provide the highest and best practicable treatment to maintain high water quality and keep water pollution at a minimum. In implementing this policy, the Secretary of the Interior will be provided with such information as he requires to discharge his responsibilities under the Federal Water Quality Act, as amended.* WPC 15(a)(4) (1969, Supplement) (Exhibit 27)

In 1973, WPC 14 and WPC 15 were amended to include identical nondegradation policies in state-wide water quality standards:

> ***Non-Degradation.*** *Waters which are of quality better than the established standards shall be maintained at high quality unless a determination is made by the Agency that a change is justifiable as a result of necessary economic or social development and will not preclude appropriate beneficial present and future uses of the waters. Any project or development which would constitute a source of pollution to waters of the state shall be required to provide the best practicable control technology currently available not later than July 1, 1977 and the best available technology economically achievable not later than July 1, 1983 and any other applicable treatment standards as defined by and in accordance with the requirements of the Federal Pollution Control Act, 33 U.S.C. 1251 et seq., as amended, in order to maintain high water quality and keep water pollution at a minimum. In implementing this policy, the Administrator of the U. S. Environmental Protection Agency will be provided with such information as he requires to discharge his responsibilities under the Federal Water Pollution Control Act, as amended.* WPC 14(a)(8)(1973) (Exhibit 28)[28] and WPC 15(a)(7)(1973) (Exhibit 29)[29]

In 1982, the rules governing the protection of Minnesota's surface waters changed from the WPC classification system to the Minnesota Code of Administrative Rules (MCAR) classification system. Nondegradation provisions found in WPC 14 and WPC 15, were included, unchanged, in 6 MCAR §§ 4.8014 (Exhibit 30)[30] and 4.8015 (Exhibit 31)[31].

The classification system was changed again in 1983 to the current administrative Minnesota Rules system and MCAR rules governing intrastate waters were codified in Minn. R. ch. 7050. In 1984, the MPCA repealed the original nondegradation policy found in the MCAR rule and replaced it with Minn. R. 7050.0180 (Nondegradation Policy, Exhibit 32)[32] which provided protection only to waters designated as ORVWs, and removed language providing for the protection for high water quality. The reasoning for abandoning nondegradation policy for non-ORVW waters is expressed in the accompanying SONAR:

> *The difficulties experienced with the [non-ORVW] policy are two: (1) identifying waters that are of such special or unique quality that their natural state must be protected; and (2) establishing restrictions on discharges to these waters such that their quality is protected. Statement of Need and Reasonableness, In the matter of the proposed Revision of 6 MCAR §§ 4.8014 and 4.8024 and Proposed Repeal of 6 MCAR §§ 4.8015 and 4.8025,* Relating to the Standards and Classification of Waters of the State, MPCA, (1984) pp. 8-9 (Exhibit 33)[33]

Region 5 of the EPA approved these 1984 water quality standards revisions in 1985 (Exhibit 34)[34]. Later in the same year, Region 5 advised the MPCA (Exhibit 35)[35] that the revised nondegradation policy did not meet federal antidegradation regulations – specifically, Minn. R. 7050.0180 did not include language for the protection of all high quality waters, as specified in 40 CFR § 131.12(a)(2). In addition, Region 5 also commented that the MPCA must assure protection of high quality waters from nonpoint sources as well as point source sources.

Minnesota's nondegradation rules were substantially changed again in 1988, in response to EPA's concerns. Major changes included the following:

- The title of Minn. R. 7050.0180 (Exhibit 36)[36] was changed from "Nondegradation Policy" to "Nondegradation for Outstanding Resource Value Waters." Additional ORVWs were designated in rule. Included as ORVWs were scientific and natural areas (SNAs), lakes suitable for the management of lake trout, and calcareous fens.
- A new rule entitled "Nondegradation for All Waters" (Minn. R. 7050.0185, Exhibit 37)[37] was adopted to provide protection for all of the state's waters from significant degradation and to maintain existing uses:

> *It is the policy of the state of Minnesota to protect all waters for significant degradation from point and nonpoint sources and to maintain existing water uses, aquatic habitats, and the level of water quality necessary to protect these uses.* Minn. R. 7050.0185, subp. 1.

The 1988 rule governing nondegradation for all waters required nondegradation review for all significant new or significant expanded discharges. New discharges are those which were not in existence before January 1, 1988, while expanded discharges are those that result in an increased pollutant loading after the same date. January 1, 1988 was the date upon which the Minn. R. 7050.0185 became effective. A significant discharge is defined either by an increase in:

- Flow – discharges greater than 200,000 gallon per day to waters other than Class 7 (i.e., limited resource value waters);
- Mass loading of a toxic pollutant – discharges likely to increase the concentration of the pollutant to a level greater than 1% over the baseline quality in the receiving water. Baseline quality is the quality consistently attained by January 1, 1988.

For significant discharges the MPCA determines whether additional control measures can reasonably be taken to minimize the impact. The determination is based on the importance of the economic and social impacts of the project, changes in the water quality, the cumulative impacts to water quality of all new or expanded discharges, and costs of additional treatment. The opportunity for public input regarding the MPCA's determination is provided when the draft permit is noticed. Discharges that do not impact ORVWs and do not meet the significance threshold are considered *de minimis* and are not required to undergo review under the current provisions.

The 1988 rule governing nondegradation of ORVWs does not contain a significance threshold for discharges to the restricted category of ORVWs – meaning that all discharges to these waters are required to undergo review. Note that new or expanded discharges are not allowed to the prohibited category of ORVWs.

In 1988, the MPCA also provided final guidance manuals to accompany the revised rules. These documents are entitled "*Guidance Manual for Applying Nondegradation Requirements for All Waters (Non-ORVW) in Minnesota*" (Exhibit 38)[38] and "*Guidance Manual for Applying Nondegradation Requirements on Outstanding Resource Value Waters in Minnesota*" (Exhibit 39)[39].

In 1989, the EPA approved the 1988 nondegradation revisions to Minn. R. ch. 7050 (Exhibit 40)[40]. The EPA headquarters and Region 5 provided an additional comprehensive review of Minnesota's nondegradation rules and draft implementing procedures and found (Exhibit

41)[41] that the rules did indeed satisfy the 40 CFR § 131.12 requirements. However, Region 5 advised that implementation procedures did not adequately follow EPA guidance in two areas: 1) nondegradation requirements should not be limited only to NPDES-permitted discharges; and 2) there should be an opportunity for public participation in all decisions allowing the lowering of water quality.

Rule revisions in 1990 to Minn. R. 7050.0180 (Exhibit 42)[42] changed the effective date for new and expanded discharges to ORVWs from November 5, 1984 to the date ORVWs are designated in rule. This was done to accommodate future ORVW designations, such as the calcareous fens added in 1990.

Revisions in 1994 to Minn. R. 7050.0180 (Exhibit 43)[43] designated additional SNAs and calcareous fens as ORVWs. The same year additional nondegradation policy language to protect wetlands (subp. 9) was added to Minn. R. 7050.0185 (Exhibit 44)[44].

Current Minn. R. 7050.0180 includes the 1988 addition of portions of Lake Superior as a prohibited ORVW. The same year Minn. R. ch. 7052 (Lake Superior Basin Water Standards) was adopted. This chapter, including its nondegradation rules (Exhibit 45)[45], provides protection against pollution from bioaccumulative pollutants in the Lake Superior basin. EPA approved the standards in 2000. (Exhibit 46)[46]

Current Minn. R. 7050.0185 includes policy language changes made in 2008 which provides better alignment with federal antidegradation regulations. The policy provided for the protection of existing uses (Tier 1 protection) and explicitly required the protection of high water quality (Tier 2 protection):

> *Existing beneficial uses and the water quality necessary to protect the existing uses must be maintained and protected from point and nonpoint sources of pollution.*
>
> *It is the policy of the agency that water quality conditions that are better than applicable water quality standards and are better than levels necessary to support existing beneficial uses must be maintained and protected unless the commissioner finds that, after full satisfaction of this part, a lowering of water quality is acceptable. In allowing a lowering of water quality, the existing beneficial uses must be maintained and protected and the provisions in subpart 3 must be applied.* Minn. R. 7050.0185, subp. 1.

3. Statutory authority

The MPCA is given and charged with powers and duties to adopt standards and rules "*in order to prevent, control or abate water pollution.*" Minn. Stat. § 115.03, subd. 1(e) (Exhibit 47)[47] Further, Minn. Stat. § 115.44 (Exhibit 48)[48] provides additional authority.

4. General statement of need and reasonableness

Minn. Stat. § 14.131 requires the MPCA to prepare, review, and make available for public review a SONAR of the proposed rules. This general statement provides a broad overview of necessity and reasonableness for this rulemaking. Section 5. provides greater detail on individual provisions of the proposed rules.

A. Importance of maintaining water quality to Minnesota citizens

The proposed rules are needed to ensure protection of the state's surface water quality. Minnesota's water resources include about 105,000 river miles, 4.5 million acres of lakes and reservoirs including approximately 1.4 million acres of Lake Superior, and about 9.3 million acres of wetlands. Within Minnesota's borders lie the headwaters of three major continental watersheds, the Great Lakes/ St. Lawrence River, the Mississippi River, and the Red River of the North/Hudson Bay watersheds. Thus, Minnesotans have the privilege and, with that, the responsibility, of living upstream of millions of users of these major waterways. Our lakes, rivers, and streams play a vital role in the state's economy and the quality of life residents and visitors enjoy. The enormous opportunities for water-related recreation these resources provide, such as aesthetic enjoyment, swimming, fishing, boating and canoeing, depend to a great extent on good water quality.

Travel and tourism in Minnesota generates:

- $12.5 billion in gross sales;
- More than 245,000 full- and part-time jobs;
- $4.3 billion in wages;
- $811 million in state sales tax. (Tourism and Minnesota's Economy, Explore Minnesota Tourism, 2014) (Exhibit 49)[49]

The value of preserving Minnesota's surface water quality is tied to these tangible economic values.

Communities and regions benefit economically from water-based outdoor recreation as visitors eat, shop, and stay in gateway communities. Municipalities such as Ely and Brainerd have transitioned into tourism destinations based primarily on water-recreation. Sustaining Minnesota's reputation as a premier recreation destination fundamentally depends upon maintaining and improving water quality.

Property values are enhanced by the presence of water, especially when good water quality is preserved. Studies in several states have shown that people are willing to pay more for properties associated with water resources of higher quality. Research conducted in Maine, Vermont and New Hampshire shows a direct correlation between water clarity and the market value of shore land property. The Maine study examined the relationship between Secchi disk transparency and the selling price of 543 properties on 34 lakes in the state from 1990 to 1994 (Water Quality Affects Property Prices: A Case Study of Selected Maine Lakes, 1996) (Exhibit 50)[50]. The authors found that a one meter improvement in lake water clarity resulted in changes in average property prices ranging from $11 to $200 per foot of lakeshore frontage. When aggregated for an entire lake, these values translate to millions of dollars in improved property prices per lake.

Closer to home, a study conducted in the late-1980s estimated the contribution of water clarity to lake-front property values on 53 lakes in northern Minnesota (Measuring the Economic Value of Water Quality: The Case of Lakeshore Land, 1992) (Exhibit 51)[51]. A significant correlation was demonstrated between water transparency and measures of lake lot price. The author found that a 1-foot increase in Secchi disk transparency raised lakeshore prices by an average of $206 to $240 per lakeshore lot (average lake frontage of lots was 121 feet). Other variables tested, including lake size, lake depth and accessibility did not prove to have a significant effect on lakeshore land value. This study compiled estimates from land value assessments that, although influenced by market factors, were less direct than actual market sales data.

Another Minnesota study that used actual property sales data found lakeshore property values increase when water clarity increases and decrease when water clarity decreases (Lakeshore Property Values and Water Quality: Evidence from Property Sales in the Mississippi Headwaters Region, 2003) (Exhibit 52)[52]. This study was patterned after the Maine study mentioned above. The authors report that a 1-meter improvement in Secchi transparency increased the value of lakeshore property by an average of $45.64 for each frontage foot on the lake (median increase, $13.59; range $1.08 to $423.58). A 1-meter decrease in Secchi transparency decreased lakeshore property values by an average of $69.36 per frontage foot (median decrease, $22.92; range $1.43 to $594.16)[5].

The value of Minnesota's sport fishery, which relies on high quality surface waters, may also be expressed in economic terms. A recent study published by the American Sportfishing Association indicates that Minnesota sportfishing in 2011 provided 35,462 jobs, generated $1.3 billion in wages and salaries, accounted for $2.4 billion in direct annual expenditures, and contributed $264 million in state and local tax revenues (Sportfishing in America, 2013) (Exhibit 53)[53]. The study further states that the economic impact of the state's sportfishing activities in 2011 exceeded $4.2 billion when adjusted for expenditures on gas, lodging and the fishing-related services.

Other additional values of surface water quality are not readily quantifiable in economic terms. These values include those that enrich the intellectual, psychological, emotional, spiritual, cultural and/or creative aspects of the human experience. A prime example of such values relevant in Minnesota is the spiritual and cultural value placed on wild rice by American Indians.

Protecting water quality is important to Minnesotans as demonstrated in the 2008 general election when voters approved the Clean Water, Land and Legacy Amendment (Laws of Minnesota of 2008, Chapter 151, Amendments added to the Minnesota Constitution, Article XI, § 15) (Exhibit 54)[54]. The Amendment increases the sales and use tax rate by three-eighths of 1% on taxable sales, starting July 1, 2009, and continuing through 2034. Of those funds, approximately 33% is dedicated to the Clean Water Fund (Minn. Stat. § 114D.50) to protect, enhance, and restore water quality in lakes, rivers, streams, and groundwater.

Likewise, the Clean Water Legacy Act calls for protecting, restoring and preserving the quality of Minnesota's surface waters. The Legislature, in passing the law, noted that:

> *(1) there is a close link between protecting, enhancing, and restoring the quality of Minnesota's groundwater and surface waters and the ability to develop the state's economy, enhance its quality of life, and protect its human and natural resources;*
>
> *(2) achieving the state's water quality goals will require long-term commitment and cooperation by all state and local agencies, and other*

[5] The lake with both the largest increase ($423.58) and largest decrease ($594.16) in dollar value with a 1-meter change in water clarity is Leech Lake. The lake with both the smallest increase ($1.08) and smallest decrease ($1.43) in dollar value with a 1-meter change in water clarity is Balsam Lake in Itasca County.

public and private organizations and individuals, with responsibility and authority for water management, planning, and protection; and

(3) all persons and organizations whose activities affect the quality of waters, including point and nonpoint sources of pollution, have a responsibility to participate in and support efforts to achieve the state's water quality goals. Minn. Stat. § 114D.10, subd. 2

Simply put, surface water quality is central to our well-being as a state. Decisions regarding the protection of water quality must be balanced with other needs of the state, including economic and social development. Antidegradation, as a regulatory tool, provides a decision-making process to determine whether, and to what extent, water quality may be lowered to meet those needs.

B. Inadequacies of the current rules

1. The current rules are outdated

The last major revisions to rules governing nondegradation found in Minn. R. ch. 7050 were made in 1988. Since that time there have been changes to federal water quality regulations. For example, most regulated stormwater activities came under NPDES permitting authority after 1988. There are no stormwater-related provisions in the current rules. The EPA has also provided additional guidance since 1988 regarding the implementation of antidegradation. In addition, the ability to accurately assess water quality and implement effective pollution controls has significantly improved since the last major rule revision.

2. The standard by which lowering of high water quality is allowed is different than federal regulatory requirements

The current rules do not align well with current federal antidegradation regulations in regard to demonstrating necessity when lowering high water quality is proposed. Federal regulations prohibit the lowering of high water quality unless it is "*…**necessary** to accommodate important economic or social development…*" 40 CFR § 131.12(a)(2) (emphasis added) The current rules do not provide the same protection standard – rather requiring that high water quality be maintained and protected unless "*…a lowering of water quality is **acceptable**.*" Minn. R. 7050.0185, subp. 1 (emphasis added)

3. The current rule governing nondegradation for all waters (Minn. R. 7050.0185) allows for de minimis discharges without considering the consumption of assimilative capacity

Federal antidegradation regulations do not specify how states should determine when antidegradation procedures are required and EPA guidance provides states with considerable discretion on the matter. Some states, including Minnesota, require antidegradation procedures only for those activities that are not considered *de minimis* based on a significance threshold. The intent of allowing for *de minimis* activities is to focus limited resources where they may result in the greatest environmental benefit. EPA guidance recommends that significance thresholds be defined in terms of assimilative capacity, unless the state can justify another approach that is equally or more protective (Tier 2 Antidegradation Reviews and Significance Thresholds, U.S. EPA memorandum from Ephraim S. King (Office of Science and Technology) to Water

Management Division Directors, Regions 1-10, (2005)) (Exhibit 55)[55]. The guidance defines available assimilative capacity of a water body as:

> …*the difference between the applicable water quality criterion for a pollutant parameter and the ambient water quality for that pollutant parameter where it is better than the criterion.* Tier 2 Antidegradation Reviews and Significance Thresholds, U.S. EPA memorandum from Ephraim S. King (Office of Science and Technology) to Water Management Division Directors, Regions 1-10, (2005)

To address cumulative impacts, the same memorandum recommends that states incorporate cumulative caps based on the use of total assimilative capacity, defined as:

> …*the baseline assimilative capacity of a waterbody established at a specific point in time.* Tier 2 Antidegradation Reviews and Significance Thresholds, U.S. EPA memorandum from Ephraim S. King (Office of Science and Technology) to Water Management Division Directors, Regions 1-10, (2005)

In other words, under federal guidance, when a predetermined amount of total assimilative capacity is consumed, antidegradation procedures are required regardless of the amount of remaining assimilative capacity.

Under the current state rule governing nondegradation for all waters, procedures for discharges to waters other than ORVWs are only required for new or expanded significant discharges. Significant discharges are those that would 1) increase daily flow rates to waters (other than Class 7 waters) by greater than 200,000 gallons or 2) increase the concentration of a toxic pollutant to a level greater than 1% over that consistently attained by January 1, 1988. The current rule's significance tests are inadequate for several reasons. First, the flow-based test does not consider the impacts of the proposed activity on the assimilative capacity. Thus a proposed sub-significant discharge of 199,000 gallons per day to a small stream with little assimilative capacity would not require review and would be treated similarly to a discharge to a large water body with a large amount of assimilative capacity. Second, although the toxic-based threshold is based on an increase of toxicant in the receiving water, it also does not address the consumption of assimilative capacity. A 1% increase in concentration of a toxic pollutant may not be significant in a water body with a large amount of assimilative capacity, but could be very consequential to a water body on the verge of being impaired. Third, the current rule does not contain a means of addressing cumulative *de minimis* discharges. As such, multiple *de minimis* discharges may result in significant water quality impacts without triggering nondegradation review.

Environmental groups have successfully challenged other states' antidegradation rules that inappropriately use significance thresholds for review exemptions (Ohio Valley Environmental Coalition v. Horinko, 279 F. Supp. 2D 732 (S.D.W.V. 2003) (Exhibit 56)[56], Kentucky Waterways Alliance v. Johnson, 540 F.3d 446 (6th Cir. 2008) (Exhibit 57)[57] and Greater Yellowstone Coalition v. EPA, Case No. 12-CV-60, (D. Idaho, 2013)) (Exhibit 58)[58].

4. The current rules are susceptible to legal challenges

Two important Minnesota appeals court decisions prompted the need for revised antidegradation rules. These decisions raised two key issues and influenced the development of the proposed rules.

- The current rules do not provide for the implementation of nondegradation through general permits.

In 2002, the MPCA issued an NPDES general permit for stormwater discharges from MS4s. Minnesota Center for Environmental Advocacy (MCEA) filed for an appeal alleging that where there is a showing in the record that the discharges to be covered under a general permit are expanded significant discharges, the MPCA must determine whether additional control measures are necessary under Minn. R. 7050.0185 to prevent degradation of state waters. The Minnesota Court of Appeals agreed and ruled that the MPCA needed to determine whether the discharges are in fact expanded discharges and that the MPCA still has discretion to determine whether additional control measures can reasonably be taken to minimize the impacts (MCEA v. MPCA, 660 N.W.2d 427 (Minn. App. 2003)) (Exhibit 59)[59].

- Nondegradation review requires a thorough alternatives analysis and an assessment of existing water quality before degradation is allowed.

The second case involved a challenge to the MPCA's issuance of an NPDES permit to the City of Princeton for a proposed wastewater treatment discharge to a segment of the Rum River designated as a restricted ORVW. New or expanded discharges to this category of ORVWs are only allowed when there is not a prudent and feasible alternative to the discharge.

In 2005, the Minnesota Court of Appeals remanded the permit back to the MPCA stating that:

> *Under Minnesota's nondegradation rules, the City of Princeton must analyze the prudence and feasibility of a downsized WWTP [wastewater treatment plant] used in conjunction with acceptable decentralized treatment to meet additional anticipated population growth before such an alternative can be rejected by the city and MPCA as not prudent or feasible. The MPCA must establish the existing water quality of the Rum River and impose necessary requirements and restrictions on Princeton's proposed WWTP to protect that quality.* MCEA v. MPCA, City of Princeton, 696 N.W.2d 95, 108-109 (Minn. App. 2005) (Exhibit 60)[60]

5. The current rules do not include adequate implementation methods thereby limiting the effectiveness of nondegradation protection

Minn. Stat. § 115.03, subd. 1 gives the MPCA regulatory authority to administer and enforce all laws related to pollution of any waters of the state. The MPCA grants authorization to activities that impact water quality through the issuance of control documents including CWA section 402 (Exhibit 61)[61] permits (i.e., NPDES permits) and CWA section 401 (Exhibit 62)[62] certifications of federal licenses and permits. These control documents specify the conditions under which the activity is allowed to operate in order to protect water quality and are therefore mechanisms through which water quality standards and antidegradation requirements are enforced. Because the activities to which antidegradation regulatory requirements apply vary considerably, the proposed rules include implementation procedures specific to the above control documents through which they are regulated.

The following EPA guidance indicates that antidegradation protection applies to all regulated activities that are required to comply with water quality standards:

- Guidance for Antidegradation Policy Implementation for High Quality Waters, U.S. EPA Region 1, March 10, 1987. Pages 2-4 (Exhibit 63)[63]
- 40 CFR § 132, Appendix E, Water Quality Guidance for the Great Lakes System (Exhibit 64)[64]
- EPA guidance memorandum, "Questions and Answers on Antidegradation," 1985 (Exhibit 65)[65]
- Water Quality Standards Handbook, Second Edition, Chapter 4 (Antidegradation), U.S. EPA (1994), p. 7
- EPA Region V Guidance for Antidegradation Policy Implementation for High Quality Waters, December 3, 1986 (Exhibit 66)[66]

One piece of EPA guidance in particular articulates the applicability of antidegradation with clarity:

> *It is the position of EPA that, at a minimum, States and authorized Tribes must apply antidegradation requirements to activities that are ''regulated'' under State, Tribal, or federal law (i.e., any activity that requires a permit or a water quality certification pursuant to State, Tribal or federal law, such as CWA § 402 NPDES permits or CWA § 404 dredge and fill permits, any activity requiring a CWA § 401 certification, any activity subject to State or Tribal nonpoint source control requirements or regulations, and any activity which is otherwise subject to State or Tribal regulations that specify that water quality standards are applicable).* Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36742 (1998), p. 36780

Although the current rules' policy statements broadly call for the protection and maintenance of water quality from point and nonpoint sources, they do not contain adequate implementation procedures to address the various regulated activities to which antidegradation regulatory requirements apply. In all fairness, the current rules were adopted at a time when the focus of nondegradation protection was on review of proposed new and expanded wastewater treatment facilities regulated under individual NPDES permits. Stormwater discharges, for example, came under the NPDES regulatory program after 1988 – the year the last major revision was made to the nondegradation rules. As illustrated in the first court ruling described above, the current rules do not adequately address discharges covered under general NPDES permits. The current rules also do not adequately address how nondegradation is to be implemented for dredge and fill activities regulated under CWA section 404, especially for surface waters other than wetlands. For these reasons the MPCA has, until recently, limited nondegradation implementation to wastewater treatment activities covered under individual NPDES wastewater permits. Where nondegradation requirements have been considered outside of individual wastewater permits (primarily through the issuance of stormwater permits), reviews have been limited to achieve the broad intent of nondegradation policy.

Note that although states have discretion to apply antidegradation requirements more broadly than minimally required by federal regulation, application of state antidegradation requirements to activities that are otherwise unregulated under state or federal water law is not required. Federal antidegradation requirements and these proposed rules do not create, nor were they intended to create state regulatory authority over otherwise unregulated activities (Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36742 (1998), p. 36780). On the other hand, some states have attempted to exempt certain types of regulated activities from antidegradation requirements. For example, the State of Kentucky attempted to provide an exemption from antidegradation requirements for stormwater activities covered under general permits alleging that the discharges were *de minimis*. The EPA's approval of Kentucky's antidegradation procedures was challenged and the Sixth Circuit Court of Appeals vacated and remanded the EPA's approval of Kentucky's *de minimis* exemptions, including discharges under stormwater general permits. (Kentucky Waterways Alliance v. Johnson, 540 F.3d, 446, 492-493 6th Cir. 2008) (Exhibit 57)

C. Petition for rulemaking

In 2007, the MPCA received a formal petition for rulemaking to revise the current nondegradation rules in Minn. R. ch. 7050 (Petition for Rulemaking to the Minnesota Pollution Control Agency, Petitioner: Minnesota Center for Environmental Advocacy, MCEA, (April 30, 2007) (Exhibit 1). The MPCA responded that it intended to proceed with the rulemaking (letter dated June 29, 2007, from Brad Moore, Commissioner, MPCA to Ms. Sigford and Mr. Reuther, MCEA) (Exhibit 67)[67].

5. Need and reasonableness of individual rule parts

The MPCA is proposing to replace the term "*nondegradation*" found in current rules with "*antidegradation*". This change is reasonable because the term "*antidegradation*" more accurately describes federal policy. While "*nondegradation*" may be an accurate description for Tiers 1 and 3 antidegradation protection, which respectively prohibit the removal of existing uses and the permanent degradation of outstanding national resource waters (ONRWs) (equivalent to the prohibited category of Minnesota's ORVWs), it is not an accurate term to describe Tier 2 protection. Tier 2 protection does not prohibit degradation when, through public participation, a determination is made that a lowering of high water quality is necessary to accommodate important economic or social development. The change is reasonable also because it creates consistency with federal regulations, EPA guidance and other states' rules and implementation procedures.

The proposed rules contain 14 parts, grouped into the following general categories:

- Purpose (Minn. R. 7050.0250)
- Definitions (Minn. R. 7050.0255)
- Determining existing water quality (Minn. R. 7050.0260)
- Antidegradation standards (Minn. R. 7050.0265 and Minn. R. 7050.0270)
- Exemptions from antidegradation procedures (Minn. R. 7050.0275)

- Antidegradation procedures (Minn. R. 7050.0280 to Minn. R. 7050.0325)
- Designated ORVWs (Minn. R. 7050.0335)

Minor additional changes are being made to other rule chapters to eliminate obsolete cross references and provide supporting references to the rules being proposed. Those changes are discussed at the end of this Section and Section 6.

A. Antidegradation purpose (Proposed Minn. R. 7050.0250)

[6]The purpose of the antidegradation provisions in parts 7050.0250 to 7050.0335 is to achieve and maintain the highest possible quality in surface waters of the state. To accomplish this purpose:

A. existing uses shall be maintained and protected;

B. degradation of high water quality shall be minimized and allowed only to the extent necessary to accommodate important economic or social development;

C. water quality necessary to preserve the exceptional characteristics of outstanding resource value waters shall be maintained and protected; and

D. proposed activities with the potential for water quality impairments associated with thermal discharges shall be consistent with section 316 of the Clean Water Act, United States Code, title 33, section 1326.

The purpose statement is needed to articulate the goal of the proposed rules. The items contained in the statement clearly comport with federal antidegradation requirements found in 40 CFR § 131.12.

The proposed purpose statement improves upon the current rule's policy governing nondegradation for all waters (Minn. R. 7050.0185). Although the current rule's policy statement provides Tier 1 protection, it lacks clarity because the term "*uses*" is expressed in four different ways:

> *The **beneficial uses** inherent in water resources are valuable public resources. It is the policy of the state to protect all waters from significant degradation from point and nonpoint sources and wetland alterations and to maintain **existing water uses** and aquatic and wetland habitats. **Existing beneficial uses** and the water quality necessary to protect the **existing uses** must be maintained and protected from point and nonpoint sources of pollution.* Minn. R. 7050.0185, subp. 1 (emphasis added)

Without defining these terms in the current rule the reader may be confused as to their meanings. The proposed purpose statement clearly reiterates the federal requirement that existing uses must be maintained and protected, and, unlike the current rules, the proposed rules provide definitions for both existing uses and beneficial uses.

The policy statement contained in the existing nondegradation rule for all waters allows for the lowering of high water quality when the MPCA determines it is "*acceptable*":

> *It is the policy of the agency that water quality conditions that are better than applicable water quality standards and are better than levels*

[6] Text of proposed rule shown in large type for reference

necessary to support existing beneficial uses must be maintained and protected ***unless the commissioner finds that****, after full satisfaction of this part,* ***a lowering of water quality is acceptable****.* Minn. R. 7050.0185, subp. 1 (emphasis added)

The proposed rules strengthen Tier 2 protection by changing the standard for which the degradation (i.e., lowering) of high water quality is allowed from what the MPCA[7] deems "*acceptable*" to what is deemed "*necessary,*" thus bringing Tier 2 protection in alignment with federal regulations.

The purpose statement (and subsequent procedures) adds clarity that the proposed rules apply to surface waters of the state. This is reasonable because the CWA and federal regulations governing water quality standards, including 40 CFR § 131.12, apply to surface waters. Note that Minn. R. 7060.0500 provides nondegradation policy for groundwater, but is not part of this rulemaking.

B. Definitions (Proposed Minn. R. 7050.0255)

Minn. R. 7050.0255 provides the definitions for important terms found in the proposed rules. Including these definitions is essential to understanding the proposed rules.

1. Subpart 1. **Applicability.** For purposes of parts 7050.0250 to 7050.0335, the following terms have the meanings given in this part. Terms in parts 7050.0250 to 7050.0335 that are not specifically defined in applicable federal or state law shall be construed in conformance with the context, in relation to the applicable section of the statutes pertaining to the matter and current professional usage.

   This subpart defines the scope of rule parts to which the definitions apply. It is reasonable to provide a broad directive regarding terms that are not specifically defined because it would be overly burdensome to define every term within the proposed rules. The definition ensures that terms not defined in the proposed rules are to be taken in the context of the proposed rule language using the professional usage of the term in question.

2. Subp. 2. **Agency.** "Agency" has the meaning given under Minnesota Statutes, section 115.01, subdivision 2, unless otherwise specified.

   Minn. Stat. § 115.03 provides the MPCA regulatory authority for controlling pollution of waters of the state. The statute defines "*agency*" as "*the Minnesota Pollution Control Agency.*" (Minn. Stat. § 115.01, subd. 2). Referencing the statutory definition instead of repeating statutory language is Minnesota Rule drafting convention.

3. Subp. 3. **Applicant.** "Applicant" means a person requesting a control document.

   This definition is reasonable because it clearly identifies the person requesting MPCA authorization to discharge to or otherwise adversely impact surface waters.

[7] When referring to "commissioner" in rule language, the SONAR uses the term "Minnesota Pollution Control Agency" or "MPCA." This was done for ease of reading. "Commissioner" is defined in the proposed rules as "the commissioner of the Minnesota Pollution Control Agency or the commissioner's designee." (Minn. R. 7050.0130, subp. 4.)

4. Subp. 4. **Beneficial use.** "Beneficial use" means a designated use described under part 7050.0140 and listed under parts 7050.0400 to 7050.0470 for each surface water or segment thereof, whether or not the use is being attained.

   The classification of state waters, as required under Minn. Stat. § 115.44, identifies seven beneficial use classifications found in Minn. R. 7050.0140:

   - Class 1 – Domestic consumption
   - Class 2 – Aquatic life and recreation
   - Class 3 – Industrial consumption
   - Class 4 – Agriculture and wildlife
   - Class 5 – Aesthetic enjoyment and navigation
   - Class 6 – Other uses and protection of border waters
   - Class 7 – Limited resource value waters

   Minnesota's term "*beneficial use*" is equivalent to the federal term "*designated use,*" which is defined in water quality standards federal regulations as:

   > *…those uses specified in water quality standards for each water body or segment whether or not they are being attained.* 40 CFR § 131.3(f) (Exhibit 68)[68]

   The proposed definition is reasonable because it reiterates the federal definition and provides reference to where the uses are described and listed in Minnesota Rules. Although the meanings are the same, it is reasonable to use the term "*beneficial use*" rather than "*designated use*" because the former term is found throughout Minn. R. ch. 7050 and other Minnesota Rules. Defining this term also provides a distinction between beneficial uses and existing uses as defined in subp. 17 of the proposed rule.

5. Subp. 5. **Calcareous fen.** "Calcareous fen" means an area listed in part 7050.0335, subpart 1, item E and described under part 8420.0935, subpart 2.

   Including this definition is reasonable because it points the reader to where calcareous fens are listed (proposed Minn. R. 7050.0335, subp. 1(E)) and provides reference (Minn. R. 8420.0935, subp. 2) to how calcareous fens are identified and the exceptional characteristics that make them restricted ORVWs.

6. Subp. 6. **Class 2 surface water.** "Class 2 surface water" means a surface water that is protected for aquatic life and recreation beneficial uses and to which water quality standards described in part 7050.0222 apply.

   Class 2 surface waters are protected for aquatic life and recreation beneficial uses. Tier 2 antidegradation protection prevents the unnecessary degradation of high water quality. The MPCA may allow the lowering of existing high water quality in a Class 2 surface water resulting from a regulated source, but only through a determination that the degradation is necessary to accommodate important economic or social development. The definition references Minn. R. 7050.0222 where Class 2 water quality standards are found.

7. Subp. 7. **Class 7 surface water.** "Class 7 surface water" means a surface water that is protected for limited resource value beneficial uses and to which water quality standards described in part 7050.0227 apply.

   This definition is needed because the proposed rules provide an exemption from antidegradation procedures for activities resulting in net increases in loading or other causes of degradation to Class 7 waters, but only when:

   - Existing uses are maintained;
   - Class 7 water quality standards are attained;
   - Downstream high water quality is not degraded;
   - Water quality essential to preserving exceptional characteristics of ORVWs is not degraded

   The definition is reasonable because it is consistent with [Minn. R. 7050.0227] which describes Class 7 surface waters as those protected for limited resource beneficial uses and are protected for aesthetic qualities, secondary body contact use, and groundwater for use as a potable water supply. Although these waters are protected by standards and may contain aquatic life, they are not considered to meet the CWA section 101(a)(2) interim goal:

   > *…it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;…* Federal Water Pollution Control Act, 33 U.S.C. § 1251 (1972, as amended)

8. Subp. 8. **Clean Water Act.** "Clean Water Act" means the federal Water Pollution Control Act, United States Code, title 33, section 1251 et seq.

   One of the origins of federal antidegradation policy is found in the objective of the CWA which is "*…to restore and **maintain** the chemical, physical, and biological integrity of the Nation's waters.*" (Federal Water Pollution Control Act, 33 U.S.C. § 1251 (CWA section 101(a)) (emphasis added). The proposed rules are implemented through the issuance and enforcement of control documents for which there is CWA regulatory authority. These activities include those regulated under the NPDES program and CWA section 401 certification actions related to federal licenses and permits.

9. Subp. 9. **Compensatory mitigation.** "Compensatory mitigation" means the restoration, establishment, or enhancement of surface waters to replace the loss of an existing use resulting from a physical alteration of a surface water after all prudent and feasible alternatives have been implemented to avoid and minimize degradation.

   Federal antidegradation regulations at 40 CFR § 131.12(a)(1) require that existing uses be maintained and protected. EPA guidance in the interpretation of maintaining and protecting existing uses specifically allows compensatory mitigation for lost uses, stating that:

   > *If a planned activity will foreseeably lower water quality to the extent that it no longer is sufficient to protect and maintain the existing uses in*

that water body, such an activity is inconsistent with EPA's antidegradation policy, which requires that existing uses are to be maintained. In such a circumstance, the planned activity must be avoided or ***adequate mitigation*** *or preventive measures must be taken to ensure that the existing uses and the water quality to protect them will be maintained.* Water Quality Standards Handbook, Second Edition, Chapter 4, U. S. EPA (1994), pp. 3-4 (emphasis added)

The above mentioned guidance further states that:

> *A literal interpretation of 40 CFR 131.12(a)(1) could prevent certain physical modifications to a water body that are clearly allowed by the Clean Water Act, such as wetland fill operations permitted under section 404 of the Clean Water Act.* Water Quality Standards Handbook, Second Edition, Chapter 4, U. S. EPA (1994), p. 5

Note that compensatory mitigation for lost uses is limited to physical modifications allowed under the CWA. Compensatory mitigation would not, for example, be allowed for wastewater discharges resulting in the loss of an existing use.

The MPCA anticipates that only those physical alterations permitted under CWA section 404 (Exhibit 69)[69] will be allowed to provide compensatory mitigation for the loss of existing uses. This section of the CWA establishes programs to regulate the discharge of dredged or fill material into waters of the United States[8]. The program is jointly administered by the Army Corps of Engineers (ACE) and the EPA. The fundamental rationale of the program is that no discharge of dredged or fill material should be permitted if there is a practicable alternative that would be less damaging to aquatic resources. Permit review and issuance follows a sequential process that encourages avoidance of impacts, followed by minimizing impacts and, finally, requiring compensatory mitigation for unavoidable impacts to the aquatic environment.

Compensatory mitigation for the losses of aquatic resources resulting from dredge and fill activities is regulated through 33 CFR § 332. The proposed definition is reasonably derived from these regulations:

> *Compensatory mitigation means the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.* 33 CFR § 332.2 (Exhibit 70)[70]

The proposed definition requires that compensatory mitigation **replace the loss of existing uses** rather than **offsetting unavoidable adverse impacts** as found in 33 § 332.2. This is because the MPCA interprets the requirement to maintain existing uses in 40 CRF § 131.12(a)(1) and EPA's guidance to mean a no net loss of existing uses. The proposed definition excludes preservation as a means of mitigation. This is reasonable because preserving a water body in its existing condition cannot reasonably compensate

[8] The term "waters of the United States" is defined in 40 CFR § 122.2. The EPA and ACE recently proposed rules to clarify the scope of waters protected under the CWA (see Proposed Rules, 79 Fed. Reg., 22188 (2014)).

for the loss of an existing use. In other words, preserving an existing use that has not been lost simply does not replace a lost use. Allowing preservation as a means of compensatory mitigation would result is a net loss of existing uses.

The preferred order of compensatory mitigation is restoration, followed by establishment and enhancement. Different situations may dictate different approaches, including a combination of these methods.

Restoration means reclaiming the use of water body to bring back one or more functions that have been lost. It is the preferred form of mitigation because the likelihood of success is greater than establishment and the potential gains (e.g., an increase in acreage or linear footage of aquatic resources) in terms of aquatic resource functions and services are greater than enhancement.

Establishment means constructing a new water body and has the potential to result in a gain in aquatic resource area and functions. It is generally applied to wetlands because of the difficulties in creating other types of water bodies. There is less assurance of success in creating new wetlands than in restoring degraded ones. Many created wetlands have not persisted over time or have not provided the functions for which they were designed. Success rates are improving as wetland construction technology is advancing. Careful design, monitoring, and long-term maintenance are critical. Although establishment may result in an increase in the acreage or linear footage of aquatic resources, this method of compensatory mitigation will only be considered where there is a high likelihood of success in replacing lost functions.

Enhancement means heightening, intensifying, or improving specific aquatic resource functions. It involves altering an existing water body to increase selected functions and benefits. Enhancement is often short-lived unless carefully designed and maintained, perhaps indefinitely. The water body often returns to the equilibrium state that existed prior to enhancement. Enhancement may involve questions of trade-offs. It typically focuses on habitat improvement which could result in the loss of one habitat type to create another. Gains for some species may result at the expense of lost habitat for other species. Enhancement will only be considered when it does not cause the loss of another existing use. It should only be considered as appropriate mitigation in the rare instance when the trade-offs are limited to habitat and when other important functions in the enhanced water body are not impaired by the alterations.

Further discussion of compensatory mitigation is provided in Section 5.D.3.

10. <u>Subp. 10. **Control document.** "Control document" means an authorization issued by the commissioner that specifies water pollution control conditions under which a regulated activity is allowed to operate. Control document includes Clean Water Act authorizations used to administer NPDES permits and section 401 certifications. For purposes of parts 7050.0250 to 7050.0335, total maximum daily loads are not control documents.</u>

Antidegradation procedures are limited to activities impacting surface waters of the state that are regulated by the MPCA. These activities are controlled through the issuance and enforcement of authorizations such as NPDES permits and CWA section 401 certifications. The definition creates flexibility in the event that other types of MPCA authorizations are established which would regulate currently unregulated activities impacting surface water quality.

The last sentence clarifies that total maximum daily loads (TMDLs) are, for the purpose of the proposed rules, not control documents because they do not create any regulatory authorizations. A TMDL is a scientific study that contains a calculation of the maximum amount of a pollutant that may be introduced into a surface water and still ensure that applicable water quality standards for that water are restored and maintained. A TMDL also is the sum of the pollutant load allocations for all sources of the pollutant, including a wasteload allocation for point sources, a load allocation for nonpoint sources (i.e., unregulated sources) and natural background, an allocation for future growth of point and nonpoint sources, and a margin of safety to account for uncertainty about the relationship between pollutant loads and the quality of the receiving surface water. TMDL's are often used to develop the terms and conditions of control documents.

11. Subp. 11. **Degradation** or **degrade.** "Degradation" or "degrade" means a measurable change to existing water quality made or induced by human activity resulting in diminished chemical, physical, biological, or radiological conditions of surface waters. For municipal sewage and industrial waste discharges, degradation is calculated at the edge of the mixing zone upon reasonable allowance for dilution of the discharge according to part 7053.0205, subpart 5.

    The proposed definition is derived from statute, which defines "*pollution of water*", or "*water pollution,*" as:

    > *...the alteration made or induced by human activity of the chemical, physical, biological, or radiological integrity of waters of the state.* Minn. Stat. § 115.01, subd. 13(b)

    The term "*alterations*" in the statutory definition is replaced with "*measurable change*" to more clearly articulate that adverse changes to water quality are to be quantifiable. The last sentence in the proposed definition is included to comport with Minn. R. 7053.0205, subp. 5, which provides for the dilution of wastewater effluents in mixing zones. Since Minnesota rules already identify mixing zones as areas where water quality standards may be exceeded, it is reasonable to acknowledge that existing provision in the definition of "*degradation*" and "*degrade*".

12. Subp. 12. **Discharge.** "Discharge" means the addition of pollutants to surface waters.

    This definition is reasonable because it derived from the statutory definition of "*discharge*":

    > *...the addition of any pollutant to the waters of the state or to any disposal system.* Minn. Stat. § 115.01, subd. 4

    The proposed definition differs from the statutory definition in that the former considers the addition of pollutants to surface waters and not "*to any disposal systems.*" The difference is reasonable because "*surface waters*" are already defined in Minn. R. ch. 7052 as:

    > *...waters of the state excluding groundwater as defined in Minnesota Statutes, section 115.01, subdivision 6.* Minn. R. 7050.0130, subp. 6

"*Waters of the state*" as defined in Minn. R. ch. 7050 has the meaning found in Minn. Stat. § 115.01, subd. 22 except that:

> *…disposal systems or treatment works operated under permit or certificate of compliance of the agency are not "waters of the state."* Minn. R. 7050.0130, subp. 2

13. Subp. 13. **Effective date.** "Effective date" means:

A. for the protection of high water quality:
   (1) when applied to a previously unregulated activity, the date when the control document is issued; or
   (2) when applied to a currently regulated activity, the date of the most recently issued control document.

B. for the protection of exceptional characteristics of outstanding resource value waters, except as provided in (1) and (2), the date when the outstanding resource value water was designated in rule.
   (1) When the commissioner determines there is an improvement in exceptional characteristics of the outstanding resource value water as a result of changes to water pollution control conditions specified in a reissued control document, the effective date is the date when the control document was reissued.
   (2) When the commissioner determines there is an improvement in exceptional characteristics of the outstanding resource value water as a result of a regulated activity ceasing to discharge to or otherwise adversely impact an outstanding resource value water, the effective date is the expiration date of the associated control document.

The effective date sets the baseline from which loading or other causes of degradation are measured. A baseline is critical in determining whether antidegradation procedures are required and whether or to what extent water quality degradation may be allowed.

Item A defines the effective date for high water quality not associated with exceptional ORVW characteristics. In this case the effective date is tied to the date of control document issuance. This is reasonable because antidegradation requirements are implemented through the issuance and enforcement of control documents, through which the MPCA grants permission for a regulated activity to discharge to, or otherwise impact, surface waters of the state. The effective date for previously unregulated activities that are not regulated by an existing control document (sub-item (1)) is the date the first control document was issued for that specific activity. This is reasonable because these activities have not previously been required to obtain antidegradation approval through the issuance of a control document. The effective date may change for currently regulated activities (sub-item (2)) to the date of the most recent control document issuance. This is reasonable because antidegradation requirements do not prohibit the degradation of high water quality, but such degradation is allowed only when a final determination has been made that the lowering of high water quality is necessary to accommodate important economic or social development. Thus when the MPCA makes a finding that Tier 2 requirements are satisfied and a lowering of high water quality results from the regulated activity, the effective date reasonably changes to the date of the most recently issued control document.

Item B defines effective date for the protection of ORVWs which are designated through rulemaking. Therefore it is reasonable that the effective date for these waters is the effective date of the rule designating them as ORVWs. Sub-items (1) and (2) provide two exceptions to this provision. The first, sub-item (1), addresses situations when the reissuance of a control document results in an improvement on an ORVW's exceptional characteristics. In such cases, the effective date changes to the date of the control document reissuance. For example, consider a regulated activity which existed prior to an ORVW being designated in rule. This activity would be allowed to continue discharging to the ORVW at loadings established in the existing control document because the discharge is "grandfathered in". However, if that same activity were to reduce its loading as a result of changes to water pollution controls specified in a more recent control **and** such changes result in the improvement of the ORVW's exceptional characteristics, the effective date changes to the date of when the control document was reissued. This is a reasonable approach because it provides for the water quality improvement of the State's most special or unique water resources. It would not be prudent for the MPCA to allow water quality to improve, and then allow degradation of the resource back to its grandfathered condition.

Sub-item (2) is similar to the first, but addresses regulated activities that cease to exist. In this case the effective date changes to the expiration date of the associated control document. The reasonableness of this provision is the same as stated above.

14. Subp. 14. **Exceptional characteristics of outstanding resource value waters.** "Exceptional characteristics of outstanding resource value waters" means characteristics for which an outstanding resource value water is designated, including wilderness, scientific, educational, ecological, recreational, cultural, or aesthetic resource characteristics or other special qualities that warrant stringent protection from degradation.

The current rule governing nondegradation of ORVWs identifies exceptional characteristics in two subparts:

> *The agency recognizes that the maintenance of existing high quality in some waters of outstanding resource value to the state is essential to their function as* ***exceptional recreational, cultural, aesthetic, or scientific resources****. To preserve the value of these special waters, the agency will prohibit or stringently control new or expanded discharges from either point or nonpoint sources to outstanding resource value waters.* Minn. R. 7050.0180, subp. 1 (emphasis added);

and

> *"Outstanding resource value waters" are waters within the Boundary Waters Canoe Area Wilderness, Voyageur's National Park, and Department of Natural Resources designated scientific and natural areas, wild, scenic, and recreational river segments, Lake Superior, those portions of the Mississippi River from Lake Itasca to the southerly boundary of Morrison County that are included in the Mississippi*

> *Headwaters Board comprehensive plan dated February 12, 1981, and other waters of the state with* ***high water quality, wilderness characteristics, unique scientific or ecological significance, exceptional recreational value, or other special qualities*** *which warrant stringent protection from pollution.* Minn. R. 7050.0180, subp. 2 (emphasis added)

The proposed definition consolidates the exceptional characteristics of ORVWs, removes reference to "*high water quality*", and adds "*educational*" as an exceptional characteristic. Consolidating the attributes of ORVWs reduces the length of the proposed rules and provides greater clarity. "*High water quality*" was removed because some waters may be designated as ORVWs for reasons other than high water quality as defined in the proposed rules. For example, some bogs listed as ORVWs may have naturally occurring low dissolved oxygen concentrations that are not better than the water quality standard, yet are outstanding ecological resources and therefore listed as ORVWs. The proposed definition adds "*educational*" resources as an exceptional characteristic because ORVWs include SNAs established by the MDNR. One criterion used in the establishment of SNAs is educational value (Minn. Stat. § 86A.05, subd. 5(b)(1)).

15. Subp. 15. **Existing uses. "**Existing uses" means those uses actually attained in the surface water on or after November 28, 1975.

Federal antidegradation regulations require that existing uses, and the level of water quality necessary to protect those uses, be maintained and protected. This level of protection is often referred to as Tier 1 antidegradation protection and is the absolute baseline below which water quality may not be degraded. The term "*existing uses*" is defined in federal regulations as:

> *…those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.* 40 CFR § 131.3(e) (Exhibit 68)

The proposed definition is reasonable because it is consistent with the federal definition of "*existing uses.*" Note that the federal definition requires the consideration of uses "*whether or not they are included in the water quality standards.*" Uses are specified in two places within the CWA. The interim goal of the CWA:

> *…provides for the* ***protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water*** *be achieved by July 1, 1983.* Federal Water Pollution Control Act, 33 U.S.C. § 1251 (CWA section 101(a)(2)) (emphasis added) (Exhibit 12)

Section 303(c)(2)(A) of the CWA requires states to incorporate specific uses in their water quality standards:

> *Whenever the State revises or adopts a new standard, such revised or new standard shall be submitted to the Administrator. Such revised or new water quality standard shall consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses. Such standards shall be such as to protect the public health or welfare, enhance the quality of water and serve the*

> *purposes of this chapter. Such standards shall be established taking into consideration their use and value for* ***public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes, and also taking into consideration their use and value for navigation****.* Federal Water Pollution Control Act, 33 U.S.C. § 1313 (CWA section 303) (emphasis added) (Exhibit 13)

Minnesota's water quality standards found at Minn. R. 7050.0140 include all of the specified uses found in CWA sections 101(a)(2) and 303(c)(2)(A).

16. Subp. 16. **Existing water quality.** "Existing water quality" means the physical, chemical, biological, and radiological conditions of a surface water, taking into account natural variability, on the effective date. Existing water quality is expressed either as a concentration of a water quality parameter or by other means to describe the condition of a surface water.

For proposed regulated activities that are anticipated to result in a net increase in loading or other causes of degradation it is essential to have an understanding of existing water quality conditions, when such assessments are reasonable. Without an understanding of baseline conditions the MPCA cannot make determinations of whether and to what extent water quality may be lowered. The proposed definition is reasonable because it:

- establishes a point in time when existing water quality is to be established (see the definition of "effective date");
- accounts for natural variability not associated with human-induced activities;
- describes how existing water quality is to be expressed

The last sentence of this definition states that existing water quality may be described either as a concentration of a water quality parameter or by other means. Although existing water quality may be expressed in terms of the concentration of a chemical parameter, other means may necessary to describe physical and biological conditions of a water body. For example the physical condition of stream may be described as natural, channelized, ditched or impounded. The health of aquatic ecosystems may be expressed in terms of fish, invertebrate or plant Indices of Biological Integrity (IBI).

17. Subp. 17. **Feasible alternative.** "Feasible alternative" means a pollution control alternative that is consistent with sound engineering and environmental practices, affordable, legal, and that has supportive governance that can be successfully put into practice to accomplish the task.

The term "*feasible alternative*" is an important concept in alternatives analyses. Under the proposed rules, when a prudent and feasible alternative is not available to **prevent** a net increase in loading or other causes of degradation, the prudent and feasible alternative that **minimizes** degradation (when existing water quality can reasonably be determined) or net increases in loading or other causes of degradation (when existing water quality cannot reasonably determined) must be identified.

Although this term is found in the current rule governing nondegradation for ORVWs (Minn. R. 7050.0180) and other MPCA water rules, it is not defined in those rules. It is, however, defined in MPCA rules governing solid waste planning:

> *"Feasible" refers to an alternative that is consistent with sound engineering and environmental practices, is economically affordable, is legally possible, and has supportive governance that can be successfully put into practice to accomplish the task.* Minn. R. 9215.0510, subp. 8b

The proposed definition is essentially the same as that found in Minn. R. 9215.0510. The proposed definition requires that a feasible alternative be consistent with sound engineering practices. This ensures only proven and reliable alternatives are considered. Pollution control technologies are continually evolving and improving. Some newer pollution control technologies hold promise in their ability to treat wastewater. An applicant may propose the implementation of such technologies but will need to provide adequate information regarding effectiveness and reliability. The SONAR supporting Minn. R. ch. 9215 amendments provides further explanation of why "*sound engineering practices*" are included in the definition:

> *Defining feasible as being consistent with sound engineering practices is reasonable because it is based on judicial interpretation such as found in Lakes Region Legal Defense Fund, Inc. v. Slater, 986 F. Supp. 1169, 1207 (N.D. Iowa 1997)("There is no 'feasible alternative' [to using protected parklands for highway purposes]... if ["]'as a matter of sound engineering it would not be feasible to build the highway along any other route.' '' (quoting Committee to Preserve Boomer Lake Park, 4F. 3d 1543, 1549 (10th Cir. 1993) quoting Citizens to Preserve Overton Park, Inc. v. Volpe, 401 U.S. 402, 411 (1971).* Statement of Need and Reasonableness, Proposed Revisions to Rules Governing Solid Waste Management Planning Requirements, Minnesota Rules Chapter 9215 (MPCA, 2007), p. 17 (Exhibit 71)[71]

The proposed definition also requires that a feasible alternative be consistent with sound environmental practices. This requirement ensures that environmental impacts other than to surface water quality are considered.

The proposed definition provides that an alternative be affordable, recognizing that, given the unique economic conditions of each applicant, what might be feasible for one applicant may not be for another. For example, economic considerations for public projects may include factors related to demographics, such as changes in tax base, resulting from changes in the work force. The economic condition of private projects may include factors such as changes in profitability over time. Further discussion on how affordability will be addressed through alternatives analyses is provided in Section 5.G.2.a. and Attachment 4.

A feasible alternative must also be legally possible. This reasonably ensures that a selected alternative can indeed be legally implemented. An example of an alternative that is not feasible because is it not legally possible is a treatment method involving the use of chemicals prohibited under federal or state law.

The alternative must also have supportive governance. "Governance" refers to policies or regulations of the local government where the alternative is to be implemented. "Supportive governance" refers to policies or regulations that support the implementation of the alternative under consideration and do not present barriers to implementation of the alternative. An infiltration alternative for stormwater treatment provides an example. The infiltration alternative is a feasible alternative only when the local government proposing the infiltration alternative has adopted policies and regulations supporting stormwater infiltration. An example is a stormwater and erosion control ordinance that includes preferences for stormwater infiltration over holding ponds. The infiltration alternative is not feasible if the local government has in place policies or regulations that prohibit stormwater infiltration. An example is planning guidance that discourages infiltration of stormwater runoff around private wellheads to protect drinking water. While the prohibition on stormwater infiltration around private wellheads may be sound policy to protect drinking water sources, it is not supportive of the infiltration alternative in the areas of the prohibition.

In summary, the proposed definition provides flexibility by recognizing that what may be feasible for one project may not be for another because of the unique conditions of each project.

18. Subp. 18. **Federally designated recreational river segment.** "Federally designated recreational river segment" means a surface water or segment thereof designated as a recreational river under the federal Wild and Scenic Rivers Act, United States Code, title 16, sections 1271 to 1287.

    Federal antidegradation regulations provide for the maintenance and protection of water quality for waters considered to be outstanding national resources:

    > *…such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance…"* 40 CFR § 131.12(a)(3)

    It is therefore reasonable that recreational rivers designated under the federal Wild and Scenic Rivers Act (16 U.S.C. §§ 1271-1287) (Exhibit 72)[72] receive protection as outstanding resources. Specifically, federally designated recreational river segments are protected under the restricted category of ORVWs which requires water quality protection necessary to maintain their recreational characteristics.

    The proposed definition provides reference to the federal program (i.e., federal Wild and Scenic Rivers Act) under which recreational river segments are designated and which describe the exceptional characteristics that make them outstanding resources. The federal Wild and Scenic Rivers Act defines "*recreational river areas*" as:

    > *…those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.* 16 U.S.C. § 1273(b)(3) (Exhibit 72)

19. Subp. 19. **Federally designated scenic river segment.** "Federally designated scenic river segment" means a surface water or segment thereof designated as a scenic river under the federal Wild and Scenic Rivers Act, United States Code, title 16, sections 1271 to 1287.

    Just as federal recreational river segments designated under the federal Wild and Scenic Rivers Act are protected as outstanding resources, scenic rivers designated under the same Act receive protection as restricted ORVWs. The protection of federally designated scenic river segments requires water quality protection necessary to maintain their scenic characteristics. The proposed definition provides reference to the federal program under which scenic river segments are designated and that describes the exceptional characteristics that make them outstanding resources. The federal Wild and Scenic Rivers Act defines "*scenic river areas*" as:

> *…those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.* 16 U.S.C. § 1273(b)(2) (Exhibit 72)

20. Subp. 20. **Federally designated wild river segment.** "Federally designated wild river segment" means a surface water or segment thereof designated as a wild river under the federal Wild and Scenic Rivers Act, United States Code, title 16, sections 1271 to 1287.

The federal Wild and Scenic Rivers Act defines "*wild river areas*" as:

> *…those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.* 16 U.S.C. § 1273(b)(1) (Exhibit 72)

Federally designated wild river segments are protected as prohibited ORVWs because the federal Wild and Scenic Rivers Act's definition makes explicit reference to unpolluted waters. The protection of prohibited ORVWs is equivalent to Tier 3 protection specified under 40 § CFR 131.12(a)(3) – meaning that new or expanded discharges to federally designated wild river segments are not allowed.

21. Subp. 21. **High water quality or of high quality.** "High water quality" or "of high quality" means water quality that exceeds, on a parameter-by-parameter basis, levels necessary to support the protection and propagation of aquatic life and recreation in and on the water.

Federal water quality standard regulations require states to develop designated use classifications that:

> *…take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation.* 40 CFR § 131.10(a) (Exhibit 73)[73]

Minnesota's Class 2 Aquatic Life and Recreation beneficial use, defined at Minn. R. 7050.0140, subp. 3, provides for the protection and propagation of aquatic life, and protection of recreation in and on the water.

Federal antidegradation regulations state that:

> *Where the quality of the waters exceeds levels necessary to support the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to*

> *accommodate important economic or social development in the area in which the waters are located.* [40 CFR § 131.12](a)(2)

As used here, the term "*levels*" generally means numeric or narrative water quality standards necessary to protect Class 2 beneficial uses. The lack of a Class 2 numeric standard does not preclude Tier 2 protection for a given parameter. For example, standards may not yet exist for some contaminants of emerging concern. In such situations the MPCA will need to make case-by-case decisions regarding the level of water quality necessary to protect aquatic life and recreation. The MPCA anticipates that these situations will be very rare. As with other aspects of antidegradation review, the public and other interested entities will have the opportunity to comment on the MPCA's case-by-case decisions.

It is also important to note that human health is tied to Class 2 beneficial uses where fish consumption and recreation are at issue. For example, the definition of high water quality includes that increment of water quality better than the mercury numeric standard established for safe fish consumption.

The proposed definition differs from that found in 40 CFR § 131.12(a)(2) in that the proposed definition uses the term "*aquatic life*" rather than "*fish, shellfish, and wildlife*" as found in regulation. The use of the term "*aquatic life*" is reasonable because it is a term used throughout Minnesota Statutes and Rules. For example, Minn. Stat. 115.01 uses the term "*aquatic life*" as part of the definition of water pollution; and Minn. R. 7050.0140 subp. 3 defines Class 2 waters to be those protected for "*aquatic life and recreation.*" The term "*aquatic life*" in the proposed rule is intended to have the same meaning as "*aquatic life*" in Minn. Stat. 115.01 and Minn. R. 7050.0140, provisions that were previously adopted by Minnesota to implement the Clean Water Act water quality standards provisions. Consistency in terms in such closely related provisions is reasonable.

Federal antidegradation regulations at 40 CFR § 131.12(a)(2)(i) provides states with the option of identifying high water quality either on a parameter-by-parameter basis or on a water body-by-water body basis. The EPA describes each approach as follows:

> *Existing approaches for identifying high quality waters fall into two basic categories: (1) pollutant-by-pollutant approaches, and (2) water body-by-water body approaches. States and Tribes following the first approach determine whether water quality is better than applicable criteria for specific pollutants that would be affected by the proposed activity. Thus, available assimilative capacity for any given pollutant is always subject to tier 2 protection, regardless of whether the criteria for other pollutants are satisfied. Such determinations are made at the time of the antidegradation review (i.e., as activities that may degrade water quality are proposed). States and Tribes following the second approach weigh a variety of factors to judge a water body segment's overall quality. Such determinations may be made prior to the antidegradation review (i.e., the State or Tribe may assign ''high quality'' designations in the State or Tribal standards), or during the course of the antidegradation review. Under this water body-by-water body approach, sometimes referred to as the ''designational'' approach, assimilative capacity for a given pollutant may not be subject to tier 2*

protection if, overall, the segment is not deemed ''high quality.'' Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36741 (1998), pp. 36782.

The MPCA is proposing to identify and protect high water quality on a parameter-by-parameter basis providing clarity that individual parameters must be evaluated independently. A water body may be considered of high quality for one parameter, yet not support aquatic life and recreation for another. Judgments of high quality are not made for a water body as a whole.

Identifying and protecting high water quality is reasonable for the following reasons.

- The parameter-by-parameter approach is easier to implement because it eliminates the need for an overall assessment weighing various qualitative criteria.
- Decisions are driven by individual data points rather than judgments concerning a water body's overall value or quality, and thus may be less susceptible to challenge.
- Compared to the water body-by-water body approach, the parameter-by-parameter approach is more likely to result in more waters receiving some degree of Tier 2 protection because it would cover waters that are clearly not attaining goal uses (i.e., waters which are not supporting the ''fishable/swimmable'' goal uses but that still possess assimilative capacity for one or more parameters).
- Under the water body-by-water body approach, decisions regarding whether a water is of high quality are typically made in advance of a proposed activity and are designated in rule. Pre-designating water bodies avoids having to make high water quality decisions at the time a prospective applicant seeks authorization to lower water quality. However, pre-designating high water quality waters would be a daunting task given the amount of Minnesota's surface water resources.
- Under the water body-by-water body approach, a potential problem can arise if the process of identifying high quality waters becomes so complicated, resource-intensive, and data-intensive that a primary purpose of Tier 2 protection (i.e., seeking to maintain and protect existing quality by identifying whether there are reasonable less degrading or non-degrading alternatives) is not adequately accomplished. In other words, when limited resources available for water quality protection are spent on the identification process, it may be at the expense of analysis that could avoid and minimize degradation.

Although the MPCA currently practices a parameter-to-parameter approach when conducting nondegradation reviews, it is not explicit in the current rules. Articulating how to identify high water quality provides greater clarity in the proposed rules.

22. Subp. 22. **Loading.** "Loading" means the quantity of pollutants, expressed as mass, resulting from a discharge or proposed discharge to a surface water.

Defining this term is needed because an anticipated net increase in loading is a means by which antidegradation procedures are triggered. The term is also important to the alternatives analysis where loading offsets may be used to avoid and minimize degradation. The definition limits loading to mass. In scientific terms, mass is commonly used to express the measurement of the amount of material contained and causes it to have weight in a gravitational field (see http://www.merriam-webster.com/dictionary/mass). Limiting loading to mass is reasonable because it provides a practical and tangible means to quantify the amount of pollutants (defined in proposed subp. 31) entering a surface water.

23. <u>Subp. 23. **Loading offset.** "Loading offset" means reductions in loading from regulated or unregulated activities, which reductions create additional capacity for proposed net increases in loading. A loading offset must occur concurrent with or prior to the proposed net increase in loading and must be secured with binding legal instruments between any involved persons for the life of the project that is being offset.</u>

    This definition is needed to describe a means by which net increases in loading to high water quality may be avoided or minimized. This is accomplished by creating additional loading capacity in the surface water where a net increase in loading is proposed. In order for this to happen there must be a reduction in loading upstream or up-gradient of the proposed loading. The definition includes two stipulations. The first is that the offset must occur concurrent with or prior to the proposed net increase in loading. This is reasonable because it avoids possible environmental damage, as well as the administrative burden of enforcing the load reduction after the net increase in loading has already occurred. The second stipulation is that the offset must be secured using binding legal instruments between the parties involved in the offset. Offsets involving only regulated activities could rely on applicable control documents to secure the load reductions. The second stipulation is particularly needed for offsets involving unregulated activities which are not subject to control documents.

24. <u>Subp. 24. **Measurable change.** "Measurable change" means the practical ability to detect a variation in water quality, taking into account limitations in analytical technique and sampling variability.</u>

    Evaluations of degradation require measurement of changes in water quality. The proposed definition includes the phrase "…*practical ability to detect a variation in water quality*…" to reasonably limit the analysis of water quality changes to standard procedures that are commonly available. It is also reasonable to allow for limitations in analytical procedures and for sampling variability to ensure confidence in measured outcomes.

25. <u>Subp. 25. **National pollutant discharge elimination system or NPDES.** "National pollutant discharge elimination system permit" or "NPDES permit" means an authorization issued by the agency under sections 307, 318, 402, and 405 of the Clean Water Act, United States Code, title 33, sections 1317, 1328, 1342, and 1345. A general NPDES permit means an NPDES permit issued pursuant to Code of Federal Regulations, title 40, section 122.28.</u>

    [Minn. Stat. § 115.03] grants the MPCA authority to administer the NPDES program. Permits issued under the NPDES program are control documents granted by the MPCA to govern discharges of pollutants to waters of the state. Under this program the MPCA has the authority to establish standards, procedures, rules and permit conditions that are consistent with, and therefore not less stringent than, the provisions established under http://www.gpo.gov/fdsys/pkg/USCODE-2011-title33/pdf/USCODE-2011-title33-chap26-subchapIV-sec1342.pdf.

26. Subp. 25. **Net increases in loading or other causes of degradation.** "Net increases in loading or other causes of degradation" means:

A. when applied to a proposed activity that is not regulated by an existing control document, any loading or other causes of degradation resulting from the proposed activity; or
B. when applied to a proposed activity that is regulated by an existing control document, an increase in loading or other causes of degradation exceeding the maximum loading or other causes of degradation authorized through water pollution control conditions specified in the existing control document as of the effective date.

Defining this term is needed because an anticipated net increase in loading or other causes of degradation is the means by which antidegradation procedures are triggered. Terms that are found within this definition and that are defined in the proposed rule include: "*loading*"; "*degradation*"; "*proposed activity*"; "*control document*"; "*water pollution control conditions*"; and "*effective date.*"

It is reasonable to include the phrase "*other causes of degradation*" because an increase in loading, as defined, may not be the sole cause of degradation. For example a regulated activity that causes an increase in *E. coli* numbers or temperature within a surface water cannot reasonably be expressed in mass. Physical alterations to a surface water – the extreme being the removal of an entire water body – are also causes of degradation not quantifiable in terms of mass loading.

Item A applies to new regulated activities (i.e., those not previously authorized through a control document). It is reasonable for these activities to undergo antidegradation procedures because the proposed loading or other causes of degradation resulting from the new activity was not previously regulated by a control document.

Item B applies to regulated activities that are seeking to expand and that expansion is anticipated to result in a net increase in loading or other causes of degradation. The definition clarifies that changes in water pollution control conditions resulting in an exceedance of the maximum loading or other causes of degradation authorized in the existing control document results in a net increase in loading or other causes of degradation – thus triggering antidegradation procedures. An example of a net increase in loading for a wastewater discharge is when a change in numeric effluent limits causes an increase in the mass of a pollutant being discharged to a surface water. An example of how a net increase in loading would trigger antidegradation procedures for stormwater activities would be an increase in population and/or impervious surfaces within the regulated entity's site or jurisdiction without corresponding BMPs to prevent the net increase.

27. Subp. 27. **Outstanding resource value waters.** "Outstanding resource value waters" mean waters of the state designated under part 7050.0335 for their exceptional characteristics.

Federal antidegradation regulations require that:

> *Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and*

> *waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.* 40 CFR § 131.12(a)(3)

Minnesota designates waters with exceptional characteristics as ORVWs, of which there are two categories; "*prohibited*" and "*restricted.*" The current rule's definition of "*outstanding resource value waters*" broadly identifies designated ORVWs:

> *"Outstanding resource value waters" are waters within the Boundary Waters Canoe Area Wilderness, Voyageur's National Park, and Department of Natural Resources designated scientific and natural areas, wild, scenic, and recreational river segments, Lake Superior, those portions of the Mississippi River from Lake Itasca to the southerly boundary of Morrison County that are included in the Mississippi Headwaters Board comprehensive plan dated February 12, 1981, and other waters of the state with high water quality, wilderness characteristics, unique scientific or ecological significance, exceptional recreational value, or other special qualities which warrant stringent protection from pollution.* Minn. R. 7050.0180, subp. 2A

Broadly listing the ORVWs in definition is redundant because the detailed list of ORVWs is found in Minn. R. 7050.0180, subp. 3 through 7050.0180, subp. 6b. The proposed rules remove the redundancy by simply providing a reference to the part of the proposed rules (proposed Minn. R. 7050.0335) where the ORVWs are listed.

28. Subp. 28. **Parameter.** "Parameter" means a chemical, physical, biological or radiological characteristic used to describe water quality conditions.

The definition of "*parameter*" is needed to describe how water quality conditions are to be expressed. It reasonably includes chemical, physical, biological or radiological characteristics which ties this definition to the definition "*degradation,*" which, in turn is tied to the statutory definition of "*pollution of water,*" or "*water pollution,*" as defined in Minn. Stat. § 115.01, subd. 13(b).

29. Subp. 29. **Person.** "Person" has the meaning given under Minnesota Statutes, section 115.01, subdivision 10.

Minnesota water pollution control statutes define "*person*" as:

> … *the state or any agency or institution thereof, any municipality, governmental subdivision, public or private corporation, individual, partnership, or other entity, including, but not limited to, association, commission or any interstate body, and includes any officer or governing or managing body of any municipality, governmental subdivision, or public or private corporation, or other entity.* Minn. Stat. § 115.01, subd. 10

Referencing the statutory definition instead of repeating statutory language is Minnesota rule drafting convention.

30. Subp. 30. **Physical alteration.** "Physical alteration" means a physical change that degrades surface waters, such as the dredging, filling, draining, or permanent inundation of a surface water.

Physical alterations are a potential cause of degradation. Regulated activities that cause physical alterations are therefore subject to antidegradation procedures. The proposed definition originates from the definition found in Minnesota Rules which define "*physical alteration*" as:

> *... dredging, filling, draining, or permanent inundating of a wetland.*
> Minn. R. 7053.0135, subp. 8

The proposed definition does not limit physical alterations to activities described in Minn. R. 7053.0135, subp. 8 because there are other degrading activities than those specifically mentioned. For example reductions in water volume may degrade a water to a point where aquatic life or recreation is adversely impacted. The proposed definition replaces the word "*wetland*" with "*surface water*" because physical alterations resulting from regulated activities are not limited to wetlands. The proposed definition limits physical alterations to activities which degrade water existing quality. The definition of "*degrade*" in turn is limited to measurable changes:

> *... to existing water quality made or induced by human activity resulting in* ***diminished*** *chemical, physical, biological, or radiological conditions of surface waters...Proposed Minn. R. 7050.0255, subp. 11 (emphasis added)*

Thus restoring a degraded resource by reestablishing its hydrology is not a physical alteration as defined in the proposed rules.

31. Subp. 31. **Pollutant.** "Pollutant" has the meaning given under Minnesota Statutes, section 115.01, subdivision 12.

    Minnesota Pollution Control statutes define "*pollutant*" as:

    > *... any sewage, industrial waste, or other wastes, as defined in this chapter, discharged into a disposal system or to waters of the state*
    > Minn. Stat. § 115.01 subd. 12

    Referencing the statutory definition instead of repeating statutory language is Minnesota rule drafting convention.

32. Subp. 32. **Prohibited outstanding resource value waters.** "Prohibited outstanding resource value waters" means surface waters identified in part 7050.0335, subparts 3 and 4.

    Including this definition is reasonable because it points the reader to parts of the proposed rules (Minn. R. 7050.0335, subps. 3 and 4) where prohibited ORVWs are identified. Prohibited ORVWs receive the level of protection found in federal antidegradation regulations at 40 CFR § 131.12(a)(3), which requires that the high water quality of outstanding national resource waters be "*maintained and protected*". This level of protection, often referred to as Tier 3 protection, is reserved for waters that possess extraordinary or unique water quality characteristics. In most cases these waters have minimal human impacts. The EPA interprets "*maintained and protected*" as allowing no new or increased discharges that would result in lower water quality, except for when discharges result in only temporary changes to water quality (Water Quality Standards Handbook, Second Edition, Chapter 4, U.S. EPA (1994), p. 10).

33. Subp. 33. **Proposed activity.** "Proposed activity" means a regulated activity for which control document authorization is being requested.

This definition provides clarity that any proposed activity is a regulated activity. Including and defining "*proposed activity*" eliminates the need to repeatedly say "*proposed* ***regulated*** *activity,*" thus reducing the length of the proposed rule.

34. Subp. 34. **Prudent alternative.** "Prudent alternative" means a pollution control alternative selected with care and sound judgment.

Like the term "*feasible alternative,*" "*prudent alternative*" is an important concept in the alternatives analysis. There is a need to define "*prudent alternative*" so applicants have guidance regarding the selection of alternatives that minimize degradation.

Although this term is found in the current rule governing nondegradation for ORVWs (Minn. R. 7050.0180) and other MPCA water rules, it is not defined in those rules. It is, however, defined in MPCA rules governing solid waste planning as an alternative "*… that is selected with care and sound judgment.*" Minn. R. 9215.0510, subp. 16a. The proposed definition is essentially the same as that found in Minn. R. 9215.0510 and fits well with the antidegradation alternatives analysis.

The SONAR supporting amendments to Minn. R. ch. 9215 provides the following explanation:

> *The definition of prudent is reasonable because it is based on the fifth and seventh meanings of "prudent" stated in The American Heritage Dictionary of the English Language: Fourth Edition, 2000. The fifth meaning is that of being judicious, that is, "[h]aving or exhibiting sound judgment" while the seventh meaning is that of providence, that is, "[c]are or preparation in advance; foresight." Statement of Need and Reasonableness, Proposed Revisions to Rules Governing Solid Waste Management Planning Requirements, Minnesota Rules Chapter 9215* (MPCA, 2007), p. 20 (Exhibit 71)

The proposed definition provides flexibility in the alternatives analysis providing that what may be prudent for one project may not be for another because of demographic, geologic, or economic differences. The definition allows for considerations that are unique to a specific project and the applicant's ability to implement alternatives that minimize degradation. For example, infiltration of untreated contaminated stormwater may not be prudent, even when it is technically feasible and/or affordable.

Cost effectiveness may be a consideration in the determination of whether the implementation of a given alternative is prudent. This differs from affordability considerations addressed in the definition of "*feasible alternative*". Cost effectiveness, in regard to the consideration of alternatives, refers to the amount of resources required to prevent or treat a given unit of pollutant. Although a given alternative may be affordable it may not be prudent based on its cost effectiveness.

35. Subp. 35. **Regulated activity.** "Regulated activity" means an activity that requires a control document.

The proposed definition lends clarity to the rules' scope – antidegradation procedures are required for activities requiring MPCA authorization to discharge to, or otherwise impact, surface waters of the state when the activity is anticipated to result in a net increase in loading or other causes of degradation. Impacts to water quality are regulated through the issuance and enforcement of control documents.

36. Subp. 36. **Restricted outstanding resource value waters.** "Restricted outstanding resource value waters" mean surface waters identified in part 7050.0335, subparts 1 and 2.

Including this definition is reasonable because it points the reader to parts of the proposed rules (Minn. R. 7050.0335, subps. 1 and 2), where restricted ORVWs are listed. Minnesota, like a number of other states, has elected to provide a fourth level of protection between Tiers 2 and 3. This extra Tier in a state's antidegradation policy is permissible under section 510 of the CWA (Federal Water Pollution Control Act, 33 U.S.C. § 1370 (1972, as amended). (Exhibit 74)[74]

Like the prohibited category of ORVWs, restricted waters possess extraordinary or unique characteristics important to the nation or state. Whereas prohibited waters are designated because of outstanding water quality, some restricted ORVWs are designated for reasons other than exceptional water quality. For example, segments of the Minnesota River are designated as a restricted ORVW because of a prior designation under the state's Wild and Scenic Act as scenic or recreational river segments. The water quality within these segments may not be exceptional and might not even meet water quality standards for some parameters.

37. Subp. 37. **Scientific and natural areas.** "Scientific and natural areas" mean areas listed in part 7050.0335, subpart 3, item D and described under Minnesota Statutes, section 86A.05, subdivision 5, paragraph (b).

Including this definition is reasonable because it points the reader to where scientific and natural areas are listed (proposed Minn. R. 7050.0335, subp. 3(D)) and provides reference (Minn. Stat. § 86A.05, subd. 5(b)) to how scientific and natural areas are identified and the exceptional characteristic that make them prohibited ORVWs.

38. Subp. 38. **Section 303(d) of the Clean Water Act.** "Section 303(d) of the Clean Water Act" means, pursuant to United States Code, title 33, section 1313(d), a requirement for states, territories and authorized tribes to develop lists of waters that do not meet applicable water quality standards, establish priority rankings, and develop total maximum daily loads for these waters.

The definition is reasonable because it identifies the federal mandate (i.e., CWA section 303(d) (Exhibit 13) requiring the MPCA to identify waters within Minnesota's boundaries where current pollution control technologies alone cannot meet the water quality standards. Every two years, the MPCA is required to submit a list of these impaired waters to EPA for approval. The impaired waters are prioritized based on the severity of the pollution and the designated use of the water body. The MPCA must establish the total maximum daily load(s) of the pollutant(s) in the water body for impaired waters on the list.

This definition is important to the proposed antidegradation standards when changes in existing water quality are not reasonably quantifiable (proposed Minn. R. 7050.0270).

Under these standards, Class 2 surface waters not identified as impaired are considered to be of high quality.

39. Subp. 39. **Section 401 certification.** "Section 401 certification" means an authorization issued by the commissioner under section 401 of the Clean Water Act, United States Code, title 33, section 1341.

    Anyone seeking a federal license or permit for any activity that may result in a discharge to waters of the United States must first obtain a CWA section 401 certification to ensure compliance with state water quality standards. Because antidegradation provisions are a part of the water quality standards program, any activity requiring a section 401 certification is subject to antidegradation provisions. The proposed definition provides reference to the federal law authorizing section 401 certifications.

40. Subp. 40. **Section 404 permit.** "Section 404 permit" means an authorization issued under section 404 of the Clean Water Act, United States Code, title 33, section 1344. A general section 404 permit means a section 404 permit issued pursuant to section 404 of the Clean Water Act, United States Code, title 33, section 1344, paragraph (e).

    Antidegradation requirements are implemented through the issuance and enforcement of control documents for regulated activities which are anticipated to impact the state's surface waters. Section 404 of the CWA establishes programs to regulate the discharge of dredged and fill material into waters of the United States. The responsibility for administering and enforcing section 404 is shared by the ACE and the EPA. The ACE administers the day-to-day program, including individual permit decisions and jurisdictional determinations, developing policy and guidance, and enforcing section 404 provisions. The EPA develops and interprets environmental criteria used in evaluating permit applications, identifies activities that are exempt from permitting, reviews and comments on individual permit applications, enforces section 404 provisions, and has authority to veto ACE permit decisions. The vast majority of CWA section 401 certifications issued by the MPCA are for section 404 permits.

    Section 404 of the CWA provides for two basic types of authorizations: individual and general. Individual section 404 permits are issued for activities that may have significant environmental impacts. General permits are issued for activities that are considered to be similar in nature and will cause only minimal adverse environmental effects when performed separately or cumulatively (40 CFR § 230.7) (Exhibit 75)[75]. The proposed rules include separate antidegradation procedures for section 401 certification of individual and general section 404 permits.

    The proposed definition reasonably provides reference to the federal law authorizing section 404 permits.

41. Subp. 41. **State designated recreational river segment.** "State designated recreational river segment" means a surface water or segment thereof designated as a recreational river under the Minnesota Wild and Scenic Rivers Act, Minnesota Statutes, sections 103F.301 to 103F.345, and described under Minnesota Statutes, section 103F.311, subdivision 4.

Federal antidegradation regulations provide for the maintenance and protection of water quality for waters considered to be outstanding national resources:

> *…such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance…"* 40 CFR § 131.12(a)(3)

It is therefore reasonable that recreational rivers designated under the Minnesota Wild and Scenic Rivers Act (Minn. Stat. §§ 103F.301 to 103F.345) receive protection as outstanding resources. Specifically, state designated recreational river segments are protected under the restricted category of ORVWs which requires water quality protection necessary to maintain their recreational characteristics.

The proposed definition provides reference to the statute which defines "*recreational rivers*" as:

> *… those rivers that may have undergone some impoundment or diversion in the past and may have adjacent lands that are considerably developed, but that are still capable of being managed so as to further the purposes of Minn. Stat. §§ 103F.301 to 103F.345.* Minn. Stat. § 103F.311, subd. 4

42. Subp. 42. **State designated scenic river segment.** "State designated scenic river segment" means a surface water or segment thereof designated as a scenic river under the Minnesota Wild and Scenic Rivers Act, Minnesota Statutes, sections 103F.301 to 103F.345, and described under Minnesota Statutes, section 103F.311, subdivision 7.

Just as state recreational river segments designated under Minn. Stat. ch. 103F are protected as outstanding resources, scenic rivers designated under the same statute already receive protection as restricted ORVWs. The protection of state designated scenic river segments requires water quality protection necessary to maintain their scenic characteristics. The proposed definition provides reference to the statute which defines "*scenic rivers*" as:

> *… those rivers that exist in a free-flowing state and with adjacent lands that are largely undeveloped.* Minn. Stat. § 103F.311, subd. 7

43. Subp. 44. **State designated wild river segment.** "State designated wild river segment" means a surface water or segment thereof designated as a wild river under the Minnesota Wild and Scenic Rivers Act, Minnesota Statutes, sections 103F.301 to 103F.345, and described under Minnesota Statutes, section 103F.311, subdivision 9.

The proposed definition provides reference to state statute which defines "*wild rivers*" as:

> *… those rivers that exist in a free-flowing state, with excellent water quality, and with adjacent lands that are essentially primitive.* Minn. Stat. § 103F.311, subd. 9

State designated wild rivers are protected as prohibited ORVWs because the statutory definition makes explicit reference to the excellent water quality of these waters. The protection of prohibited ORVWs is equivalent to Tier 3 protection specified under [40 § CFR 131.12](a)(3) – meaning that new or expanded discharges to state designated wild river segments are not allowed.

44. Subp. 44. **Total maximum daily load or TMDL.** "Total maximum daily load" or "TMDL" has the meaning given under Minnesota Statutes, 114D.15, subdivision 10.

[Minn. Stat. § 114D.15] defines "total maximum daily load" as:

> *… a scientific study that contains a calculation of the maximum amount of a pollutant that may be introduced into a surface water and still ensure that applicable water quality standards for that water are restored and maintained. A TMDL also is the sum of the pollutant load allocations for all sources of the pollutant, including a wasteload allocation for point sources, a load allocation for nonpoint sources and natural background, an allocation for future growth of point and nonpoint sources, and a margin of safety to account for uncertainty about the relationship between pollutant loads and the quality of the receiving surface water. "Natural background" means characteristics of the water body resulting from the multiplicity of factors in nature, including climate and ecosystem dynamics, that affect the physical, chemical, or biological conditions in a water body, but does not include measurable and distinguishable pollution that is attributable to human activity or influence. A TMDL must take into account seasonal variations.* [Minn. Stat. § 114D.15], subd. 10

This term is used in the proposed rules within the definition of "*control document*", which intentionally excludes TMDLs as control documents. The proposed definition is reasonable because it is included in state statute and thus creates consistency with other state programs involved in water quality protection.

45. Subp. 45. **Unregulated activity.** "Unregulated activity" means an activity that does not require a control document.

This definition is needed to distinguish between activities that require control documents from those that do not. Antidegradation regulatory requirements are implemented through the issuance of control documents governing regulated activities. The proposed rules provide a means of meeting antidegradation requirements through the application of loading offsets, including those involving unregulated activities.

46. Subp. 46. **Water pollution control conditions.** "Water pollution control conditions" means effluent limitations as defined in part 7001.1020, subpart 13 or other conditions specified in a control document that limits water pollution as defined in Minnesota Statutes, section 115.01, subdivision 13.

Defining this term is needed because it is critical to the understanding of "*control documents*" (defined in proposed subp. 10) which are the means through which antidegradation requirements are implemented. The definition is reasonable because [Minn. Stat. § 115.03], subd. 1 gives the MPCA regulatory authority to administer and enforce all laws related to pollution of any of the waters of the state. "*Pollution of water*" and "*water pollution*" is defined in statute as:

> *(a) the discharge of any pollutant into any waters of the state or the contamination of any waters of the state so as to create a nuisance or render such waters unclean, or noxious, or impure so as to be actually or potentially harmful or detrimental or injurious to public health, safety or welfare, to domestic, agricultural, commercial, industrial, recreational or other legitimate uses, or to livestock, animals, birds, fish or other aquatic life; or (b) the alteration made or induced by human activity of the chemical, physical, biological, or radiological integrity of waters of the state.* Minn. Stat. § 115.01, subd. 13

For NPDES permits, the means through which water pollution is controlled is through the application of effluent limitations. An "*effluent limitation*" pertaining to NPDES permits is defined as:

> *…a restriction established by rule or permit condition on quantities, discharge rates, and concentrations of pollutants that are discharged from point sources into waters of the state.* Minn. R. 7001.1020, subp. 13

Examples of restrictions in the above definition include numeric effluent limitations to control wastewater treatment discharges and best management practices (BMPs) to control stormwater discharges. While numeric effluent limits generally restrict the release of pollutants in quantitative terms, "*best management practices*" are:

> *…practices to prevent or reduce the pollution of the waters of the state, including schedules of activities, prohibitions of practices, and other management practice, and also includes treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge, or waste disposal or drainage from raw material storage.* (Minn. R. 7001.1020, sub. 5)

40 CFR § 122.44 (Exhibit 76)[76] requires that each NPDES permit contain applicable conditions, including:

> *Best management practices (BMPs) to control or abate the discharge of pollutants when:*
>
> *(1) Authorized under section 304(e) of the CWA for the control of toxic pollutants and hazardous substances from ancillary industrial activities;*
>
> *(2) Authorized under section 402(p) of the CWA for the control of storm water discharges;*
>
> *(3) Numeric effluent limitations are infeasible; or*
>
> *(4) The practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.* 40 CFR § 122.44 (k) (Exhibit 76)

In EPA's revisions to NPDES storm water regulations the federal agency determined:

> *…that pollutants from wet weather discharges are most appropriately controlled through management measures rather than end-of-pipe numeric effluent limitations.* 64 Fed. Reg., 68722, p. 68753 (Exhibit 77)[77]

Specific to NPDES large and medium municipal separate storm sewer systems (MS4) discharges, 40 CFR § 122.26(d)(2)(iv) (Exhibit 78)[78] requires state NPDES programs to reduce pollutant discharges to the maximum extent practicable (MEP). These regulations do not define MEP allowing for flexibility in MS4 permitting. The pollutant reductions that represent MEP may be different for each MS4, given the unique local hydrologic and geologic concerns that may exist and the differing possible pollutant control strategies. The MEP standard for identifying appropriate BMPs fits well with antidegradation requirements to minimize high water quality degradation to the extent prudent and feasible.

Besides effluent limitations the proposed definition includes *"…other conditions specified in a control document…"* as a means to control water pollution. This is reasonable because the definition of effluent limitation in Minn. R. 7001.1020, subp. 13 is limited to NPDES permits, whereas antidegradation requirements apply to all regulated activities such as those regulated under section 401 certifications. Section 401 of the CWA requires anyone who wishes to obtain a federal license or permit for any activity that may result in a discharge to waters of the United States to obtain a section 401 certification to ensure proposed projects comply with the state's water quality standards. Minn. R. 7001.1470 requires that section 401 certifications issued by the MPCA include terms and conditions necessary to achieve compliance with applicable Minnesota or federal statutes or rules.

47. Subp. 47. **Water quality standard.** "Water quality standard" means a parameter concentration, level, or narrative statement, representing a quality of water that supports a beneficial use. When water quality standards are met, water quality will generally protect the beneficial use.

Although the term "*water quality standard*" is found in Minn. R. ch. 7050 and other state rules governing water quality, it is not defined in Minn. R. 7050.0130 or Minn. Stat. § 115.01. The proposed definition is reasonable because it is consistent with the federal definition of "*criteria*". The term "*water quality standard*" as used in Minn. R. ch. 7050 has the same meaning as the federal term "*criteria*" which is defined in federal regulations as:

> *… elements of State water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use.* 40 CFR § 131.3(b) (Exhibit 68)

C. Determining existing water quality (Proposed Minn. R. 7050.0260)

Subpart 1. **Methods.** Existing water quality shall be determined using methods described in items A to C. The methods are listed in descending order of priority. Lower priority methods shall be used only if higher priority methods are not reasonably available. More than one method shall be used when a single method does not adequately describe existing water quality.

A. Using commissioner-approved monitoring data that exist at the time the determination of existing water quality is undertaken.
B. Monitoring surface waters, provided that samples are collected in a manner and place and of such type, number, and frequency as may be considered necessary by the commissioner to adequately reflect the condition of the surface waters. Samples shall be collected, preserved, and analyzed following accepted quality control and quality assurance methods and according to the procedures in part 7050.0150, subpart 8.
C. Identifying reference surface waters that have similar physical, chemical, and biological characteristics and similar impacts from regulated and unregulated activities.

Subp. 2. **Consideration of existing regulated activities.** For surface waters impacted by activities that are regulated by existing control documents, existing water quality includes surface water conditions that are anticipated at loadings or other causes of degradation authorized in the applicable control documents.

The proposed rules provide a means by which the MPCA determines whether and to what extent existing water quality may be degraded. Therefore, it is necessary for the MPCA to have an understanding of existing conditions before making its determinations, when assessments of existing water quality are reasonable. (A discussion on when assessments of existing water quality are reasonable is presented in Section 5.D.)

Specific components of antidegradation protection that require an understanding of existing conditions include the following:

- The determination of whether surface waters are of high quality.
- The evaluation of the impacts to existing high water quality including the consumption of available assimilative capacity.
- The determination of whether proposed degradation of high water quality is needed for important economic or social development. Without an understanding of existing water quality, it would be impossible for the MPCA to weigh degradation of high water quality against the economic and social benefits resulting from the proposed activity.
- The public's ability to provide meaningful comments regarding the degradation of high water quality.
- The determination of existing uses.

There is also legal precedent for the need to determine existing water quality in antidegradation determinations. In 2005, the Minnesota Court of Appeals found that the MPCA must base its antidegradation analyses on existing conditions, stating that:

> *Without defining what the existing quality of the water is, it is not possible to evaluate whether [a] proposed discharge has been restricted to the extent necessary to preserve that quality…* MCEA v. MPCA, City of Princeton, 696 N.W.2d 95, 108 (Minn. App. 2005), p. 108 (Exhibit 60)

In a 1992 decision, the Ohio Supreme Court ruled that the state must protect high quality (i.e., Tier 2) waters at their current levels unless antidegradation requirements are met. The Court noted that:

> *Even where the prescribed technology is applied, a point source may not discharge effluent which would violate the applicable water quality standards. In the present case, the applicable water quality standard is the **current ambient condition** of Blacklick Creek inasmuch as the antidegradation policy establishes that quality as the benchmark.*
> Columbus and Franklin County Metropolitan Park District v. Shank, 65 Ohio St. 3d 86, 101 (Oh. Sup. Ct. 1992) (emphasis added.) (Exhibit 79)[79]

The proposed approach is reasonable because it provides and prioritizes a number of methods by which existing water quality may be determined. The first choice (Item A) is to use existing and reliable monitoring data, eliminating the need for an applicant to expend resources on monitoring ambient water quality where reliable information exists. The MPCA is available to assist applicants in determining if and what monitoring information is available for the determination of existing water quality. Sources of information may include databases maintained by the EPA, the MPCA and other entities that compile and store reliable water quality monitoring information. Much of this information will likely come from ongoing ambient monitoring programs underway at the MPCA. The MPCA continues to make assessment of the state's waters a priority, and applicants will benefit from these efforts.

When previously collected monitoring data are nonexistent, incomplete, or are of inadequate quality, monitoring is the second choice (Item B) for determining existing quality. This will require the applicant to work closely with MPCA staff in developing protocols that will result in data of sufficient quality to determine existing water quality. Specific protocols are not included in rule for the reasons described below.

- The MPCA cannot predict which parameters will need to be assessed due the wide range of regulated activities seeking coverage under individual control documents and the unique characteristics of each surface water.
- Variability in environmental conditions (e.g., changes in stream flow and volume).
- Variation among the analytical techniques for each assessed parameter and the degree of confidence associated with each technique.

Item B requires sample collection, preservation and analysis be conducted according to procedures in Minn. R. 7050.0150, subp. 8. This requirement is reasonable because the referenced procedures have already been established in rule and are currently implemented in the determination water quality conditions.

The MPCA intends to develop further guidance as it and the regulated community gain more experience in data collection for the purpose of establishing existing water quality for antidegradation assessments. It is likely that methods and protocols will draw from guidance currently used to assess waters for water quality impairments as required under CWA section 303(d) (Exhibit 13).

The final option is to compare the surface water which will be impacted with a similar reference water body (Item C). This is the least preferred option because it may be difficult to find monitoring data from truly representative waters because of differing physical, chemical, and biological characteristics and the diverse activities that impact each water body. However, there may be situations where this type of monitoring data can accurately characterize the water being considered, or where this type of reference water comparison can, in combination with the other types of monitoring data, help to establish existing water quality.

The proposed approach is reasonable also because it is in general alignment with EPA guidance. Guidance from EPA Region 9 recommends the following approach to determining existing water quality for the purpose of antidegradation reviews:

> *First, the State should develop procedures to document the degree to which water quality exceeds that necessary to protect the uses. Ambient monitoring data can be used to provide this documentation. States must adopt procedures to assure that, where little or no data exists, adequate information will be available to determine the existing quality of the water body or bodies, which could be adversely affected by the proposed action.* Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12, U.S. EPA Region 9 (1987), p. 6 (Exhibit 80)[80]

EPA Region 8 guidance suggests that states focus on the pollutants of concern believed to be in the discharge and requests that the applicant collect information wherever possible:

> *Certainly, monitoring and assessing surface water quality is a difficult and ongoing task, and projecting the water quality that will result from proposed activities can be made difficult by the inherent complexity of receiving water systems. The critical issue becomes: How much information and analysis is needed to make the required antidegradation Tier 2 findings, and where information is lacking, who should be responsible for providing it?* EPA Region VIII Guidance: Antidegradation Implementation, Chapter 4, EPA Region 8 (1993), p. 57 (Exhibit 81)[81]

Further guidance suggests that:

> *The applicant may be required to provide monitoring data or other information about the affected water body to help determine the applicability of Tier 2 requirements based on the high-quality test. The information that will be required in a given situation will be identified on a case-by-case basis.*

and

> *Such information may include recent ambient chemical, physical, and biological monitoring data sufficient to characterize, during the appropriate critical condition(s), the existing uses and the spatial and temporal variability of existing quality of the segment for the parameters that would be affected by the proposed activity.* EPA Region VIII Guidance: Economic Antidegradation Implementation, Chapter 2, EPA Region 8 (1993), p. 15 (Exhibit 82)[82]

The EPA's Great Lakes antidegradation guidance (Water Quality Guidance for the Great Lakes System: Supplementary Information Document (SID), U.S. EPA, Office of Water, (1995), (Exhibit 83)[83] also discusses conducting reviews of potential degradation in terms that assume existing water quality data are known or will be collected. The guidance specifies that the level of protection afforded a water body under antidegradation provisions will be determined on a parameter-by-parameter basis, considering each individual pollutant separately from the others present in a water body. The guidance notes that under this approach:

> *… a discharger contemplating an action that would result in an increased loading would identify the constituents of its effluent that would increase as a result of the action. Then,* ***the ambient level of the pollutants of interest would be determined*** *and compared to the applicable criteria. Where ambient concentrations of the pollutants in question are less than criteria concentrations, the water body would be considered high quality for those pollutants and increases in those pollutants would be subject to the requirements applicable to high quality waters.* Water Quality Guidance for the Great Lakes System: Supplementary Information Document (SID)*, U.S. EPA, Office of Water (1995), Section VII (C)(2)(b)(i) (Exhibit 83) (emphasis added)*

Subpart 2 addresses situations when a previously-regulated activity is seeking reissuance of a control document and the actual loading or other cause of degradation is less than what has been permitted in the control document. This paragraph affects wastewater treatment facilities regulated under individual NPDES permits in particular. Wastewater treatment facilities are designed to accommodate population growth or production over time periods longer than the typical five-year NPDES permit cycle. For example, owners/operators of domestic sewage treatment facilities will typically design for loading capacities expected in 20 years and effluent limits set by the MPCA are based accordingly. It is therefore reasonable to determine existing water quality based on conditions which are anticipated at the levels of pollutants authorized to be discharged by the existing control document. The following hypothetical example illustrates this point.

In 2015, a municipal wastewater plant requests preliminary effluent limits from the MPCA for a facility plan that will accommodate the expected population in 2035. The surface water which will be impacted is a Class 2B water and not an ORVW. Antidegradation procedures are required because there is an anticipated net increase in loading from their previous NPDES permit. Pollutant *X* is identified by the MPCA as parameter of concern and the ambient concentration of this pollutant is 10 milligrams per liter (mg/L) at the time of the application. The water quality standard for Pollutant *X* is 100 mg/L, therefore the water is of high quality for that pollutant and there is 90 mg/L of available assimilative capacity. Because the water is of high quality the applicant is required to provide an alternatives analysis to identify the least degrading prudent and feasible alternative. The applicant submits this information to the MPCA for review and the MPCA agrees that the selected alternative will minimize degradation. Based on the selected alternative and the expected design flow needed for the expected population growth, the annual loading of Pollutant *X* will be 800 pounds. This loading will cause the ambient concentration of the pollutant to increase to 40 mg/L and the remaining assimilative capacity will be 60 mg/L. The MPCA's antidegradation review, including the social and economic justification, is based on the impacts (i.e., pollutant concentration and consumption of available assimilative capacity) to the surface water expected in 2035. Effluent limits are included in the draft permit to reflect the projected loading. After receiving comments on the preliminary antidegradation determination, a final determination is made and the NPDES permit is issued in 2016.

In 2021, the permittee requests reissuance of the permit and the anticipated projected loading needs have not changed. The actual annual loading of Pollutant *X* at the time of the request is 400 lbs. Under the proposed rules, antidegradation procedures regarding Pollutant *X* are not required because loading limits in the previous permit and the final antidegradation determination accounted for future growth. However, this does not mean that an antidegradation review will not be required for other pollutants. For example, in the five-year time period between permit reissuance, the MPCA may become aware of other pollutants that were not of concern, and therefore not addressed, when following the initial antidegradation procedures.

D. Antidegradation standards when changes in existing water quality are reasonably quantifiable (Proposed Minn. R. 7050.0265)

1. Subpart 1. Scope

   Subpart 1. **Scope.** This part applies to activities regulated by the following control documents:

   A. new, reissued, or modified individual NPDES wastewater permits;
   B. new, reissued, or modified individual NPDES stormwater permits for industrial activities, as defined under part 7090.0080, subpart 6;
   C. new, reissued, or modified individual NPDES stormwater permits for construction activities, as defined under part 7090.0080, subpart 4;
   D. section 401 certifications for new, reissued, or modified individual federal licenses and permits; and
   E. other control documents that authorize net increases in loading or other causes of degradation and where changes in existing water quality of individual surface waters can reasonably be quantified through antidegradation procedures.

   Subpart 1 is needed to identify the range of activities to which the standards apply. Items A to D specifically identify activities regulated under individual wastewater, industrial stormwater and construction stormwater NPDES permits, as well as activities for which CWA section 401 certifications are required for individual federal licenses and permits. Each of these control documents regulates activities that have the potential to impact an individual surface water or a limited number of surface waters, the identity of which are known at the time the activity is proposed. It is therefore reasonable to expect that the existing water quality and projected impacts to that quality can be quantified. Item E extends the scope to other activities not specifically identified but which are regulated under control documents where changes to existing water quality of individual waters can reasonably be quantified. Although the control documents identified in the first four items are those for which the MPCA has current regulatory authority, it is possible that additional regulatory authority will be granted to the MPCA and the scope of this rule will extend to other types of control documents. This provision reasonably provides flexibility to apply antidegradation requirements to similar types of control documents.

2. Subpart 2. Protection of existing uses.

Subp. 2. **Protection of existing uses.** The commissioner shall approve a proposed activity only when existing uses and the level of water quality necessary to protect existing uses are maintained and protected. Evaluation of the maintenance and protection of existing uses includes consideration of:

A. aquatic life that utilizes or is present in or on the surface waters;
B. recreational opportunities in or on the surface waters;
C. hydrologic conditions, geomorphic conditions, water chemistry, and habitat necessary to maintain and protect existing aquatic life or recreation in or on the surface waters; and
D. commercial activity that depends on the preservation of water quality.

Federal antidegradation regulations at [40 CFR § 131.12](a)(1) require that existing uses and the level of water quality necessary to protect those uses be maintained and protected. Existing uses are defined in the proposed rule and federal regulations ([40 CFR § 131.3](e)) (Exhibit 68) as uses actually attained in the water body on or after November 28, 1975. This subpart is needed to fulfill the federal requirement.

This subpart reasonably describes how the MPCA will consider existing use protection. Item A specifies that aquatic life that utilizes or is present in and on the water must be considered. This may include an assessment of projected deterioration to an existing aquatic community, such as a shift from a community of predominately pollutant-sensitive species to pollutant-tolerant species. The evaluation may also consider whether there are aquatic species that depend on the water resource but are not present in the water body at all times. For example, there may be species that utilize the water body for seasonal migratory purposes. Item B allows for consideration of recreational opportunities, such as canoeing or swimming. Item C ensures that not only are the uses themselves protected, but the conditions which provide for those uses are maintained and protected. For example, if a self-sustaining walleye fishery has been in existence since November 28, 1975, protecting the use includes not only sustaining the adult population (which could be achieved through stocking hatchery reared fingerlings), but also maintaining spawning habitat. Item D requires the consideration of commercial activities that depend on the preservation of water quality. Examples of commercial activities dependent on water quality preservation are farms and industries that need clean water for their operations.

3. Subpart 3. Compensatory mitigation; loss of existing uses.

Subp. 3. Compensatory mitigation; loss of existing uses.

A. Except as provided in item D, the commissioner shall allow compensatory mitigation for the loss of an existing use resulting from physical alterations to a water body when:
   (1) prudent and feasible alternatives are not available to avoid or minimize adverse impacts to the existing use;
   (2) the mitigation is sufficient to ensure replacement of the lost existing use;
   (3) the mitigation is accomplished by restoring a previously impacted surface water of the same type or, when restoring is not a prudent or feasible alternative, establishing or enhancing a surface water of the same type;

(4) the mitigation occurs within the same watershed, to the extent prudent and feasible; and
(5) the mitigation is completed before or concurrent with the actual physical alteration, to the extent prudent and feasible.

B. For the purposes of subpart 2 and part 7050.0250, item A, existing uses are maintained and protected when regulated activities involving the physical alterations are in compliance with item A.

C. When the physically altered water body is of high quality, the commissioner shall ensure the requirements specified in subpart 5 are satisfied.

D. The commissioner shall prohibit the loss of existing uses resulting from physical alterations, regardless of the compensatory mitigation proposed, when the proposed activity would physically alter or otherwise degrade the exceptional characteristics of an outstanding resource value water designated in part 7050.0335.

Compensatory mitigation for the loss of aquatic resources resulting from physical alterations is implemented through the issuance of CWA section 404 permits administered by the ACE. As with other federal permits, the MPCA is required to ensure compliance with water quality standards (through the issuance or denial of CWA section 401 certifications) including antidegradation protection of existing uses.

Federal antidegradation regulations at 40 CFR 131.12(a)(1) require that existing uses be maintained and protected. EPA guidance in the interpretation of maintaining and protecting existing uses specifically allows compensatory mitigation, stating that:

> *If a planned activity will foreseeably lower water quality to the extent that it no longer is sufficient to protect and maintain the existing uses in that water body, such an activity is inconsistent with EPA's antidegradation policy, which requires that existing uses are to be maintained. In such a circumstance, the planned activity must be avoided or* ***adequate mitigation*** *or preventive measures must be taken to ensure that the existing uses and the water quality to protect them will be maintained.* Water Quality Standards Handbook, Second Edition, Chapter 4, U. S. EPA (1994), pp. 3-4 (emphasis added)

The above mentioned guidance further states that:

> *A literal interpretation of 40 CFR 131.12(a)(1) could prevent certain physical modifications to a water body that are clearly allowed by the Clean Water Act, such as wetland fill operations permitted under section 404 of the Clean Water Act.* Water Quality Standards Handbook, Second Edition, Chapter 4, U. S. EPA (1994), p. 5

Note that compensatory mitigation is not allowed as an option for all activities that result in degradation of a water body; only for those activities that result in physical alteration as allowed by the CWA. For example, compensatory mitigation will not be allowed when a discharge from a proposed wastewater treatment facility would result in the loss of an existing use. The MPCA anticipates that only those physical alterations permitted under CWA section 404 will be allowed to provide compensatory mitigation for the loss of existing uses.

It is also important to note that the current rule governing nondegradation for all waters addresses physical alterations of wetlands (Minn. R. 7050.0185, subp. 9), but not other water bodies. The subpart is needed to clarify that compensatory mitigation may be applied to water bodies other than wetlands. A memorandum of agreement between the EPA and the ACE regarding the implementation of 40 CFR § 230 (Exhibit 84)[84] (i.e., section 404(b)(1) guidelines for specification of disposal sites for dredged or fill material) states that:

> *In focusing the goal on no overall net loss to wetlands only, EPA and Army have explicitly recognized the special significance of the nation's wetlands resources. This special recognition of wetlands resources does not in any manner diminish the value of other waters of the United States, which are often of high value. All waters of the United States, such as streams, rivers, lakes, etc., will be accorded the full measure of protection under the Guidelines, including the requirements for appropriate and practicable mitigation.* Memorandum of Agreement Between the Environmental Protection Agency and the Department of the Army Concerning the Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines (1990), Section II(B) (Exhibit 85)[85]

It is also evident from the requirements found in 40 CFR § 230 that the section 404(b)(1) guidelines apply to waters other than wetlands. For example 40 CFR § 230.93(e)(3) (Exhibit 86)[86] addresses mitigation requirements for difficult-to-replace resources such as streams.

The MPCA agrees that there are situations where compensatory mitigation is a reasonable option to redress the degradation of an existing use. The proposed rules only allow compensatory mitigation if the specific conditions described in Item A are met. These conditions are reasonable, in part, because they are supported by federal regulations and EPA guidance. In addition to being based in the federal requirements, the proposed conditions are a reasonable way to provide flexibility for development while retaining no net loss of existing uses.

Item A, sub-item 1 provides that compensatory mitigation may be allowed, but only when prudent and feasible alternatives are not available to avoid or minimize adverse impacts to the existing use. This requirement is reasonable because it ensures that compensatory mitigation is allowed only when impacts to existing uses cannot be avoided or minimized, to the extent prudent and feasible. This is consistent with federal regulations governing compensatory for the loss of aquatic resources:

> *Pursuant to these requirements, the district engineer will issue an individual section 404 permit only upon a determination that the proposed discharge complies with applicable provisions of 40 CFR part 230, including those which require the permit applicant to take all appropriate and practicable steps to avoid and minimize adverse impacts to waters of the United States. Practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. Compensatory mitigation for unavoidable impacts may be required to*

> *ensure that an activity requiring a section 404 permit complies with the Section 404(b)(1) Guidelines.* 40 CFR § 230.91(c)(2) (Exhibit 87)[87]

Item A, sub-item 2 provides that compensatory mitigation must be sufficient to ensure replacement of the lost use. EPA guidance states that when a planned activity will result in the loss of an existing use, it:

> *…must be avoided or adequate mitigation or preventive measures must be taken to ensure that the existing uses and the water quality to protect them will be maintained.* Water Quality Standards Handbook, Second Edition, Chapter 4, U. S. EPA (1994), pp. 3-4

Federal regulations governing compensatory mitigation for the loss of aquatic resources require that:

> *Compensatory mitigation requirements must be commensurate with the amount and type of impact that is associated with a particular DA permit.* 33 CFR § 332.3(a)(1) (Exhibit 88)[88]

Unlike the other conditions for compensatory mitigation, the requirement that the mitigation must be sufficient to replace the lost use is not qualified by consideration of prudence and feasibility. The MPCA considers that this requirement is the absolute minimum that must be provided for the loss of an existing use.

Item A, sub-item 3 provides that compensatory mitigation must be accomplished by restoring the existing use of previously impacted water bodies of the same type or, when restoring is not prudent or feasible, establishing or enhancing water bodies of the same type. Federal regulations establish priorities for how mitigation is to be accomplished:

> *Compensatory mitigation may be performed using the methods of restoration, enhancement, establishment, and in certain circumstances preservation. Restoration should generally be the first option considered because the likelihood of success is greater and the impacts to potentially ecologically important uplands are reduced compared to establishment, and the potential gains in terms of aquatic resource functions are greater, compared to enhancement and preservation.* 33 CFR § 332.3(a)(2) (Exhibit 88)

With one exception, subpart 3(A)(3) is in alignment with 33 CFR § 332.3(a)(2) allowing for "*establishing or enhancing*" a water body of the same type when it is not prudent and feasible to "*restore*" a water body. While "*preservation*" is, in certain circumstances, allowed under 33 CFR § 332.3(a)(2), preservation is not included as a method of mitigation in the proposed rules. The MPCA does not expect any scenario where preserving an existing use is a viable option for compensatory mitigation. Preserving an existing use that has not been lost does not replace a lost use.

An example may be helpful in thinking about how restoring, establishing or enhancing water bodies may be used for compensatory mitigation. A company is proposing to expand their operations that would result in the removal of a wetland. The preferred option is restoration because the likelihood of success is greater than establishment and the potential gains in terms of aquatic resource functions and services are greater than enhancement. For example, the company may be able to reclaim a wetland that was lost by previous actions. If restoration is not prudent or feasible, the company may consider constructing a new wetland. For example, the company may be able to enlarge an existing wetland. When establishment of a new wetland is proposed, the MPCA will need assurance through careful design, monitoring and long-term maintenance planning that the functions of the created wetland persist over time. If establishing a new wetland is not prudent or feasible, the company may consider enhancing an existing wetland. For example, the wetland the company proposes to remove contains habitat necessary for migrating waterfowl. Enhancement could be applied by improving the habitat an existing wetland which would accommodate migrating waterfowl. As with created wetlands, the MPCA would need assurance through careful design, monitoring, and long-term maintenance planning to ensure the functions of the enhanced wetland persist over time. In addition, the MPCA would need assurance that other wetland uses are not lost through the enhancement.

Item A, sub-item 4 provides that compensatory mitigation must occur within the same watershed, to the extent prudent and feasible. Federal regulations governing compensatory mitigation state that:

> *In general, the required compensatory mitigation should be located within the same watershed as the impact site …* 33 CFR § 332.3(b)(1) (Exhibit 88)

The MPCA utilizes the following watershed sizes based on United States Geological Survey's Hydrologic Unit Codes (HUC): 4-digit HUC (4 in Minnesota), 6-digit HUC (10 in Minnesota), 8-digit HUC (81 in Minnesota) and 10-digit HUC (5,600 in Minnesota). In recognition of the great variability of watershed sizes and conditions, the above regulations do not specify a mandatory watershed size for implementing a watershed approach to compensatory mitigation. Likewise the proposed rules do not specify the watershed size.

The decision on the mitigation site location is best made on a case-by-case basis in conjunction with the factors identified in Item A. In general, the sequence used for mitigation site selection should identify sites within the same smaller watersheds before considering a location within sequentially larger watersheds. This is reasonable given the ecological benefits of immediate geographic connectivity of restored hydrology and the dependent aquatic life.

This approach also aligns the ACE St. Paul District's policy for wetland compensatory siting sequence which provides the follows steps:

> *Siting Sequence for Project-Specific Compensation Location of Wetland Compensation Site vs. Impact Site*
>
> *(a) on-site;*
>
> *(b) in the same 10-digit HUC watershed (5,600 in MN);*
>
> *(c) in the same 8-digit HUC watershed (81 in MN);*
>
> *(d) in the same modified 6-digit HUC watershed (10 in MN);*
>
> *(e) in the same 4-digit HUC watershed (4 in MN); then*
>
> *(f) statewide.*

> St. Paul District Policy for Wetland Compensatory Mitigation in Minnesota, St. Paul District, USACE, 2009, (Exhibit 89)[89]

Item A, sub-item 5 provides that compensatory mitigation must be completed before or concurrent with the actual physical alteration of the water bodies affected by the proposed activity to the extent prudent and feasible. Federal regulations require:

> *Implementation of the compensatory mitigation project shall be, to the maximum extent practicable, in advance of or concurrent with the activity causing the authorized impacts. The district engineer shall require, to the extent appropriate and practicable, additional compensatory mitigation to offset temporal losses of aquatic functions that will result from the permitted activity.* 33 CFR § 332.3(m), (Exhibit 88)

Timing is an important consideration when applying compensatory mitigation. Delaying mitigation may have significant negative environmental impacts and therefore should be avoided to the extent prudent and feasible. For example, if a proposed activity will result in the loss of use of a water body for migratory waterfowl, it is important that the lapse in the availability of that use be minimized so that impacts to the migration are reduced.

Item B states that when the conditions specified in Item A are satisfied, existing uses will be considered maintained and protected. This prevents potential conflicts with the purpose statement (proposed Minn. R. 7050.0250) and federal antidegradation regulations (40 CFR § 131.12(a)(1)), which require that existing uses be maintained and protected.

Item C provides that if the physically altered water body is of high quality, Tier 2 requirements must be satisfied. This reasonably ensures that physical alteration activities are held to the same standards for the protection of high water quality as other regulated activities.

Item D prohibits the loss of an existing use when the proposed activity would 1) physically alter the exceptional characteristics of a designated ORVW, or 2) otherwise degrade the exceptional characteristics of a designated ORVW. The first prohibition relates to direct physical alterations, such as dredging or filling, of an ORVW. The second prohibition addresses indirect impacts to an ORVW resulting from physical alterations of other water bodies. This prohibition on the loss of any existing use for ORVWs is based in federal regulations which recognize that there may be circumstances when the adverse impacts of an activity are so significant that the discharge may not be permitted regardless of the compensatory mitigation proposed (40 CFR § 230.10 (c), (Exhibit 90)[90]). These prohibited types of significant impacts include adverse effects on "*special aquatic sites*" (40 CFR § 230.10(c)(1)). Minnesota's ORVWs qualify as "*special aquatic sites*" because they possess exceptional characteristics that must be protected from permanent degradation as required in 40 CFR § 131.12(a)(3).

4. Subpart 4. Protection of beneficial uses.

Subp. 4. **Protection of beneficial uses.** The commissioner shall not approve a proposed activity that would permanently preclude attainment of water quality standards.

This proposed requirement is needed to ensure beneficial uses are protected. This provision is reasonable because it comports with federal regulations requiring permit limits to be set at a level that will not cause or contribute to violations of standards (40 CFR § 122.44(d) (Exhibit 91)[91]). Note that a use attainability analysis may be conducted to evaluate whether a beneficial designated use is indeed attainable. When adequate evidence is presented that a beneficial designated use is not attainable the designated beneficial use is changed through rulemaking. (see Minn. R. 7050.0405)

5. Subpart 5. Protection of surface waters of high quality.

Subp. 5. **Protection of surface waters of high quality.** Items A to D apply to surface waters the commissioner determines to be of high quality.

A. The commissioner shall not approve a proposed activity when the commissioner makes a finding that prudent and feasible prevention, treatment or loading offset alternatives exist that would avoid degradation of existing high water quality. When the commissioner finds that prudent and feasible prevention, treatment or loading offset alternatives are not available to avoid degradation, a proposed activity shall be approved only when the commissioner makes a finding that degradation will be prudently and feasibly minimized.
B. The commissioner shall approve a proposed activity only when the commissioner makes a finding that economic or social changes resulting from the proposed activity are important in the geographic area in which degradation of existing high water quality is anticipated. The commissioner shall consider the following factors in determining the importance of economic or social changes:
    (1) economic gains or losses attributable to the proposed activity, such as changes in the number and types of jobs, median household income, productivity, property values, and recreational, tourism, and other commercial opportunities;
    (2) contribution to social services;
    (3) prevention or remediation of environmental or public health threats;
    (4) trade-offs between environmental media; and
    (5) the value of the water resource, including:
        (a) the extent to which the resources adversely impacted by the proposed activity are unique or rare within the locality, state, or nation;
        (b) benefits associated with high water quality for uses such as ecosystem services and high water quality preservation for future generations to meet their own needs; and

(c) factors, such as aesthetics, that cannot be reasonably quantified; and

(6) other relevant environmental, social, and economic impacts of the proposed activity.

C. A proposed activity that would result in degradation of existing high water quality shall be approved only if the commissioner determines that issuance of the control document will achieve compliance with all applicable state and federal surface water pollution control statutes and rules administered by the commissioner.

D. The commissioner shall provide an opportunity for intergovernmental coordination and public participation before allowing degradation of existing high water quality.

Federal antidegradation regulations governing the protection of high water quality require that:

> *Where the quality of the waters exceeds levels necessary to support the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected* ***unless the State finds****, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.* 40 CFR § 131.12(a)(2) (emphasis added)

This subpart fulfills federal antidegradation regulatory requirements to protect high water quality. Specifically, 40 CFR § 131.12(a)(2) prohibits the degradation of high water quality unless the following conditions are met:

- The state finds that allowing degradation is necessary. (Addressed in Item A and discussed below.)
- The state finds that allowing degradation accommodates important economic or social development in the area in which the waters are located. (Addressed in Item B and discussed below.)
- Existing uses must be protected. (Addressed in subparts 2 and 3 and discussed above.)
- The highest statutory and regulatory requirements for all new and existing point sources and all cost effective and reasonable best management practices for nonpoint source controls must be achieved. (Addressed in Item C and discussed below.)
- Decisions allowing for degradation must include intergovernmental coordination and public participation. (Addressed in Item D and discussed below.)

Item A addresses the question of whether the high water quality degradation is necessary. Various EPA guidance documents, as well as some states, refer to this part of antidegradation procedures as the "*necessary test*", "*finding of necessity*" or "*alternatives analysis*". (EPA Region VIII Guidance: Antidegradation Implementation (1993), Chapter 2, p. 19 (Exhibit 82); Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36741 (1998), p. 36783). The proposed rule language is consistent with 40 CFR § 131.12(a)(2), which requires the state to make a formal decision – a finding – that high water quality degradation is necessary. As previously discussed (Section 4.B.2.), the proposed provisions change the standard for decisions regarding high water quality degradation from what the MPCA finds "*acceptable*" (Minn. R. 7050.0185, subp. 1) to what the MPCA finds "*necessary,*" thus bringing Tier 2 protection in alignment with federal regulations.

The MPCA proposes that the determination of necessity be accomplished in a two-step process. The first step ensures that degradation is not permitted when there are prudent and feasible alternatives to avoid net increases in loading or other causes of degradation. The second step ensures that when avoidance is not prudent or feasible, degradation is minimized. This approach reflects EPA guidance, which suggests that states ensure that all feasible alternatives to allowing high water quality degradation have been adequately evaluated and that the least degrading reasonable alternative is implemented (Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36741 (1998), p. 36784). The proposed rules specifically identify prevention, treatment and loading offsets as means through which degradation may be avoided and minimized. Prevention addresses potential sources of pollution prior to the need for treatment or offsets. Treatment entails eliminating or reducing pollution at the permitted facility or site. Loading offsets (defined in proposed Minn. R. 7050.0255, subp. 25 and described in Section 5.B.23.) allow the creation of additional loading capacity in the water where a net increase in loading is proposed.

The "*prudent and feasible*" standard is reasonable because it allows for considerations that are unique to a specific project and the applicant's ability to implement alternatives that avoid or minimize degradation. The need for and reasonableness of including the individual terms is found in Sections 5.B.17. and 5.B.34. Examples of how the terms will be applied in an applicant's antidegradation assessment are provided in Section 5.G.2. The "*prudent and feasible*" standard is also reasonable because it is in alignment with various Minnesota Statutes governing environmental protection, including those regarding the grounds for intervention and judicial review:

> *In any such administrative, licensing, or other similar proceedings, the agency shall consider the alleged impairment, pollution, or destruction of the air, water, land, or other natural resources located within the state and no conduct shall be authorized or approved which does, or is likely to have such effect so long as there is a* ***feasible and prudent alternative*** *consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land, and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct.* Minn. Stat. § 116B.09, subd. 2 (emphasis added)

Regarding environmental policy related to environmental impact statements:

> *No state action significantly affecting the quality of the environment shall be allowed, nor shall any permit for natural resources management and development be granted, where such action or permit has caused or is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a* ***feasible and prudent alternative*** *consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct.* Minn. Stat. § 116D.04, subd. 6 (emphasis added)

A subtle, but very important, distinction between the existing rules and the proposed rules is how determinations are made regarding alternatives that minimize impacts to water quality. Under the current rules, all new or expanded discharges are required to apply control measures that, at minimum, meet water quality standards (Minn. R. 7050.0185, subp. 3). For significant new or expanded discharges the MPCA makes a determination of whether additional control measures (beyond those needed to meet the water quality standards) can reasonably be taken to minimize impacts (Minn. R. 7050.0185, subp. 4). Under this approach the baseline for determining how degradation is to be minimized is the water quality standard necessary to sustain beneficial uses. It is from this point that alternatives are considered and are required if deemed reasonable. Under the proposed rule, the baseline for evaluating alternatives that minimize degradation is not the water quality standard, but existing water quality. This change is reasonable because protecting existing high water quality, and not just the beneficial use, is the intent of Tier 2 protection.

Item B is needed because federal regulatory requirements are very general – stating only that important economic or social development must justify a lowering of high water quality. The regulations say nothing about the methods and data needed to make this justification. The proposed provision strikes a balance between the generality of federal regulations and a system that tries to fit all communities into a single, highly-specified mold. However, local environments and economies are idiosyncratic. Resources, trade and growth trends vary considerably between Burnsville, Duluth and Mankato, for example. This provision requires the MPCA to only approve proposed activities when "*the commissioner makes a finding that economic or social changes resulting from the proposed activity are important in the geographic area in which degradation of existing high water quality is anticipated.*" In other words, the determination of importance involves weighing of benefits resulting from the proposed activity against the loss of water quality. Speaking to decisions regarding the justification for lowering high water quality based on economic or social importance, EPA guidance states that:

> *This provision is intended to provide relief only in a few extraordinary circumstances where the economic and social need for the activity clearly outweighs the benefit of maintaining water quality above that required for "fishable/swimmable" water, and both cannot be achieved. The burden of demonstration on the individual proposing such activity*

> *will be very high.* Water Quality Standards Handbook, Second Edition, Chapter 4, U. S. EPA (1994), p. 7

The requirements of Item B are also in alignment with a legislative directive authorizing and directing the MPCA to:

> *…identify and develop methods and procedures that will ensure that environmental amenities and values, whether quantified or not, will be given at least equal consideration in decision making along with economic and technical considerations.* Minn. Stat. § 116.03 subd. 2(3)

Federal regulations limit the demonstration of importance to "*the area in which the waters are located.*" 40 CFR 131.12(a)(2) The meaning and application of this phrase is important because it puts boundaries around the extent to which economic and social changes are considered. EPA guidance and States' antidegradation provisions have interpreted this phrase in a number of ways.

The EPA's water quality guidance for the Great Lakes identifies "*affected area*" as:

> *The area in which the economic benefits occur should correspond with the* ***area in which water quality is lowered****. Determining the area is a case-by-case decision, made taking into account the pollutants involved as well as the location of the discharge.* Water Quality Guidance for the Great Lakes System: Supplementary Information Document (SID)*, U.S. EPA, Office of Water (1995), Section VII(C)(3)(c)(iii) (Exhibit 83), (emphasis added)*

Additional guidance from EPA Region 9 states that the:

> *Demonstration of important economic or social development entails two steps. First, the party should describe and analyze the current state of economic and social development in the area that would be affected. The purpose of this step is to determine the "baseline" economic and social status of the affected community, i.e., the measure against which the effect of the water quality downgrade is judged.* ***The area's use or dependence upon the water resource affected by the proposed action should be described in the analysis****.* Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12, U.S. EPA Region 9 (1987), p. 9 (Exhibit 80), (emphasis added)

Colorado's implementation procedures state that:

> *The "area in which the waters are located" shall be determined from the facts on a case-by-case basis. The area shall include all* ***areas directly impacted by the proposed regulated activity****.* The Basic Standards and Methodologies for Surface Water Antidegradation Policy (5 CCR 1002-3)*,* Colorado Department of Public Health and Environment Water Quality Commission (Regulation No. 31) (2007),p. 18 (Exhibit 92)[92], (emphasis added)

In decisions regarding whether to allow new sources, North Dakota's procedures define "*zone of influence*" as that:

> *...determined as appropriate for the parameter of concern, the characteristics of the receiving waterbody (e.g., lake versus river, etc.), and other relevant factors.* NDAC Chapter 33-16-02, Standards of Quality for Waters of the State, Appendix IV (North Dakota Implementation Procedure) (2001), p. 39 (Exhibit 93)[93]

Indiana's rules address this topic by stating that:

> *Any person requesting a new or increased loading that would cause a lowering of water quality that is not exempt under section 4 of this rule shall submit the information described in this section to the commissioner to support the commissioner's determination that the proposed new or increased loading is necessary and accommodates important social or economic development in the area of the loading. The following basic information must be submitted: ... (3) The location of the proposed discharge and a map of the area of the proposed discharge that shows the **receiving water or waters that would be affected by the new or increased loading, including the area downstream of the proposed discharge**.* Indiana Administrative Code, Title 327, Article 2, Section 5(a)(3) (2012) (Exhibit 94)[94] (emphasis added)

Arizona's implementation procedures provide that:

> *If the proposed discharge is determined to be necessary to accommodate important economic or social development in the area in which the **affected waters** are located, the substance and basis for that preliminary determination shall be documented and the Tier 2 review shall continue.* Antidegradation Implementation Procedures, Arizona Department of Environmental Quality, 2008, p. 7-3 (Exhibit 95)[95] (emphasis added)

What appears to be consistent in EPA guidance and other States' provisions is that "*in the area in which the waters are located*" means areas where degradation of high water quality due to a regulated source is anticipated, including downstream waters. This is the approach taken the proposed rules.

Findings of importance will be made on a case-by-case basis depending on the parameter in question and the characteristics of the waters that will be impacted. This presents wide-ranging possibilities for the physical area that is considered when demonstrating the importance of lowering high water quality. Take, for example, the discharge of pollutants creating biochemical oxygen demand (BOD) to a river segment. The impacted waters may be found in a relatively small area because BOD is typically attenuated rapidly in the water column and oxygen concentrations return to upstream conditions over a relatively small distance and time. On the other hand, the discharge of mercury, a bioaccumulative and persistent pollutant, to the same river segment has the potential to impact downstream waters a relatively large distance from the discharge site.

Item B requires the MPCA to consider a number of factors in the finding of importance identified in the sub-items. Sub-item 1 specifically addresses economic gains and losses attributable to the activity. These reasonably include, but are not limited to, changes in the number and types of jobs, median household income, productivity, property values, and recreational, tourism and other commercial opportunities. Note that changes in job numbers could reflect unemployment changes.

Sub-item 2 addresses the requirement in 40 CFR § 131.12(a)(2) that states' decisions regarding the lowering of high water quality include consideration of important social development. The proposed provision articulates this requirement as "*contribution to social services*" which is more easily quantified than "*social development.*" Contributions to social services may include activities that improve education or community health. An example of how lowering of high water quality may contribute to improved education is an extension of sewer services (and associated increased loadings) to a rural area where a new school is needed. An example of how degrading high water quality may be justified for needed community health is additional loading resulting from a city's plans to provide sewer connections to previously unsewered communities where there has been a history of septic system failures.

Sub-item 3 requires the consideration of preventing or remediating environmental or public health threats. For example, the MPCA would evaluate whether the expansion of a wastewater treatment facility would prevent or mitigate downstream public health concerns.

Sub-item 4 addresses trade-offs between environmental media. Such trade-offs, for example, may include impacts to groundwater and surface water. A city may have porous soil conditions that would affect decisions on how much infiltration to groundwater would be safe to protect those reliant on wells as a potable water source. Impacts to air quality may be an issue when considering energy-intensive treatment options for wastewater. Land use may be a concern if a wastewater treatment facility is disposing toxic-laden sludge.

Sub-item 5 requires evaluation of the water body's value. Where reasonable, the value of the water resource may be quantified in economic terms to address preserving unique or rare species, ecosystem services, preserving high water quality for future generations and the aesthetics associated with a given resource.

Ecosystem services, which are the benefits people obtain from ecosystems, may be divided into four categories – supporting, provisioning, regulating and cultural. Supporting services are those that are necessary for the production of all other ecosystem services. Examples include nutrient recycling and primary production. These services make it possible for the ecosystems to provide services such as food supply, flood regulation and water purification. Providing services are those products obtained from ecosystems such as food, raw materials, genetic resources and energy. Regulating services are benefits obtained from the regulation of ecosystem process. Examples include waste decomposition and detoxification, and diseases control. Cultural services are nonmaterial benefits people gain from the ecosystem. Examples include spiritual and historical enrichment, scientific discovery, recreation and aesthetic enjoyment.

In making a finding as to whether a given regulated activity is important, the MPCA will also need to consider the value of assimilative capacity to accommodate the needs of future generations as declared in the state's environmental policy statement (Minn. Stat. § 116D.02). For example, it would not be prudent to permit the consumption of all the remaining assimilative capacity of a water body when future growth and resulting need for some assimilative capacity is anticipated.

Sub-item 6 provides the flexibility needed to make determinations of importance based on other relevant factors. These importance determinations are made on a case-by-case basis and include potentially very wide-ranging activities and factors not expressed in the previous sub-items. Therefore, the MPCA believes it is reasonable to allow for the consideration of additional factors.

Due to the complexities and idiosyncratic nature of importance evaluations, the MPCA is not providing a quantitative threshold by which importance is determined. As the Washington State implementation guidance manual points out, one of the key purposes of the socioeconomic evaluation is to:

> *…set the stage for a public discussion on the relative merits and tradeoffs associated with allowing water quality to be degraded.* Water Quality Program Guidance Manual, Supplemental Guidance on Implementing Tier II Antidegradation, Department of Ecology, State of Washington (2011), p. 11 (Exhibit 96)[96]

Washington's guidance goes on to explain that if the lowering of water quality resulting from the preferred alternative is not in the overriding public interest (OPI), then the agency must deny the permit. If the lowering of water quality is found to be in the overriding public interest, this finding is documented and submitted for public comment along with the draft permit incorporating the preferred alternative.

Like Washington State's approach to determining OPI, the proposed rule uses do not contain specific thresholds for the determination of importance. As expressed in Washington State guidance:

> *Whether based on qualitative or quantitative information, however, the fact that the OPI evaluation includes issues of varying human values means that the results and how they are interpreted are subjective in nature. Rather than trying to identify strict cost-to-benefit ratios, Ecology's final decision is most appropriately focused on identifying those actions that are clearly not in the overriding public interest.* Water Quality Program Guidance Manual, Supplemental Guidance on Implementing Tier II Antidegradation, Department of Ecology, State of Washington (2011), pp. 11-12 (Exhibit 96)

In its determination of importance for complex projects, the MPCA may rely, in part, on the EPA's Interim Economic Guidance for Water Quality Standards, U.S. EPA (1995) (Exhibit 97)[97]. Chapter 5 of the Guidance focuses on antidegradation and essentially helps states determine whether the social and economic benefits of a project outweigh the costs of lowering water quality.

Item C is needed to fulfill the federal regulatory requirement that, before allowing the lowering of high water quality,:

> *… the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control…* 40 CFR 131.12(a)(2)

In their interpretation of this language, EPA guidance suggests that states require permits be in compliance, or there be adequate assurance that existing compliance problems will be resolved, before allowing degradation on high water quality.

> *The rationale behind the antidegradation regulatory statement regarding achievement of statutory requirements for point sources and all cost effective and reasonable BMPs for nonpoint sources is to assure that, in high quality waters, where there are existing point or nonpoint source control compliance problems, proposed new or expanded point sources are not allowed to contribute additional pollutants that could result in degradation. Where such compliance problems exist, it would be inconsistent with the philosophy of the antidegradation policy to authorize the discharge of additional pollutants in the absence of adequate assurance that any existing compliance problems will be resolved.* Water Quality Standards Handbook, Second Edition, Chapter 4, U. S. EPA (1994), p. 8

The provision in Item C is reasonable because it is in alignment with existing Minnesota rules governing final determinations on permit issuances:

> *Subpart 1. Agency action.*
>
> *Except as provided in subpart 2, the agency shall issue, reissue, revoke and reissue, or modify a permit if the agency determines that the proposed permittee or permittees will, with respect to the facility or activity to be permitted, comply or will undertake a schedule of compliance to achieve compliance with all applicable state and federal pollution control statutes and rules administered by the agency, and conditions of the permit and that all applicable requirements of Minnesota Statutes, chapter 116D, and the rules adopted under Minnesota Statutes, chapter 116D, have been fulfilled. For solid waste facilities, the requirements of Minnesota Statutes, section 473.823, subdivisions 3 and 6, must also be fulfilled.*
>
> *Subp. 2. Agency findings.*
>
> *The following findings by the agency constitute justification for the agency to refuse to issue a new or modified permit, to refuse permit reissuance, or to revoke a permit without reissuance:*
>
> *A. that with respect to the facility or activity to be permitted, the proposed permittee or permittees will not comply with all applicable state and federal pollution control statutes and rules administered by the agency, or conditions of the permit;*
>
> *B. that there exists at the facility to be permitted unresolved noncompliance with applicable state and federal pollution control statutes and rules administered by the agency, or conditions of the permit and that the permittee will not undertake a schedule of compliance to resolve the noncompliance;*
>
> *C. that the permittee has failed to disclose fully all facts relevant to the facility or activity to be permitted, or that the permittee has submitted false or misleading information to the agency or to the commissioner;*

D. *that the permitted facility or activity endangers human health or the environment and that the danger cannot be removed by a modification of the conditions of the permit;*

E. *that all applicable requirements of Minnesota Statutes, chapter 116D and the rules adopted under Minnesota Statutes, chapter 116D have not been fulfilled;*

F. *that with respect to the facility or activity to be permitted, the proposed permittee has not complied with any requirement under parts 7002.0210 to 7002.0310 or chapter 7046 to pay fees;*

G. *that with respect to the facility or activity to be permitted, the proposed permittee has failed to pay a penalty owed under Minnesota Statutes, section 116.072; or*

H. *for a solid waste transfer facility, that the permittee has received an agency permit but has failed to build and operate the permitted facility within the term of the permit.* Minn. R. 7001.0140, subparts 1 and 2.

This language focuses on the compliance status of the facility that is the subject of the permit. In some cases there may be noncompliance with water quality standards because of other facilities. In these cases, where there are upstream compliance problems, the MPCA does not intend to deny permit issuance based on antidegradation reviews for a new or expanded activity that is in compliance. Doing so would be unfair to the new or expanding activity. Therefore, provided there is reasonable assurance of future compliance, required controls on existing regulated sources will not need to be fully achieved before authorizing a proposed activity. Reasonable assurance would include a permit, schedule of compliance, or other enforceable document requiring future compliance.

It is important to remember that persons interested in a proposed activity and its impact to water quality will be given the opportunity to weigh in on the MPCA's preliminary determination including the assurance of controls.

An important sub-topic that needs to be addressed is the applicability of antidegradation implementation to nonpoint (i.e., unregulated) source controls. Federal regulatory language requires "*all cost-effective and reasonable best management practices for nonpoint source control*" (40 CFR § 131.12(a)(2)) be achieved before allowing the lowering of high water quality. This has led to confusion as to whether states are required to establish and implement BMPs for nonpoint sources before allowing degradation. EPA guidance addresses this question by stating that:

> *Section 131.12(a)(2) does not REQUIRE a State to establish BMPs for nonpoint sources where such BMP requirements do not exist.*
>
> *We interpret Section 131.12 (a) (2) as REQUIRING States to adopt an antidegradation policy that includes a provision that will assure that all cost-effective and reasonable BMPs* ***established under State authority*** *are implemented for nonpoint sources before the State authorizes degradation of high quality waters by point sources.* Interpretation of Federal Antidegradation Regulation Requirement, U.S. EPA memorandum from Tudor T. Davies (Director, Office of Science and Technology) to Water Management Division Directors (Regions I-X) (1994), (Exhibit 98)[98], (emphasis added)

The proposed rules clarify that antidegradation standards apply to those activities which require a control document (See proposed Minn. R. 7050.0265, subp. 1 and Minn. R. 7050.0270, subp. 1). As discussed in Section 5.B.46., control documents specify water pollution control conditions, including BMPs established under State authority, under which a regulated activity is allowed to operate.

Item D is needed to fulfill the federal regulatory requirement (40 CFR § 131.12(a)(2)) for intergovernmental cooperation and public participation before allowing the degradation of high water quality. Like the existing rules, the proposed rules provide an opportunity for comment through processes found in Minn. R ch. 7001. This is a reasonable approach because they are existing procedures that have proven to be an effective way of receiving comments. Federal regulations separate "*intergovernmental coordination*" and "*public participation*". The proposed rules combine "*intergovernmental coordination*" and "*public participation*" by providing the opportunity for comment from any entity interested in a proposed activity. Minn. R. 7001.0100**,** subpart 5 (B) requires the distribution of the public notice to all persons who have registered their names and addresses on the mailing list established under Minn. R. 7001.0200. MPCA maintains a public notice list satisfying this requirement. The list includes local governments, federal and state agencies, and other officials which have an interest in the MPCA's permit issuances. Minn. R. 7001.0100, subpart 5 (B) incorporates by reference the requirements of Minn. R. 7001.0660, subpart C which requires additional notification of certain local governments, federal and state agencies, and other officials for draft permits.

6. Subpart 6. Protection of restricted outstanding resource value waters.
   Subp. 6. **Protection of restricted outstanding resource value waters.** The commissioner shall restrict a proposed activity in order to preserve the existing water quality as necessary to maintain and protect the exceptional characteristics for which the restricted outstanding resource value waters identified under part 7050.0335, subparts 1 and 2, were designated.

Minnesota, like a number of other states, has elected to provide a fourth level of protection more stringent than Tier 2, yet less stringent than Tier 3. The extra protection level in states' antidegradation policy is permissible under section 510 of the CWA (Federal Water Pollution Control Act, 33 U.S.C. § 1370 (1972, as amended) (Exhibit 74). This level of protection (referred to as Tier 2.5 in some states) is provided to water bodies specifically designated in the current rule (Minn. R. 7050.0180, subp. 6 through subp. 6b) and the proposed rules (Minn. R. 7050.0335, subp. 1) as restricted ORVWs. The MPCA is not proposing to add or remove restricted ORVWs in this rulemaking.

The proposed provision does not fundamentally change how restricted ORVWs are currently protected, but provides clarification. The current rule protecting restricted ORVWs states that:

> *No person may cause or allow a new or expanded discharge of any sewage, industrial waste, or other waste to any of the following waters unless there is not a prudent and feasible alternative to the discharge...*

and,

> *If a new or expanded discharge to these waters is permitted, the agency shall restrict the discharge to the extent necessary to preserve the existing high quality, or to preserve the wilderness, scientific, recreational, or other special characteristics that make the water an outstanding resource value water.* Minn. R. 7050.0180, subp. 6

In other words, the current rule allows for water quality degradation of restricted ORVWs when there are no reasonable alternatives to a new or expanded discharge. Where discharges that degrade water quality are allowed, the characteristics for which the water was designated must still be preserved. The existing rules also state that the MPCA shall "*restrict,*" not necessarily "*prohibit*" the discharge. As discussed below, there may be situations where a complete prohibition of a discharge is inappropriate. In some cases a discharge from a proposed activity can be modified so that it does not cause any degradation of the characteristics for which the water is identified as outstanding. In this situation there is no need to prohibit the activity, but it may be necessary to impose conditions or restrictions to protect the exceptional characteristics.

The proposed provision is very similar to that found in the current rule, with two notable changes.

- Clarification regarding *"high water quality"*
- The phase "*existing high water quality*" is changed to "*existing water quality*" because the existing water quality of some parameters found within restricted ORVWs may not be of high quality as defined in the proposed rules.
- Exceptional characteristics
- The phase "*wilderness, scientific, recreational, or other special characteristics*" found in the current rule is replaced with "*exceptional characteristics,*" which is defined in the proposed rules.

It is reasonable to maintain the level of protection currently afforded to restricted ORVWs because there are waters that possess unique characteristics, yet may not have exceptional water quality. For example, many of the restricted ORVWs were designated as such because of their designation as "*scenic*" and "*recreational*" segments under the Minnesota Wild and Scenic Rivers Act (Minn. Stat. § 103F.301 through Minn. Stat. § 103F.345). The Rum River provides an example of a water body with multiple ORVW designations, since it has all three of the Minnesota Wild and Scenic River Act's classifications (wild, scenic and recreational). The 5.3 mile reach of the Rum River from the Ogechie Lake spillway (excluding the shore of Shakopee Lake) to the river's northernmost confluence with Lake Onamia is classified as a wild river. This classification is reserved for rivers "*…that exist in a free-flowing state with excellent water quality and with adjacent lands that are essentially primitive.*" Minn. R. 6105.0060, subp. 2. Under that same subpart the term "*excellent water quality*" means that, "*…the water quality is in or approaches natural condition with no significant evidence of human activities.*" In other words, a wild river's water quality is representative of pre-settlement conditions. Because of this reach's excellent water quality, the MPCA classifies this reach as a prohibited ORVW and protects it accordingly. Downstream of the prohibited reach the river alternates between the "*scenic*" and the "*recreational*" classifications. The same part of Minn. R. ch. 6105 defines "*scenic rivers*" as those rivers, "*…that exist in a free-flowing state and with adjacent lands that are* *largely undeveloped…"* and "*recreational rivers*" as, "*…those rivers that may have undergone some impoundment or diversion in the past and that may have adjacent lands which are considerably developed, but that are still capable of being managed so as to further the purposes of this act*" (i.e. Minnesota Wild and Scenic Rivers Act). Again, it is important to note that exceptional water quality itself is not a factor for the designation of either scenic or recreational rivers or river segments.

So how will restricted ORVWs be protected under the proposed rules? The water quality necessary to maintain the characteristics for which the water body was designated will not be allowed to degrade. However, high water quality not associated with designation characteristics may be lowered, but only when both Tier 1 and 2 protection requirements are satisfied. For example, an applicant proposes an activity that will discharge copper to a restricted ORVW that was designated for its scenic characteristics. Through an assessment of existing water quality it is found that the copper concentration of the surface water at the point of the proposed discharge is better than the Class 2 water quality standard for copper. Because an increase in copper would not impact the scenic characteristics of the water, the MPCA may allow the discharge if certain conditions are met. These conditions include a demonstration that the discharge is necessary to accommodate important economic or social development, existing and beneficial uses are fully protected, and the public has had an opportunity to comment.

7. Subpart 7. Protection of prohibited outstanding resource value waters.

   Subp. 7. **Protection of prohibited outstanding resource value waters.** The commissioner shall prohibit a proposed activity that results in a net increase in loading or other causes of degradation to prohibited outstanding resource value waters identified under part 7050.0335, subparts 3 and 4.

   Federal antidegradation regulations at 40 CFR § 131.12(a)(3) require that high water quality of outstanding national resource waters be maintained and protected. This level of protection, often referred to as Tier 3 protection, is reserved for water bodies that possess extraordinary or unique water quality characteristics. In most cases these waters have minimal human impacts. The EPA interprets "*maintained and protected*" as no new or increased discharges that would result in lower water quality, except for when discharges result in temporary changes to water quality (Water Quality Standards Handbook, Second Edition, Chapter 4, U.S. EPA (1994), p. 10).

   This provision is needed to fulfill the federal regulatory requirements found in 40 CFR § 131.12(a)(3). Subpart 7 provides the same level of protection for prohibited ORVWs found in the current rule. The proposed rules, however, remove the specific provision for discharges upstream of ORVWs found in the current rule:

   > *The agency shall require new or expanded discharges to waters that flow into outstanding resource value waters be controlled so as to assure no deterioration in the quality of the downstream outstanding resource value water.* Minn. R. 7050.0180, subp. 9

This provision is no longer needed because the proposed rules simply require the MPCA to prohibit activities that would result in a net increase in loading to or otherwise degrade prohibited ORVWs. It does not matter whether the discharge is directly to the ORVW or to an upstream water - the prohibited ORVW would be degraded in either case.

As with restricted ORVWs, the proposed language does not use the term "*high quality waters*" found in federal regulations, but instead prohibits net increases in loading or causes of degradation to "*existing water quality.*"

8. Subpart 8. Protection against impairments associated with thermal discharges.

   Subp. 8. **Protection against impairments associated with thermal discharges.** When there is potential for water quality impairment associated with thermal discharges, the commissioner's allowance for existing water quality degradation shall be consistent with section 316 of the Clean Water Act, United States Code, title 33, section 1326. When a variance is granted under section 316(a) of the Clean Water Act, United States Code, title 33, section 1326, antidegradation standards under this part still apply.

   This provision is needed to fulfill the requirements found at 40 CFR § 131.12(a)(4) which requires States' antidegradation provisions to be consistent with section 316 of the CWA (Exhibit 99)[99] when there are potential thermal impairments. Thermal discharges are subject to the best practicable and best available control technology requirements. However, if a thermal discharger can demonstrate that a thermal standard is more stringent than that necessary to protect the propagation of fish, shellfish, and wildlife, the state may set a less stringent standard. EPA antidegradation guidance states that:

   > *...section 131.12 (a)(4) of the regulation is intended to coordinate the requirements and procedures of the antidegradation policy with those established in the Act for setting thermal discharge limitations. Regulations implementing section 316 may be found at 40 CFR § 124.66. The statutory scheme and legislative history indicate that limitations developed under section 316 take precedence over other requirements of the Act.* Water Quality Standards Handbook, Second Edition, Chapter 4, U.S. EPA (1994), p. 2

   Current nondegradation provisions fulfill the 40 CFR § 131.12(a)(4) requirement. This is clearly stated in the rule governing ORVWs (Minn. R. 7050.0180, subp. 10). The requirement is met indirectly in the rule governing all waters:

   > *Any person authorized to maintain a new or expanded discharge of sewage, industrial waste, or other waste, whether or not the discharge is significant, **shall comply with** applicable water quality standards of this chapter and effluent limits in chapter 7053 and **other applicable federal** and state **point source treatment requirements**.* Minn. R. 7050.0185, subp. 3 (emphasis added)

   The proposed provision adds clarity that even when less stringent standards are set (as allowed by section 316 of the CWA (Exhibit 99)), antidegradation procedures are still required if a proposed activity is anticipated to result in a net increase in loading or other causes of degradation. In other words, thermal discharges allowed by a variance are not exempt from antidegradation procedures because high water quality may still be degraded.

E. Antidegradation standards when changes in existing water quality are not reasonably quantifiable (Proposed Minn. R. 7050.0270)

1. Subpart 1. Scope.

   Subpart 1. **Scope.** This part applies to activities regulated by the following control documents:

   A. new, reissued, or modified individual NPDES stormwater permits for municipal separate storm sewer systems, as defined under part 7090.0080, subpart 8;

   B. new, reissued, or modified general NPDES permits;

   C. section 401 certifications for new, reissued, or modified general federal licenses and permits; and

   D. other control documents that authorize net increases in loading or other causes of degradation and where changes in existing water quality of individual surface waters cannot reasonably be quantified through antidegradation procedures.

   Subpart 1 is needed to identify the range of activities to which the antidegradation standards apply. Items A to C specifically identify activities regulated under individual NPDES permits for municipal stormwater activities and general authorizations (e.g., general NPDES permits and CWA section 401 certifications of general federal licenses and permits). These types of control documents allow impacts to potentially numerous surface waters. The identity of which individual waters may be impacted is not known when the control document is issued. It is therefore reasonable not to expect that the existing water quality of the waters and projected impacts to that quality can be quantified. Item D requires antidegradation standards to be applied to other activities regulated under control documents where changes to existing water quality of individual waters cannot reasonably be quantified. Although the control documents identified in the first three items are those for which the MPCA intends to apply the standards under current regulatory authority, it is possible that other control documents could be required if additional regulatory authority is granted to the MPCA for currently unregulated activities. This provision reasonably provides flexibility if this were to happen and would avoid additional future changes to the proposed rule.

   General authorizations are provided to categories of permittees whose operations, emissions, activities, discharges, or facilities are the same or substantially similar. They are typically issued prior to knowing who will seek coverage, when applicants will seek coverage, how many applicants will seek coverage, and which surface waters will be impacted. The issuance of general authorizations provide for administrative efficiency where there are large numbers of applicants/permittees. For example, between 2008 and 2012, the MPCA provided coverage under the NPDES general construction stormwater permit for an average of 2,023 permittees each year. Requiring an assessment of existing water quality for each action covered under a general authorization is not reasonable given the large number of actions covered and the lack of site-specific information when the authorization is issued.

In the case of municipal storm sewer systems, individual and general permit coverage is provided for activities that have the potential to impact all surface waters of the state within the entity's jurisdiction. It is not reasonable for the applicant or the MPCA to know which individual waters will be impacted over the life of the permit. Given the numerous (sometimes hundreds) waters of the state within each applicant's jurisdiction which may potentially be impacted, it is not reasonable to require water quality assessments on each.

2. Subpart 2. Protection of existing uses.

Subp. 2. **Protection of existing uses.** The commissioner shall issue control documents that will maintain and protect existing uses.

This provision is needed to fulfill federal antidegradation regulatory requirements to maintain and protect existing uses. Note that these standards do not provide for compensatory mitigation for the loss of existing uses, as was provided in the previous standards. Compensatory mitigation requires assessments of individual water bodies on a case-by-case basis. Where compensatory mitigation is allowed, the previous standards apply.

3. Subpart 3. Protection of beneficial uses.

Subp. 3. **Protection of beneficial uses.** The commissioner shall not issue a control document that would permanently preclude attainment of water quality standards.

As with the previous standards, this requirement is needed to ensure the protection of beneficial uses. The reasoning is the same in that this requirement comports with federal regulations requiring permit limits to be set at a level that will not cause or contribute to violations of standards (40 CFR § 122.44(d) (Exhibit 91)).

4. Subpart 4. Protection of surface waters of high quality.

Subp. 4. **Protection of surface waters of high quality.**

A. For the purpose of this part and on a parameter-by-parameter basis, Class 2 surface waters not identified as impaired pursuant to section 303(d) of the Clean Water Act are considered of high quality. Items B to E apply to Class 2 surface waters that are of high quality.

B. The commissioner shall not issue a control document when the commissioner makes a finding that prudent and feasible prevention, treatment or loading offset alternatives exist that would avoid net increases in loading or other causes of degradation. When the commissioner finds that prudent and feasible alternatives are not available to avoid net increases in loading or other causes of degradation, a control document shall only be issued when the commissioner makes a finding that the issuance of the control document will prudently and feasibly minimize net increases in loading or other causes of degradation.

C. The commissioner shall issue a control document that authorizes a net increase in loading or other causes of degradation only when the commissioner makes a finding that the issuance of the control document accommodates important economic or social change.

D. The commissioner shall issue a control document that would result in a net increase in loading or other causes of degradation to waters of high quality only if the commissioner determines that issuance of the control document will achieve compliance with all applicable state and federal surface water pollution control statutes and rules administered by the commissioner.

E. The commissioner shall provide an opportunity for intergovernmental coordination and public participation before issuing a control document that would result in net increases in loading or other causes of degradation.

These proposed Tier 2 protection standards are similar to proposed Minn. R. 7050.0265, subp. 5 which are standards applied when changes in existing water quality are reasonable quantifiable. Both standards contain provisions to minimize impacts, provide justification based on economic or social importance, require compliance with state and federal surface water pollution control statutes and rules, and allow for public participation. There are, however, three distinct differences between the two standards. The first is the difference in how high water quality is identified. Under the previous standards (proposed Minn. R. 7050.0265), high water quality is determined by the applicant's (and the MPCA's subsequent review or) assessment of existing water quality conditions of individual receiving waters. This is reasonable given the types activities/control documents (e.g., individual permits for wastewater activities) which are subject to the standards. Proposed Minn. R. 7050.0270, subp. 4(A) provides that high water quality be identified as those Class 2 surface waters not identified as impaired. Relying on previous 303(d) assessments to identify high water quality is reasonable because it is not realistic to make assessments of individual waters for each activity covered under the applicable control documents (e.g., general permits).

The second is that Tier 2 decisions in these standards are based on net increases in loading or other causes of degradation, not degradation itself as in the previous standards. Note that degradation is defined as a human-induced measureable decrease in existing water quality.

The third difference is how the determination of importance is made. Federal antidegradation regulations state that high water quality must be maintained unless a state finds "*…that allowing lower water quality is necessary to accommodate important economic or social development…*" (40 CFR § 131.12(a)(2)). The phrase "*lower water quality*" implies that existing conditions of a surface water and impacts to that water quality resulting from a proposed activity can reasonably be assessed before the activity is allowed. The demonstration of importance can then be made by weighing the detriments of lowering of water quality against the economic or social benefits resulting from the proposed activity. This is how the importance determination is made in the previous standards. The demonstration of importance is particularly challenging for activities where individual assessments of water quality are not reasonable. In the case of individual municipal stormwater permits and general permits, the MPCA will need to evaluate the economic or social benefits of issuing the control documents despite not knowing which waters will be degraded and by how much. This is a reasonable approach given the numerous water bodies and activities covered under individual municipal stormwater permits and general permits.

It is worth noting that the same general approach to implementing antidegradation through general permits is taken by Washington State – an approach approved by EPA Region 10 (EPA Review of the 2003 Water Quality Standards for Antidegradation, USEPA Region 10 (May 2, 2007) (Exhibit 100)[100]. In regards to the federally-required importance demonstration, Washington's guidance provides that:

> *Ecology's decision to develop a general permit or a control program for a type of pollutant source is considered in the overriding public interest because it takes into account the costs and benefits of permitting a large number of activities in the most effective and efficient way possible, thus saving public funds while protecting water quality.* Water Quality Program Guidance Manual: Supplemental Guidance on Implementing Tier II Antidegradation, Department of Ecology, State of Washington, (2011) p.17 (Exhibit 96)

Note that Washington does not attempt to assess impacts to individual water bodies and weigh those impacts against the net benefits of the activities covered under the permit, but rather states that the decision to develop a general permit is, in itself, in the overriding public interest (i.e., accommodates important economic or social development).

This approach is in alignment with at least one scholarly analysis of implementing antidegradation requirements through general NPDES permits:

> *…the final general permit must contain a determination that* ***authorization of the discharge*** *is necessary for "economic and social development." This would reflect a formal determination for state-issued general permits. J. M. Gaba,* Generally Illegal: NPDES General Permits Under the Clean Water Act, Harvard Environmental Law Review, Vol. 31, (2007) p. 455 (Exhibit 101)[101] (emphasis added)

Again note that, for general NPDES permits, the determination of importance is not based on the lowering of high water quality but the authorization of the activity.

It is important to remember that the MPCA has the ability to require individual permit coverage when it determines that general permit coverage is not appropriate (Minn. R. 7001.0210, subp. 6). An example of when individual permit coverage may be required for an activity normally covered under a general authorization is when a proposed activity has the potential to degrade an ORVW.

5. Subpart 5. Protection of restricted outstanding resource value waters.

   Subp. 5. **Protection of restricted outstanding resource value waters.** The commissioner shall issue control documents that restrict net increases in loading or other causes of degradation as necessary to maintain the exceptional characteristics for which the restricted outstanding resource value waters identified under part 7050.0335, subparts 1 and 2, were designated.

This provision is similar to subpart 6 of the previous rule part, and provides for the protection of restricted ORVWs. The overall need and reasonableness is the same. Under this part, control document conditions must be such to ensure that the exceptional characteristics of restricted ORVWs are maintained. For example, a stormwater permit may require specific BMPs to protect these waters. Alternatively, the MPCA could require the applicant to provide an assessment of impacts to restricted ORVWs as a condition of control document coverage. It is important to remember that the public and other governmental agencies will have the opportunity to comment on the MPCA's preliminary determination on the control document conditions needed to protect restricted ORVWs.

6. Subpart 6. Protection of prohibited outstanding resource value waters.

   Subp. 6. **Protection of prohibited outstanding resource value waters.** The commissioner shall issue control documents that prohibit a net increase in loading or other causes of degradation to prohibited outstanding resource value waters identified under part 7050.0335, subparts 3 and 4.

   This provision is needed to satisfy federal regulatory requirements found at [40 CFR § 131.12](a)(3). In this case the control document conditions could specify that there be no net increase in loading or other causes of degradation to prohibited ORVWs. Again the public and governmental agencies will have the opportunity to weigh in on the MPCA's preliminary determination.

7. Subpart 7. Protection against impairments associated with thermal discharges.

   Subp. 7. **Protection against impairments associated with thermal discharges**. When there is potential for water quality impairment associated with thermal discharges, a control document that allows a net increase in loading or other causes of degradation must be consistent with section 316 of the Clean Water Act, United States Code, title 33, section 1326. When a variance is granted under section 316(a) of the Clean Water Act, United States Code, title 33, section 1326, antidegradation standards under this part still apply.

   This provision will meet federal regulatory requirements associated with antidegradation determinations involving potential thermal impairments. It is the same provision as found in the previous part and the reasoning for its inclusion is the same.

F. Exemptions from procedures (Proposed Minn. R. 7050.0275)

Exemptions from antidegradation procedures are provided for activities impacting Class 7 waters and temporary and limited impacts. The need and reasonableness of these exemptions is discussed below.

1. Subpart 1. Class 7 surface waters.

   Subp. 1. **Class 7 surface waters.** The procedures specified in parts 7050.0280 and 7050.0285 do not apply to proposed activities resulting in a net increase in loading or other causes of degradation to a Class 7 surface water except when, in the commissioner's judgment, there is reasonable risk that the proposed activity would result in:

A. <u>the loss of existing uses and the level of water quality necessary to protect existing uses in the Class 7 surface water;</u>
B. <u>permanently precluding attainment of water quality standards:</u>
C. <u>degradation of downstream existing high water quality; or</u>
D. <u>degradation of downstream existing water quality essential to preserve the exceptional characteristics of outstanding resource value waters.</u>

Subpart 1 provides an exemption from antidegradation procedures for activities anticipated to result in a net increase in loading or other causes of degradation to Class 7 surface waters. The proposed rules define a "Class 7 surface water" as:

> *...a surface water that is protected for limited resource value beneficial uses and to which water quality standards described in part 7050.0227 apply.* Proposed Minn. R. 7050.0255, subp. 7

Minn. R. 7050.0227 standards provide for the protection of aesthetic qualities, secondary body contact use, and groundwater for use as a potable water supply. Although these waters are protected by standards and may contain aquatic life, they are not considered to meet the CWA section 101(a)(2) interim goal:

> *...it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;...* Federal Water Pollution Control Act, 33 U.S.C. § 1251 (1972, as amended)

Tier 2 protection allows lowering of water quality levels exceeding what is necessary for the propagation of fish, shellfish, and wildlife and recreation in and on the water, when the lowering is necessary to accommodate important economic or social development. This exemption is reasonable because it does not require a finding of necessity and importance for lowering the quality of waters not exceeding those levels. It is also reasonable because the MPCA has the ability to deny the exemption when there is reasonable risk that the proposed activity will not meet other antidegradation standards, namely that:

- Existing uses are maintained;
- Class 7 water quality standards are attained;
- Downstream high water quality is not degraded;
- Water quality essential to preserving exceptional characteristics of ORVWs is not degraded

Under the current nondegradation rule governing all waters (Minn. R. 7050.0185), new or expanded discharges greater than 200,000 gallons per day to Class 7 waters are not considered significant and therefore are not subject to nondegradation procedures. Proposed discharges under the current rules are still required to meet minimum treatment requirements to ensure water quality standards and existing beneficial uses are maintained. The proposed exemption for activities impacting Class 7 waters retains these requirements. However, the proposed rule language goes further by providing protection of downstream existing high water quality and ORVWs. This is reasonable because there may be situations where the impacts of a proposed discharge to a Class 7 water could result in the degradation of downstream ORVWs or waters of high quality. The proposed rules clearly articulate that, in such cases, antidegradation procedures are required to protect downstream waters.

Note that this exemption is applicable to antidegradation procedures for:

- individual NPDES wastewater permits and individual NPDES storm water permits for industrial and construction activities (Minn. R. 7050.0280); and
- section 401 certifications of individual federal licenses and permits (Minn. R. 7050.0285).

Limiting the applicability of this exemption is reasonable because individual surface waters impacted by proposed activities covered under the above-mentioned control documents can and will be identified prior to antidegradation review. For example, the MPCA will know if the impacted surface water is a Class 7 or not. Antidegradation determinations under these procedures are based on impacts to individual identifiable waterbodies. It is important to know that, even with this exemption, Class 7 waters will still be protected because the antidegradation standards (i.e., Minn. R. 7050.0265) require the maintenance of existing uses and water quality standards for all waters.

The exemption does not apply to procedures for individual MS4 stormwater permits and general authorizations (Minn. R. 7050.0290 through Minn. R. 7050.0315). This is reasonable because antidegradation determinations under these procedures are not based on the identity of individual water bodies.

2. Subpart 2. Temporary and limited degradation.

Subp. 2. **Temporary and limited degradation.** The procedures specified in parts 7050.0280 and 7050.0285 do not apply to proposed activities that result in temporary and limited degradation of high water quality when the requirements of items A to D are met.

A. The applicant must provide a request for an exemption, on forms developed by the commissioner, before submitting a control document application. The request must include:
   (1) identification of surface waters and associated beneficial uses which will be impacted by the regulated activity;
   (2) parameters likely to cause degradation;
   (3) length of time during which the water quality will be impacted, which must not exceed 12 months from when water quality is initially impacted by the proposed activity;
   (4) a description of water quality at the time the exemption is requested using methods described in part 7050.0260 and anticipated net changes to water quality for parameters likely to cause adverse impacts over the time period the surface waters are impacted;
   (5) a description of prevention, treatment, or loading offset alternatives that were considered to avoid and minimize net increases in loading or other

causes of degradation and the reasons why the selected alternative was chosen;

(6) a description of how water quality will be returned to pre-activity conditions within 12 months from when water quality is initially impacted by the proposed activity; and

(7) a description of any residual long-term impacts on existing uses.

B. The commissioner shall consider subitems (1) to (3) before deciding to approve or deny the requested exemption from antidegradation procedures for the proposed temporary and limited degradation:

(1) information submitted by the applicant under item A;

(2) information on cumulative effects on water quality from multiple exemptions for temporary and limited degradation; and

(3) other reliable information available to the commissioner.

C. The commissioner shall approve a proposed temporary and limited degradation of high water quality only when:

(1) existing uses and the level of water quality necessary to protect the existing uses are maintained and protected;

(2) it would not cause a permanent deviation from water quality standards; and

(3) a prudent and feasible alternative does not exist that would avoid or minimize the degradation.

D. If the temporary and limited degradation exemption is approved, the control document conditions must include an enforceable plan to ensure that water quality is returned to pre-activity conditions within 12 months from when water quality is initially impacted by the activity.

Subpart 2 provides an exemption from antidegradation procedures for activities resulting in temporary and limited degradation. Current nondegradation rules do not explicitly provide for temporary and limited degradation. The proposed exemption is reasonable for the following reasons:

- Alignment with the exemption provided in Minn. R. ch. 7052

  Minnesota rules contain nondegradation provisions regarding the discharge of bioaccumulative chemicals of concern (BCCs) to high quality waters in the Lake Superior basin (Minn. R. ch. 7052). Minn. R. 7052.0310, sub. 7(A) allows an exemption from review for activities resulting in short-term (i.e., weeks or months) lowering of water quality. The MPCA currently operates under nondegradation guidance to address short-term toxic discharges to all waters throughout the state (Nondegradation for short-term toxics discharges, MPCA internal guidance, April 4, 1999 (Exhibit 102)[102] to avoid potential conflicts with Minn. R. ch. 7052. The proposed exemption assures that the discharge of non-BCCs would not be treated more stringently than BCCs, which the MPCA regards as presenting a greater degree of environmental risk than most other pollutants.

- EPA guidance provides for short-term and temporary lowering of water quality in outstanding national resource waters

Even at the highest level of antidegradation protection (Tier 3), the EPA has provided guidance allowing for some limited activities which result in temporary and short-term changes in water quality:

> *The regulation requires water quality to be maintained and protected in ONRWs [Outstanding National Resource Waters]. The regulation requires water quality to be maintained and protected in ONRWs. EPA interprets this provision to mean no new or increased discharges to ONRWs and no new or increased discharge to tributaries to ONRWs that would result in lower water quality in the ONRWs. The only exception to this prohibition, as discussed in the preamble to the Water Quality Standards Regulation (48 F.R. 51402) permits States to allow some limited activities that result in temporary and short-term changes in the water quality of ONRW. Such activities must not permanently degrade water quality or result in water quality lower than that necessary to protect the existing uses in the ONRW. It is difficult to give an exact definition of "temporary" and "short-term" because of the variety of activities that might be considered. However, in rather broad terms, EPA's view of temporary is weeks and months, not years. The intent of EPA's provision clearly is to limit water quality degradation to the shortest possible time. If a construction activity is involved, for example, temporary is defined as the length of time necessary to construct the facility and make it operational. During any period of time when, after opportunity for public participation in the decision, the State allows temporary degradation, all practical means of minimizing such degradation shall be implemented.* Water Quality Standards Handbook, Second Edition, Chapter 4, U.S. EPA (1994), p. 10

The handbook provides example situations where short-term and temporary lowering of water quality may be allowed:

> *Example 1.* ***A national park wishes to replace a defective septic tank-drainfield system in a campground. The campground is located immediately adjacent to a small stream with the ONRW use designation.***
>
> *Under the regulation, the construction could occur if best management practices were scrupulously followed to minimize any disturbance of water quality or aquatic habitat.*
>
> *Example 2.* ***Same situation except the campground is served by a small sewage treatment plant already discharging to the ONRW. It is desired to enlarge the treatment system and provide higher levels of treatment.***
>
> *Under the regulation, this water-quality-enhancing action would be permitted if there was only temporary increase in sediment and, perhaps, in organic loading, which would occur during the actual construction phase.*

> *Example 3.* ***A National forest with a mature, second growth of trees which are suitable for harvesting, with associated road repair and re-stabilization. Streams in the area are designated as ONRW and support trout fishing.***
>
> *The regulation intends that best management practices for timber harvesting be followed and might include preventive measures more stringent than for similar logging in less environmentally sensitive areas. Of course, if the lands were being considered for designation as wilderness areas or other similar designations, EPA's regulation should not be construed as encouraging or condoning timbering operations. The regulation allows only temporary and short-term water quality degradation while maintaining existing uses or new uses consistent with the purpose of the management of the ONRW area.*
>
> *Other examples of these types of activities include maintenance and/or repair of existing boat ramps or boat docks, restoration of existing sea walls, repair of existing stormwater pipes, and replacement or repair of existing bridges.* Water Quality Standards Handbook, Second Edition, Chapter 4, U.S. EPA (1994), p. 11

Rather than using the phrase "*short-term and temporary*" found in EPA guidance, the MPCA is proposing the phase "*temporary and limited.*" This is reasonable because "*short-term*" and "*temporary*" have essentially the same meaning and incorporating the term "*limited*" ensures that the magnitude of impacts are addressed.

The proposed exemption is reasonable because it extends the allowance for temporary lowering of water quality found for the highest level of protection (Tier 3) to high water quality protection (Tier 2).

- Exemptions will be addressed case-by-case

Applying this exemption on a case-by-case basis is reasonable because it ensures that the quality of individual water bodies will be adequately protected. To accomplish this, the proposed exemption requires the applicant to provide the necessary information found in Item A to be used in the MPCA's decision. The MPCA decided not to include a "one-size-fits-all" decision criterion due to the wide range of activities and waters which may be covered under this provision.

In particular, the request that the applicant provide information regarding existing water quality is needed and reasonable because in order to return water quality to a previous condition, the original condition must be understood. The risk of removing an existing or beneficial use, for example, is an important consideration in the MPCA's determination of whether to grant an exemption for temporary and limited impacts to high water quality. The MPCA may be willing to grant such an exemption when a water has a large amount of assimilative capacity, but may deny a request if the assimilative capacity of a water is very small.

- Temporary and limited impacts will be limited to 12 months

In regard to outstanding national resource waters, the EPA describes temporary as weeks and months, not years (Water Quality Standards Handbook, Second Edition, Chapter 4, U.S. EPA (1994), p. 10). The proposed exemption requires that water quality be returned to pre-activity conditions within 12 months from when high water quality is initially impacted by the activity. This time period is reasonable because it complies with EPA guidance. It is also reasonable to provide the permittee with adequate time to allow the water quality to return pre-activity conditions. For example, it is not unreasonable for some bridge construction projects to take up to 12 months from the time the project impacts water quality to the time the water quality is returned to pre-activity conditions. The MPCA believes that a proposed project which would impact water quality for a time period greater than 12 months is significant and should be required to undergo full antidegradation review.

- Opportunity for public participation

  EPA guidance recommends that states provide an opportunity for public participation before making a decision whether to allow for temporary degradation of outstanding national resource value waters (Water Quality Standards Handbook, Second Edition, Chapter 4, U.S. EPA (1994), p. 10). The proposed language requires the applicant to request an exemption before submitting a control document application. The opportunity for public comment regarding the temporary and limited exemption will be provided under Minn. R. 7001.0110 in connection with the issuance of the control document.

- Others states that have recently adopted antidegradation provisions have similar provisions

  Other states, such as Illinois (IL), Indiana (IN), Iowa (IA) and Michigan (MI), provide exemptions from antidegradation review for temporary impacts to both high water quality and outstanding waters (i.e., those receiving Tier 3 protection). In fact, the exemption found in the proposed rule closely resembles the exemption for temporary and limited degradation in Iowa Antidegradation Implementation Procedure (2010) (Exhibit 103)[103] (incorporated by reference into Iowa Administrative Code, 567, Chapter 61.2(2) (2011) (Exhibit 104)[104]).

- Timeliness of control document issuance

  The proposed exemption is reasonable because it will save time and effort on behalf of the MPCA and the regulated community by not requiring full antidegradation procedures for proposed activities with short-term and minimal impacts to water quality.

  Because of the potential effect of recurring temporary and limited impacts, it is necessary to draw a distinction between activities which are short-term but occur only once or very infrequently from those that are anticipated to occur periodically. One-time-only activities are generally construction projects for new facilities or existing project maintenance activities that occur once in ten or more years. An example of the former kind of activity is the disturbance of pollutant-laden sediments due to placement of footings and pilings during bridge construction over a water body. This kind of activity is not repeated on a predictable or frequent basis.

Therefore, exposure to pollutants occurs only once and for a short time-frame, and antidegradation procedures would not be required. This type of activity is in contrast to activities such as maintenance dredging, which may occur at a site for only a few days but is repeated regularly, so that the exposure to contaminated sediments is also repeated. Maintenance dredging activities are often accompanied by the need for areas to dispose of dredged sediment (call confined disposal facilities), which may also impact water quality through the return flow of water into the water body. Confined disposal facilities imply the potential for repeated exposures. Therefore, these types of re-occurring activities would not be exempt from antidegradation procedures.

This exemption is limited to procedures specified in Minn. R. 7050.080 and 7050.0285. This is reasonable because, both procedures are subject to antidegradation standards where changes in existing water quality can reasonably be quantified (i.e., Minn. R. 7050.0265). In other words, applicants will be able to describe, in quantitative terms, the temporary nature of a proposed activity.

Conversely, not providing the exemption to procedures identified in Minn. R. 7050.0290 through 7050.0315 makes sense because quantifying changes to existing water quality of individual surface waters is not reasonable for the applicable activities. In other words, applicants will not be able to describe, in quantitative terms, temporary changes to water quality of individual waters.

G. Procedures for individual NPDES wastewater permits and individual NPDES stormwater permits for industrial and construction activities. (Proposed Minn. R. 7050.0280)

This part is needed to describe procedures by which antidegradation requirements will be implemented through individual NPDES permits for regulated wastewater treatment, industrial stormwater and construction stormwater activities.

Minn. Stat. § 115.03, subd. 1 gives the MPCA regulatory authority to administer and enforce all laws related to pollution of waters of the state. The MPCA grants authorization to activities that impact water quality through the issuance of control documents including CWA § 402 permits (i.e., NPDES permits). The NPDES is a federal program established under the CWA to protect the nation's waterways from regulated point sources. The MPCA was first given authorization from EPA to issue NPDES permits in 1974. Specific state authority for administering NPDES permits is found at Minn. Stat. § 115.03, subd. 5. These permits specify the conditions under which the activity is allowed to operate in order to protect water quality and is therefore a reasonable mechanism through which antidegradation may be implemented.

Procedures for these two types of NPDES permits are reasonably combined because, in each case, coverage is provided by the MPCA for activities impacting single or relatively few surface waters. The identity of those individual waters is known prior to the permit application.

Note that the MPCA has not issued individual construction stormwater permits. However, there is nothing that precludes the MPCA from doing so in the future. Including individual construction stormwater permits in this provision is reasonable because it provides flexibility.

The need and reasonableness of each subpart is discussed below.

1. Subpart 1. Antidegradation procedures required.
   Subpart 1. **Antidegradation procedures required.** Except as provided in part 7050.0275, the antidegradation procedures in this part apply to new, reissued, or modified individual NPDES wastewater, industrial stormwater, and construction stormwater permits that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters.

   This subpart is needed because it describes the circumstances that trigger antidegradation procedures. The proposed provision requires antidegradation procedures when the MPCA anticipates that a proposed regulated activity will result in a net increase in loading or other causes of degradation. Note that the same trigger is used for all of the remaining types of control documents. The need and reasonableness of proposing this trigger is addressed in a question and answer format below.

   a. *Why is the current significance threshold not included in the proposed rules as a means to trigger antidegradation procedures?*

      The current significance threshold for triggering antidegradation procedures is not included in the proposed rules for reasons provided in Section 4.B.3.

   b. *Why does the proposed provision not include a significance threshold which would allow for* de minimis *high water quality degradation?*

      The provision does not provide an exemption for *de minimis* degradation of high water quality for the following reasons.

      - Not all parameters which may degrade high water quality have numeric water quality standards

        If used, significance thresholds should reasonably be based on the effect a proposed activity will have on the quality of the surface water. The current significance threshold does not meet this standard. As discussed in Section 4.B.3., EPA guidance recommends that the consumption of assimilative capacity be used for this purpose. The determination of assimilative capacity requires that a parameter have a numeric water quality standard. However, not all parameters that degrade high water quality have numeric standards. For example, there is currently no nitrate standard to protect aquatic life. It is therefore difficult to apply significance thresholds (based on consumption of assimilative capacity) where numeric water quality standards do not exist.

      - Multiple thresholds may be needed to account for varying risk levels to water quality

        A single assimilative capacity threshold for all parameters does not reflect the risks associated with wide-ranging effects of pollutants on aquatic life and recreation. Take, for example, a single significance threshold that triggers antidegradation procedures when greater than 10% of the available assimilative capacity will be consumed. Not requiring procedures for a proposed activity which will consume less than 10% of available assimilative capacity for total suspended solids (TSS) may be justifiable in some instances. The same threshold may not be prudent when considering an increase in a bioaccumulative toxin which poses an unacceptable risk even at very low levels. This doesn't mean that multiple thresholds could not be used, but they would add considerable complexity to antidegradation procedures.

- Difficulty in accounting for cumulative impacts

  Unacceptable levels of degradation may occur as a result of *de minimis* degradation where there are no methods to trigger antidegradation procedures based on cumulative impacts. If states use the consumption of assimilative capacity to trigger antidegradation procedures, EPA guidance recommends that states incorporate cumulative caps based on the use of **total** assimilative capacity, defined as:

  > *…the baseline assimilative capacity of a waterbody established at a specific point in time.* Tier 2 Antidegradation Reviews and Significance Thresholds, U.S. EPA memorandum from Ephraim S. King (Office of Science and Technology) to Water Management Division Directors, Regions 1-10, (2005)

  In other words when a predetermined amount of total assimilative capacity is consumed, antidegradation procedures are required regardless of the amount of remaining assimilative capacity.

  Tracking the consumption of total assimilative capacity requires that baseline water quality conditions are established at some fixed point in time. Establishing a single baseline date for all parameters which may be subject to antidegradation requirements presents challenges when there are incomplete monitoring data for a given parameter. Multiple baseline dates for individual surface waters could be established once data become available. This would require a significant amount of effort to track, store and analyze data related to the total assimilative capacity of many individual surface waters for multiple parameters. The MPCA believes that this effort could be better expended in work to minimize water quality impacts.

  There have also been some legal challenges surrounding cumulative caps in states' antidegradation procedures. In one case involving a challenge to the EPA's approval of Kentucky's antidegradation procedures, the Sixth Circuit Court of Appeals held that the EPA failed to analyze the cumulative effects of *de minimis* exemptions and also failed to document calculations or estimates of the assimilative capacity of a water body that would be expected to be lost under the exemptions (Kentucky Waterways Alliance v. Johnson, 540 F.3d 446, 492-493 (6th Cir. 2008)) (Exhibit 57). In another instance the EPA's approval of West Virginia's significance threshold of 10% of available assimilative capacity was upheld in court. However, the Court rejected West Virginia's and the EPA's arguments that a cumulative cap of 20% was a *de minimis* lowering of water quality consistent with federal mandate (Ohio Valley Environmental Coalition v. Horinko, 279 F. Supp. 2d 732, 738, 773 and 777 (S.D.W.V., 2003) (Exhibit 56).

- Prudent use of human resources to achieve environmental protection

Using resources to conduct the alternatives analysis and identify pollution control measures which minimize degradation achieves greater environmental benefit than using significant resources to determine whether or not antidegradation procedures are triggered.

c. *How does a "net increase in loading or other causes of degradation" trigger antidegradation procedures?*

As a starting point the reader is referred to the need for and reasonableness of the definition for "net increase in loading and other causes of degradation" in Section 5.B.26.

Antidegradation procedures will always be required for new activities that are anticipated to result in a net increase in loading or other causes of degradation, because the activity had not previously operated under a control document. For the reissuance of control documents, antidegradation procedures are triggered when the anticipated loading or other causes of degradation exceeds the maximum authorized in the existing permit. For NPDES-permitted wastewater activities, anticipated loading is determined using numeric effluent limits and appropriate design characteristics of the facility. The determination of maximum loading is dependent upon the type of facility and associated effluent limits.

Antidegradation procedures are triggered by the maximum loading allowed, not actual loadings. This is reasonable because what is authorized is typically based on projected needs to allow for future growth or expansion. For example, it is not uncommon for municipal wastewater treatment operators to project loading needs over a 20-year period and request to be permitted accordingly. Activities resulting in incremental loading within limitations authorized by the MPCA, such as municipal sewer extensions, occur with relative frequency, allowing the applicant to adequately plan for facility expansion based on authorized loadings. An existing facility may be subject to antidegradation procedures when reissuance is sought, even if the facility does not want to change existing authorized limitations. New information may become available that a given pollutant not considered in procedures conducted previously is now of concern. In such cases, antidegradation procedures addressing that pollutant would be warranted.

Water pollution from stormwater discharges is generally controlled through BMPs rather than numeric effluent limits. For permit reissuance of existing discharges, antidegradation procedures will be required when changes at the facility (industrial discharges) or within jurisdictional boundaries (municipal discharges) will cause an increase in loading or other causes of degradation beyond that allowed by the existing permit. For example, procedures will be required for an industrial stormwater facility which increases its chemical storage area for pollutants of concern and where that area is exposed to stormwater runoff.

The proposed rule's baseline date for triggering antidegradation procedures differs from the current rules. The current rule's baseline for increased loading to non-ORVWs is January 1, 1998. The proposed rules' baseline date for these waters is the effective date of the most-recently issued permit. This change is reasonable because increased loading or other causes of degradation may be allowed through antidegradation determinations in subsequent reissuances. Therefore it is reasonable that the baseline reflect the loading or other causes of degradation already authorized by MPCA antidegradation determinations. The baseline date for ORVWs remains unchanged – the date upon which the ORVW was designated in rule.

Subpart 1 requires antidegradation procedures for proposed activities that are anticipated to impact surface waters of the state. "Waters of the state" is defined in statute as:

> *…all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, reservoirs, aquifers, irrigation systems, drainage systems and all other bodies or accumulations of water, surface or underground, natural or artificial, public or private, which are contained within, flow through, or border upon the state or any portion thereof.* Minn. Stat. § 115.01, subd. 22

The definition is further clarified in Minn. R. 7050.0130, subp. 2, which states that waters of the state have the same meaning as that given in Minn. Stat. § 115.01 except that disposal systems or treatment works operated under permits or certificates of compliance are not waters of the state. Thus, it is reasonable that antidegradation provisions, as with other parts of the state's water quality standards rules, apply only to activities impacting surface waters of the state as defined in Minn. R. 7050.0130. This is reasonable because the CWA and federal regulations governing water quality standards, including 40 CFR § 131.12, apply to surface waters. Minn. R. 7060.0500 provides nondegradation policy for groundwater.

2. Subpart 2. Applicant's antidegradation assessment.
   Subp. 2. **Applicant's antidegradation assessment.** The applicant must include the following information with the written permit application specified in part 7001.0050:
   A. an analysis of alternatives that avoid net increases in loading or other causes of degradation through prudent and feasible prevention, treatment, or loading offsets;
   B. when the commissioner determines there are no prudent and feasible alternatives to avoid net increases in loading or other causes of degradation, an assessment of:
      (1) existing uses; and
      (2) existing water quality using determination methods described in part 7050.0260.
   C. when the commissioner determines there are no prudent and feasible alternatives to avoid net increases in loading or other causes of degradation to existing high water quality:
      (1) an analysis of prudent and feasible alternatives that minimize degradation through prudent and feasible prevention, treatment, or loading offsets that identifies the least degrading prudent and feasible alternatives;

(2) the design considerations and constraints, expected performance, construction, operation, and maintenance costs, and reliability of the least degrading prudent and feasible alternatives; and

(3) the following information based on the least degrading prudent and feasible alternatives:

   (a) a comparison of loading or other causes of degradation previously authorized by the commissioner in the most recently issued control document to the anticipated loading or other causes of degradation expected when the proposed activity is fully implemented;

   (b) a comparison of existing water quality to the anticipated water quality when the proposed activity is fully implemented; and

   (c) for the geographic area in which high water quality degradation is reasonably anticipated, a comparison of existing and expected economic conditions and social services when the proposed activity is fully implemented. The comparison must include the factors identified in part 7050.0265, subpart 5, item B, subitems (1) to (6).

The proposed rules improve upon the existing provisions by including implementation procedures which clearly identify the roles and responsibilities of applicants, the MPCA and entities interested in the MPCA's antidegradation determinations. Subpart 2 requires the applicant to provide the MPCA with an antidegradation assessment of the proposed activity. The assessment contains information the MPCA will need to conduct a review and provide a determination of whether and to what extent water quality may be lowered. It is reasonable that the applicant provide this information because it is the applicant who is requesting authorization for an activity which is anticipated to result in water quality degradation. The applicant is also the entity who is most familiar with the proposed activity and is therefore best able to provide the necessary information.

Although the trigger for antidegradation procedures is very broad (i.e., activities anticipated to result in a net increase in loading or other causes of degradation), the assessment and subsequent review will be limited to parameters of concern. Parameters of concern:

- are pollutants reasonably expected in a discharge or as a result of a proposed activity;
- are anticipated to cause degradation (i.e., measurable change to existing water quality made or induced by human activity resulting in diminished conditions of surface waters);
- have numeric or narrative standards;
- present the greatest risk of degradation.

Review of parameters of concern applies to all three levels or Tiers of antidegradation protection. Regarding Tier 1 protection, parameters will be reviewed that present risks to the loss of existing uses. Tier 2 protection will require a review of parameters that present risks to aquatic life and recreation – those for which there are Class 2 numeric or narrative standards. Tier 3 protection will require review of parameters that present risks to degrading exceptional characteristics of ORVWs.

Limiting antidegradation procedures to parameters of concern is reasonable for the following reasons.

- Wise use of available resources

  Identifying parameters of concern allows the applicant and the MPCA staff to focus available resources on those parameters that present the greatest risk to water quality. Requiring an applicant to provide an assessment, and for the MPCA to review the assessment, on every parameter that could potentially impact water quality is an unreasonable undertaking. Providing and reviewing an assessment for all parameters for which there are water quality standards would require resources more prudently placed on the alternatives analysis – the goal of which is to avoid and minimize degradation from those parameters that present the greatest environmental risk.

- Parameters of concern are identified based on the characteristics of the discharge or activity

  Given the wide range of sources, it is prudent to identify parameters that are expected to impact existing water quality associated with a particular type of activity. For example, total phosphorus may be a parameter of concern for municipal wastewater discharges, but may not be of concern for an industrial wastewater discharge. (See discussion below on suggested parameters of concern based on regulated activity.)

- Parameters of concern are identified based on the characteristics of the surface water

  The selection of parameters of concern also depends on the characteristics of individual waters. For example, the discharge of a given pollutant to a surface water with a relatively large amount of assimilative capacity may not be of concern. On the other hand, the discharge of an equal quantity of the same pollutant may be of concern in a water having very little assimilative capacity.

- Meaningful alternatives analysis

  One improvement that the proposed rules provide is that they place greater emphasis on the alternatives analysis. When conducting an alternatives analysis it is imperative that parameters of concern be identified in order to have a meaningful evaluation of pollution prevention and treatment alternatives.

- Identifying parameters of concern is consistent with the parameter-by-parameter approach to identifying high water quality

  The proposed rules identify high water quality on a parameter-by-parameter basis. It is therefore reasonable that individual parameters be evaluated to ensure high water quality is not unnecessarily degraded.

- The selection of parameters reviewed is subject to public comment

  As with other components of the MPCA's preliminary antidegradation determinations, the public has the opportunity to weigh in on which parameters are reviewed.

Selecting which parameters to review will require consultation between applicants and the MPCA. While applicants will generally have a better understanding of the pollutants associated with the proposed activity, the MPCA may have a better understanding of the impacted surface water quality. It is the MPCA that will ultimately decide which parameters will be reviewed because it is the MPCA which responsible for making antidegradation determinations.

It is possible to generically identify some parameters of concern based on the type of regulated activity and the MPCA will do so in guidance. Having a list of activity-based parameters of concern would benefit prospective applicants who are in the early stages of planning. The following parameters of concern are examples of those associated with identified activities:

- Municipal wastewater treatment discharges:
    - total phosphorus (TP)
    - total suspended solids (TSS)
    - carbonaceous biochemical oxygen demand (CBOD)
    - ammonia
    - nitrate
    - chloride
    - bacteria
    - temperature (when impacting cold-water streams)
- Industrial wastewater treatment discharges:

  Pollutants discharged from industrial facilities vary greatly and depend on the industry type. Federal effluent guidelines may be used to assist in the identification of parameters of concern.
- Municipal storm water discharges:
    - TP
    - TSS
    - chloride
    - bacteria
    - temperature (when impacting cold-water streams)
- Industrial storm water discharges:

  Like industrial wastewater facilities, pollutants associated with industrial storm water discharges depend upon specific industries. Either or both of the following may be used to identify parameters of concern: 1) activities for which there is a narrative description associating it with industrial stormwater, and/or 2) activities with a primary Standard Industrial Classification (SIC) code that is included at 40 CFR § 122.26(b)(14) (Exhibit 78)
- Construction stormwater discharges:
    - TP
    - TSS
- Activities causing physical alterations (e.g., those requiring section 404 permits)
    - TP
    - TSS

Additional flexibility and efficiency may be achieved by grouping parameters of concern based on pollutant fate characteristics and use a representative pollutant as the surrogate parameter to evaluate for the larger group. For example, pollutants that are largely hydrophobic and associate with solids may be represented by TSS. Use of surrogate parameters not only reduces the number of parameters reviewed, but may also assist in the identification of pollution control measures considered in the alternatives analysis.

In most cases, parameters of concern will be identified prior to the initiation of the antidegradation assessment. However, there may be situations where additional parameters may require evaluation to account for unforeseen or unique, site-specific circumstances. In addition to the pollutants of concern, regulated entities may also be requested to provide water quality data for parameters necessary to determine the appropriate value range of water quality criteria (e.g., pH, temperature, hardness). For example, if a dissolved metal is a pollutant of concern, a regulated entity may also be requested to provide hardness data to translate the total metal present in the discharge to an in-stream dissolved concentration. Again, the importance of consultation between the applicant and the MPCA prior to the selection of parameters of concern cannot be overstated.

Subpart 2 requires that the antidegradation assessment be included with the written permit application specified in Minn. R. 7001.0050. This requirement is reasonable because it allows the MPCA enough time to review the assessment and make a preliminary determination within the 150-day period set as a goal for issuing or denying permits (Minn. Stat. § 116.03, subd. 2(b)).

Items A to C describe the specific information that needs to be included in the assessment.

a. *Item A – Analysis of alternatives that avoid net increases in loading or other causes of degradation through prudent and feasible prevention, treatment, or loading offsets.*

   Federal antidegradation regulations prohibit the lowering of high water quality unless it is "*…necessary to accommodate important social or economic development…*" 40 CFR 131.12(a)(2) An approach recommended by the EPA is to require the proponent of a proposed activity to develop an analysis of pollution control/pollution prevention alternatives (Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36741 (1998), p. 36784). The alternatives analysis requires applicants to justify their chosen alternative and show that the proposed water quality degradation is necessary because reasonable non-degrading alternatives are not available (EPA Region VIII Guidance: Antidegradation Implementation, Chapter 2 (1993), p. 19 (Exhibit 82); Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36741 (1998), p. 36783).

   Item A requires the applicant to provide an analysis of alternatives that avoid "*net increases in loading or other causes of degradation…*" Note that the language does not require the applicant to provide analysis of alternatives that "*…avoid degradation,*" which would require an assessment of measurable changes to existing water quality. The way the proposed language is written allows the applicant to evaluate the loading or causes of degradation without the need to make a water quality assessment. A water quality assessment will only be required if the applicant demonstrates that additional loading or other causes of degradation cannot reasonably be avoided.

Item A requires the applicant to evaluate prudent and feasible prevention, treatment, or loading offsets alternatives. The "*prudent and feasible*" standard is reasonable because it allows for considerations that are unique to a specific project and the applicant's ability to implement alternatives that avoid or minimize degradation. The proposed rules define a "*prudent alternative*" as:

> *… a pollution control alternative selected with care and sound judgment. (proposed Minn. R. 7050.0255, subp. 34)*

Cost effectiveness will likely be a consideration in the determination of whether the implementation of a given alternative is prudent. Opportunity costs may also be considered in determining whether an alternative is prudent. For example, lost income from lots in a proposed subdivision that would be used for land application of treated wastewater rather than housing, or losses related to process changes that result in missed production runs are legitimate and may be considered if adequately documented. The applicant's analysis may also include consideration of whether or not the alternative is equitable. For example, a project that will disproportionately impact the low-income members of the community may not be equitable. Thresholds for equity may differ from community to community. Therefore, an understanding of the social needs and conditions of the community may be used to determine if an alternative is socially equitable. Additionally, the analysis may consider the overall needs in the community. For instance, the analysis may consider funds that are available to the community to pay for pollution control but that are already targeted for education, health care, and other needs of high priority in the affected community. Thought should also be given to environmental impacts other than those to surface waters. For example, an alternative that provides for infiltration of untreated contaminated stormwater near ground water drinking sources may not be reasonable, even when infiltration is technically feasible.

There are a number of factors that are to be considered by the applicant on whether an alternative is "*feasible.*" The proposed rule defines a "*feasible alternative*" as:

> *… a pollution control alternative that is consistent with sound engineering and environmental practices, affordable, and legally and that has supportive governance that can be successfully put into practice to accomplish the task.* Proposed Minn. R. 7050.0255, subp. 17

The evaluation of alternatives that are consistent with sound engineering is reasonable because it ensures only proven and reliable alternatives are considered. Pollution control technologies are continually evolving and improving. Some newer pollution control technologies hold promise in their ability to treat wastewater. An applicant may propose the implementation of such technologies but will need to provide adequate information regarding effectiveness and reliability.

The applicant's ability to pay for a given alternative will also be taken into consideration. In order to justify the elimination of an alternative from consideration, the applicant must demonstrate to the MPCA's satisfaction that the costs of the alternative are unaffordable given facility- and site-specific (or community-specific in the case of public-sector projects) considerations. The MPCA realizes that the determination of what represents affordable pollution control alternatives is case-specific. Therefore, the MPCA is not proposing a defined threshold to determine affordability. The determination of affordability for public and private entities is an emerging issue nationally. As such, EPA guidance has not yet been finalized. Until such time, the applicant may use the EPA's Interim Economic Guidance for Water Quality Standards, U.S. EPA (1995) (Exhibit 97) for the determination of affordability. This guidance document presents two sets of procedures: one for public sector projects and the other for private sector projects. For public sector developments, EPA's Guidance determines whether the community can clearly afford to pay for the project by focusing on the average total pollution control cost per household, the community's ability to obtain financing for the project, and the general economic health of the community. For private sector projects, the guidance investigates the effect of the proposed alternative on profits and requires consideration of a number of other factors to develop a full picture of the applicant's financial health. In order to demonstrate that an alternative is not affordable, the applicant may provide all information necessary to apply the screening tests described in the EPA's Interim Economic Guidance or provide other compelling information regarding affordability. (Attachment 4 provides further detail on EPA's Interim Economic Guidance.)

The consideration of the legality of the alternative is reasonable because the MPCA should not approve an alternative that is contrary to current laws. An example of an alternative that is not feasible because is it not legally possible is a treatment method involving the use of chemicals prohibited under federal or state law.

The alternative must also have supportive governance to ensure it can be implemented in the context of local and state governmental directives and priorities. As an example, a city's stormwater plan may discourage infiltration of contaminated stormwater runoff around groundwater wellheads to protect drinking water sources. A stormwater treatment alternative relying on this kind of infiltration would not be considered feasible on the grounds that the infiltration alternative does not have supportive governance.

Item A requires the applicant to evaluate alternatives in terms of prevention, treatment and loading offsets. Evaluating pollutant source reduction focuses attention on alternatives that will not lead to the release of pollutants to the environment rather than on those that depend upon treating the pollution after it is generated. If pollution prevention alternatives prove not prudent or feasible, then it is reasonable to consider treatment as means to avoid net increases in loading or other causes of degradation. This approach is consistent with the hierarchy outlined in the policy of the Pollution Prevention Act of 1990 (40 U.S.C. § 13101(b)) (Exhibit 105)[105].

Loading offsets are also considered in the alternatives analysis. For the purposes of the proposed rules, loading offsets create addition capacity for proposed loading. In order for this to happen, a reduction in loading must occur upstream of the proposed activity. An offset resulting in compensation of the entire proposed loading means that there is no net increase in loading to the surface water. In such cases further antidegradation procedures would not be required. This is in alignment with EPA trading policy:

> *Antidegradation. Trading should be consistent with applicable water quality standards, including a state's and tribe's antidegradation policy established to maintain and protect existing instream water uses and the level of water quality necessary to support them, as well as high quality waters and outstanding national resource waters (40 CFR*

> *131.12). EPA recommends that state or tribal antidegradation policies include provisions for trading to occur without requiring antidegradation review for high quality waters. EPA does not believe that trades and trading programs will result in "lower water quality" as that term is used in 40 CFR 131.12(a)(2), or that antidegradation review would be required under EPA's regulations when the trades or trading programs achieve a **no net increase of the pollutant traded** and do not result in any impairment of designated uses.* Water Quality Trading Policy, U.S. EPA, Office of Water (2003), p. 8 (Exhibit 106)[106] (emphasis in original)

There is also a legal precedent that supports loading offsets in regards to potential water quality impairments. The Minnesota Supreme Court ruled in 2007 that the MPCA's interpretation of 40 CFR § 122.4(i) (Exhibit 107)[107] as allowing offsets from another source in determining whether a new source will cause or contribute to the violation of water quality standards was reasonable. The Court also ruled that deference should be given to the MPCA's interpretation of its rules and the MPCA's decision to provide permit coverage to the new wastewater treatment plant should be upheld (Cities of Annandale and Maple Lake NPDES/SDS Permit Issuance for the Discharge of Treated Wastewater, 731, N.W.2d 502) (Mn. Sup. Ct. 2007) (Exhibit 108)[108]). The case stemmed from a requirement under 40 CFR § 122.4(i) that an NPDES permit may not be issued for a new source when its discharge will cause or contribute to the impairment of waters with impaired status under the CWA. The MPCA had issued an NPDES permit for a wastewater treatment plant jointly proposed by the City of Annandale and the City of Maple Lake (the Cities). The MPCA found that the proposed plant—when operating at capacity—would increase phosphorus discharge to the North Fork of the Crow River by approximately 2,200 pounds per year over that discharged by the Cities' existing facilities. The MPCA also concluded that, under 40 CFR § 122.4(i), this increase would not contribute to the violation of water quality standards in the Lake Pepin watershed. The MPCA reached this conclusion and issued a permit on the basis that the increased discharge would be offset by an approximately 53,500-pound annual reduction in phosphorus discharge due to an upgrade of a wastewater treatment plant in nearby Litchfield.

The requirement to consider prevention, treatment and loading offset alternatives is fairly broad and therefore gives the applicant flexibility to address the individual characteristics of each proposed activity. The MPCA intends to develop guidance on the alternatives analysis that will assist the applicant's evaluation. The alternatives under consideration for wastewater treatment activities include, but are not limited to, the following:

- holding tanks with transport to a permitted treatment system
- pipeline conveyance to a permitted treatment system/regionalization
- pollution prevention, pollution minimization and/or pretreatment techniques
- modified, additional or enhanced treatment technology alternatives and treatment levels , such as changing from continuous discharge to controlled or seasonal discharge, filters, or chemical addition

- reduction in the scale of the activity, such as downsizing the project and/or implementing water conservation practices so that a land disposal method might be used
- discharge to alternative locations
- loading offsets/pollutant trading, such as point to point trading and point to nonpoint trading
- recycle/reuse of pollutants and/or water
- improved operation and maintenance of existing pollution prevention and treatment systems.
- land application and/or infiltration, such as spray irrigation, rapid infiltration, mound systems.
- alternative water supply source(s) and/or alternative water supply treatment technologies, such as a water supply with lower pollutant levels, hardness levels)

b. Item B – Assessment of existing uses and existing water quality when avoidance is not prudent or feasible

When the MPCA determines that there are no prudent and feasible alternatives that avoid a net increase in loading or other causes of degradation, additional requirements are included in the assessment. Item B(1) requires the applicant to provide an assessment of existing uses.

Uses are specified in two places within the CWA. The interim goal of the CWA:

> *...provides for the* ***protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water*** *be achieved by July 1, 1983.* Federal Water Pollution Control Act, 33 U.S.C. § 1251 (CWA section 101(a)(2)) (emphasis added) (Exhibit 12)

Section 303(c)(2)(A) of the CWA requires states to incorporate specific uses in their water quality standards:

> *Whenever the State revises or adopts a new standard, such revised or new standard shall be submitted to the Administrator. Such revised or new water quality standard shall consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses. Such standards shall be such as to protect the public health or welfare, enhance the quality of water and serve the purposes of this chapter. Such standards shall be established taking into consideration their use and value for* ***public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes, and also taking into consideration their use and value for navigation****.* Federal Water Pollution Control Act, 33 U.S.C. § 1313 (CWA section 303) (emphasis added) (Exhibit 13)

Requiring the applicant to identify existing uses is reasonable because it is the applicant who will likely be most familiar with the characteristics and uses of the surface water which will be impacted.

Item B(2) asks the applicant to provide an assessment of existing water quality using procedures described in proposed Minn. R. 7050.0260. An existing water quality assessment is necessary to determine if the water body is of high quality for the parameter in question which will, in turn, dictate whether additional Tier 2 protection steps are required. This is in alignment with EPA guidance:

> *The applicant may be required to provide monitoring data or other information about the affected water body to help determine the applicability of tier 2 requirements based on the high-quality test. The information that will be required in a given situation will be identified on a case-by-case basis.* EPA Region VIII Guidance: Antidegradation Implementation, Chapter 2 (1993), p. 15 (Exhibit 82)

The EPA's Water Quality Guidance for the Great Lakes System: Supplementary Information Document (SID) (U.S. EPA, Office of Water (1995) (Exhibit 83)) also discusses conducting reviews of potential degradation in terms that assume existing water quality data are known or will be collected. The guidance specifies that the level of protection afforded a water body under antidegradation protection will be determined on a parameter-by-parameter basis, considering each individual pollutant separately from the others present in a water body. The guidance notes that under this approach:

> *… the ambient level of the pollutants of interest would be determined and compared to the applicable criteria. Where ambient concentrations of the pollutants in question are less than criteria concentrations, the water body would be considered high quality for those pollutants and increases in those pollutants would be subject to the requirements applicable to high quality waters.* Water Quality Guidance for the Great Lakes System: Supplementary Information Document (SID), *U.S. EPA, Office of Water (1995), Section VII(C)(2)(b)(i) (Exhibit 83)*

If the parameter of concern is not of high quality no further information will be required as part of the antidegradation assessment. There are, however, two possible outcomes when a water body is found to be impaired. The first is if there is an EPA-approved TMDL for the parameter of concern, the permit will contain conditions that are consistent with the TMDL. The second situation is where a water body is impaired for a parameter of concern but there is not an EPA-approved TMDL. In such cases, the proposed activity will not be allowed to contribute to the impairment.

If a parameter of concern is of high quality, the assessment of existing water quality is needed to establish a baseline from which degradation is measured. This is reasonable because without an understanding of baseline conditions the MPCA cannot make meaningful determinations of whether the net benefits of a proposed activity outweigh water quality degradation.

As previously mentioned an existing water quality assessment is necessary to determine if the water body is of high quality for the parameter in question. Note that federal regulations prohibit lowering high water quality (i.e., that quality which exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water) unless the lowering is necessary to accommodate important economic or social development. Minnesota's Class 2 numeric and narrative standards for aquatic life and recreation generally represent these levels. There may be situations where an assessment of a parameter indicates levels of water quality that do not support aquatic life and recreation, and a numeric Class 2 standard does not exist. An example is the lack of a Class 2 numeric standard for nitrate. In such situations the MPCA will need to make case-by-case decisions regarding the level of water quality necessary to protect aquatic life and recreation. The MPCA anticipates that these situations will be very rare.

c. *Item C, sub-item 1 – Analysis of alternatives that minimize existing high water quality degradation*

Item C(1) requires that when the impacted water is of high quality and there are no prudent and feasible alternatives to avoid net increases in loading or other causes of degradation, the applicant must identify alternatives that minimize degradation. This analysis includes the concepts of "*prudent and feasible*", as well as "*prevention, treatment, or loading offsets*" already described above. In addition, the applicant needs to identify the least degrading prudent and feasible alternative. This is in alignment with the EPA's recommendation that the alternatives evaluation should:

> *…ensure that all feasible alternatives to allowing degradation have been adequately evaluated, and that the least degrading alternative is implemented.* Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36741 (1998), p. 36784.

d. *Item C, sub-item 2 – Characteristics of the least degrading prudent and feasible alternative*

This provision requires the applicant to provide the MPCA with information pertinent to the design, expected performance, construction, operational and maintenance costs, and reliability of the least degrading prudent and feasible alternative. This is reasonable because it will allow MPCA staff to work with the applicant in verifying that the selected alternative is indeed prudent and feasible.

e. *Item C, sub-item 3(a) – Comparisons of loading and other causes of degradation*

Once the least degrading prudent and feasible alternative is identified, projected loading and other causes of degradation can be compared to that previously authorized. This provision is reasonable because the resulting net increase in loading or other causes of degradation will then be used to estimate the impacts to existing water quality.

f. *Item C, sub-item 3(b) – Water quality comparisons*

This provision is needed to evaluate how water quality will change as a result of implementing the least degrading prudent and feasible alternative. This information will in turn be used by the MPCA to evaluate whether the resulting degradation is important to accommodate important economic or social development. The requirement for the applicant to provide an assessment of impacts to existing water quality is in alignment with Minnesota legislative policy for the development of regulatory methods that:

…encourage facility owners and operators to assess the pollution they emit or cause, directly and indirectly, to the air, water, and land; Minn. Stat. § 114C.01(1)

g. *Item C, sub-item 3(c) – Comparison of economic conditions and social services*

This provision is needed so that the MPCA can make the required determinations of whether the economic or social benefits of a proposed activity outweigh the resulting degradation to high water quality. Regarding this requirement, EPA guidance states that:

> *This provision is intended to provide relief only in a few extraordinary circumstances where the economic and social need for the activity clearly outweighs the benefit of maintaining water quality above that required for "fishable/swimmable" water, and both cannot be achieved. The burden of demonstration on the individual proposing such activity will be very high.* Water Quality Standards Handbook, Second Edition, Chapter 4, U. S. EPA (1994), p. 7

The provision requires the applicant to provide a comparison between the existing economic conditions and social services to what is anticipated when the proposed activity is fully implemented. The comparison is confined to the area where high water quality degradation is anticipated for reasons discussed in Section 5.D.5. Net estimates are required because a reasonable estimate must take into account both the positive and the negative impacts of proposed projects. Failing to do so would present a one-sided and unreasonable picture of the changes expected to follow from a proposal. The comparison is to include the factors identified in proposed Minn. R. 7050.0265, subp. 5(B)(1 to 6). This is reasonable because these are the specific elements upon which the MPCA will make its determination of importance. The justification for including the factors is presented in Section 5.D.5.

The MPCA suggests that applicants use the following steps in their comparisons.

Step 1. Identify the geographic area where degradation of high water quality is anticipated

The geographic area where high water quality degradation is anticipated will be dependent upon the characteristics of parameter in question. Parameter characteristics may include whether the parameter tends to persist in the aquatic environment or is rapidly attenuated. The area of impact will also be dictated by how much of the parameter is released and the characteristics of the water itself. For example, the area of impact will likely be smaller for waters having more dilution capacity compared to ones with less dilution capacity, when the pollutant type and amount discharged are the same.

Step 2. Identify the affected communities

The affected communities are those within the geographic area in which high water quality degradation is anticipated as identified in Step 1.

Step 3. Identify relevant factors that characterize the social and economic conditions of the affected community

In order to describe the economic conditions and social services associated with the proposed activity, the applicant will need to determine the economic and social factors that best characterize the affected community. Some of the factors identified in proposed Minn. R. 7050.0265, subp. 5(B)(1 to 6) may be more relevant than others depending upon the type of activity. For example, private sector activities may have little or no impact on social services, whereas a public sector activity, such as a municipal wastewater treatment plant, may. In the case of municipal wastewater treatment plants, social services could include the extension of sewered areas, which may in turn allow for improved social services, such as the building of new schools.

Step 4. Describe the expected changes associated with the proposed activity

The applicant will then describe the expected changes in the factors identified in Step 3 by comparing the existing to the predicted conditions of the affected community.

Step 5. Provide a justification for high water quality degradation

Providing a justification for high water quality degradation allows the applicant the opportunity to summarize how the economic and social benefits of the proposed activity outweigh the impacts of lowering of high water quality.

In summary, requiring the applicant to provide an antidegradation assessment is reasonable because it is the applicant who is requesting authorization to discharge to or otherwise impact surface waters of the state and who is most familiar with the proposed activity. The MPCA needs this information to make antidegradation determinations. Note that any information submitted in the antidegradation assessment which contains trade secret information will be kept confidential by the MPCA as nonpublic data pursuant to Minn. Stat. § 13.37, subd. 2. "*Trade secret information*" means:

> *government data, including a formula, pattern, compilation, program, device, method, technique or process (1) that was supplied by the affected individual or organization, (2) that is the subject of efforts by the individual or organization that are reasonable under the circumstances to maintain its secrecy, and (3) that derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.* Minn. Stat. § 13.37, subd. 1(b)

3. Subpart 3. Antidegradation review.

Subp. 3. **Antidegradation review.** The commissioner shall conduct an antidegradation review based on the information provided under subpart 2 and other reliable information available to the commissioner concerning the proposed activity and other activities that cause cumulative changes in existing water quality in the surface waters. The purpose of the antidegradation review is to evaluate whether the proposed activity will satisfy the antidegradation standards in part 7050.0265. If, in the commissioner's judgment, the antidegradation standards described in part 7050.0265 will not be satisfied, the commissioner shall provide written notification to the applicant of the deficiencies and provide recommendations necessary to satisfy the antidegradation standards in part 7050.0265.

Subpart 3 is needed because it describes how the MPCA will evaluate information relevant to satisfying the antidegradation standards found in proposed Minn. R. 7050.0265. It is reasonable that the review be based on the applicant's antidegradation assessment because the purpose of providing the assessment is to inform the MPCA of the proposed activity and its impact to water quality. It is also reasonable that the MPCA base the review on other relevant information that may not be contained in the applicant's assessment. For example, the MPCA (but not the applicant) may be aware of trends in nonpoint source (i.e., unregulated source) pollutant contributions in the watershed where the proposed activity is planned. It is reasonable that the MPCA notify the applicant of any deficiencies so that the applicant, with the MPCA's assistance, can work towards meeting the standards. Providing a written notification of deficiencies is reasonable because doing so provides transparency in the MPCA's decision.

4. Subpart 4. Preliminary antidegradation determination.

Subp. 4. **Preliminary antidegradation determination.** Based upon the review described in subpart 3, the commissioner shall prepare a written preliminary antidegradation determination as to whether the antidegradation standards described in part 7050.0265 are satisfied. The preliminary antidegradation determination must be included with the commissioner's preliminary determination to issue or deny the permit according to part 7001.0100. If, in the commissioner's judgment, the antidegradation standards are not satisfied, reasons why they are not satisfied must be included in the preliminary antidegradation determination.

Subpart 4 requires the MPCA to provide written documentation as to whether the proposed activity will satisfy the antidegradation standards. The preliminary determinations are the means by which those interested in proposed activities are informed and upon which comments are based. It is reasonable that the preliminary determination be included in the decision to issue or deny the permit through existing procedures in Minn. R. 7001.0100 because it is at this point the MPCA determines whether the proposed activity will or will not meet regulatory requirements.

The MPCA anticipates that at this point in the process and through dialogue with the applicant, the vast majority of determinations will result in standards being satisfied. Where serious problems exist with meeting standards, applicants will likely withdraw the proposed activity from consideration early in the process. However, there may be situations where a resolution may not be reached. In these cases it is reasonable that the MPCA include in the preliminary determination the reasons for why antidegradation standards are not met.

5. Subpart 5. Opportunity for comment.

Subp. 5. Opportunity for comment. The commissioner shall:

A. include the preliminary antidegradation determination with the public notice to issue or deny the permit according to part 7001.0100, subpart 4;
B. distribute the public notice according to part 7001.0100, subpart 5; and

C. <u>provide opportunity for comment on the preliminary antidegradation determination according to part 7001.0110.</u>

Subpart 5 allows those interested in how proposed activities impact water quality to comment on the MPCA's preliminary determinations. This subpart is also needed to satisfy federal regulatory requirements found in 40 CFR § 131.12(a)(2). Federal regulations make a distinction between "intergovernmental coordination" and "public participation." The proposed rules combine the two by providing the opportunity for comment from any entity interested in a proposed activity. Minn. R. 7001.0100, subp. 5(B) requires the distribution of the public notice to all persons who have registered their names and addresses on the mailing list established under Minn. R. 7001.0200. This list includes government agencies which have an interest in the MPCA's permit issuances. Additionally, large complex projects involve numerous regulating agencies that will be aware of MPCA's role in environmental protection, including antidegradation requirements.

As with the existing rules, the proposed rules provide an opportunity for comment through processes found in Minn. R ch. 7001. This is a reasonable approach because they are existing procedures that have proven to be an effective way of receiving comments.

6. <u>Subpart 6. Final antidegradation determination.</u>

<u>Subp. 6. **Final antidegradation determination.** The commissioner shall consider comments received under subpart 5 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement of whether the proposed activity achieves or fails to achieve the antidegradation standards specified in part 7050.0265. The final antidegradation determination must be included with the commissioner's final determination to authorize or not authorize the proposed activity according to part 7001.0140.</u>

Requiring a final antidegradation determination is needed because it allows the MPCA to go on record that either 1) the issuance of the permit will provide for antidegradation protection requirements found in proposed Minn. R. 7050.0265 and 40 § CFR 131.12 or 2) the permit is not being issued because the proposed activity cannot meet the antidegradation protection requirements. It is reasonable that the final determination be included with the final determination to authorize or not authorize the activity through existing procedures found in Minn. R. 7001.0140.

H. Procedures for section 401 certifications of individual federal licenses and permits. (Proposed Minn. R. 7050.0285)

Antidegradation standards are implemented through the issuance and enforcement of control documents including section 401 certifications of federal licenses and permits. Section 401 of the CWA requires anyone who wishes to obtain a federal license of permit for any activity that may result in a discharge to waters of the United States to obtain a section 401 certification to ensure proposed projects comply with the state's water quality standards.

EPA guidance specifically calls for states to apply antidegradation through section 401 certifications:

> *It is the position of EPA that, at a minimum, States and authorized Tribes must apply antidegradation requirements to activities that are ''regulated'' under State, Tribal, or federal law (i.e., any activity that requires a permit or a water quality certification pursuant to State, Tribal or federal law, such as CWA § 402 NPDES permits or CWA § 404 dredge and fill permits, any activity requiring a CWA § 401 certification, any activity subject to State or Tribal nonpoint source control requirements or regulations, and any activity which is otherwise subject to State or Tribal regulations that specify that water quality standards are applicable).* Advanced Notice of Proposed Rulemaking, 63 Fed. Reg. 36741 (1998), p. 36780

Further EPA guidance states that:

> *If a State fails to require compliance with its antidegradation policy through section 401 certification related to permits issued by other Federal agencies (e.g., a Corps of Engineers section 404 permit), EPA could comment unfavorably upon permit issuance.* Water Quality Standards Handbook, Second Edition, Chapter 4, U. S. EPA (1994), p. 13

This part is needed to fulfill the federal regulatory requirements to ensure activities regulated under federal licenses and permits comply with the state's water quality standards, including antidegradation requirements.

The vast majority of federal licenses and permits for which section 401 actions are taken by the MPCA are CWA section 404 dredge and fill permits issued by the ACE. Other federal licenses and permits which require section 401 actions include hydropower projects seeking a license from the Federal Energy Regulatory Commission and activities requiring Rivers and Harbors Act sections 9 and 10 (33 U.S.C. § 401 (Exhibit 109)[109] and 33 U.S.C. § 403 (Exhibit 110)[110], respectively) permits issued by the ACE or the Coast Guard.

Federal regulations governing section 404 activities contain some requirements that are very similar to those required in the federal antidegradation regulations. The decision-making process relative to section 404 permitting is contained in the CWA section 404(b)(1) guidelines (40 CFR § 230) (Exhibit 84). Prior to issuing a section 404 permit under the 404(b)(1) guidelines, the ACE:

- makes a determination whether the proposed activity discharge are unavoidable;
- examines alternatives to the proposed activity and authorizes only the least damaging practicable alternative;
- requires mitigation for remaining unavoidable impacts

In addition, the ACE is required to conduct a public interest review to ensure that permitting decisions are based on the evaluation of:

> *…the benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments.* 33 CFR § 320.4(a)(1) (Exhibit 111)[111]

The intention of these proposed procedures is not to create an unnecessarily duplicative process, but rather to ensure compatibility with the ACE permitting processes. The MPCA is the CWA delegated authority to develop, implement and enforce water quality standards, including antidegradation requirements. As such, the ACE relies on the MPCA's section 401 actions to make sure that the issuance of section 404 permits does indeed comply with those standards.

1. Subpart 1. Antidegradation procedures required.

   Subpart 1. **Antidegradation procedures required.** Except as provided in part 7050.0275, the antidegradation procedures in this part apply to section 401 certifications of new, reissued, or modified individual federal licenses and permits that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters.

   This subpart is needed to describe the circumstances that trigger antidegradation procedures when CWA section 401 certifications are issued, reissued, revoked and reissued, or modified for individual federal licenses and permits. The specific circumstances that trigger antidegradation procedures are the same as proposed procedures for other control documents. The need and reasonableness for the trigger is found in Section 5.G.1.

2. Subpart 2. Applicant's antidegradation assessment.

   Subp. 2. **Applicant's antidegradation assessment.** The applicant must provide information specified in part 7050.0280, subpart 2, to the commissioner, unless the applicant is notified that the commissioner is waiving the agency's authority to certify the federal license or permit under part 7001.1460. In addition, the applicant may propose compensatory mitigation for the loss of existing uses and the level of water quality necessary to protect the existing uses resulting from physical alteration. In such cases, the applicant must provide a compensatory mitigation plan that includes:

   A. a description of existing uses and the level of water quality necessary to protect existing uses of the surface waters that will be physically altered;
   B. a description of existing uses and the level of water quality necessary to protect existing uses of the surface waters in which mitigation will occur;
   C. a description of how compensatory mitigation will fully replace existing uses and the level of water quality necessary to protect existing uses; and
   D. a proposal for monitoring and reporting the changes in existing uses and the level of water quality necessary to protect existing uses of the surface waters in which mitigation will occur.

   As with proposed Minn. R. 7050.0280, procedures for section 401 actions taken on individual federal licenses and permits requires the applicant to provide an antidegradation assessment of the proposed activity to the MPCA. The reasoning for doing so is the same (Section 5.G.2.).

   The exception for an applicant to provide an assessment is when the MPCA exercises its authority to waive a section 401 certification. Minn. R. 7001.1460 provides this authority. This exception is reasonable because it would be unnecessary for the applicant to go through the effort of providing an assessment when the MPCA exercises its waiving authority.

Unlike procedures proposed in Minn. R. 7050.0280, this proposed provision does not require the antidegradation assessment to be part of the written application specified in Minn. R. 7001.0050. The reason for this is that, in general, federal license and permit applicants submit their applications directly to the federal agency governing the activity (e.g., the ACE). Under current practices, applicants for 404 permits in Minnesota submit a simplified joint application (Minnesota Local/State/Federal Application Forms for Water/Wetland Projects, September 17, 2007, (Exhibit 112)[112], the intent of which is to satisfy permitting needs of local units of government, the ACE, the MDNR, the Minnesota Board of Water and Soil Resources (MBWSR), and the MPCA. The ACE receives an application and then decides whether the proposed activity warrants coverage under an individual or general CWA section 404 permit. If individual coverage is warranted, the application is sent to the MPCA for section 401 considerations. Oftentimes the MPCA will request additional information from the applicant for complex projects that pose significant risks to water quality. Note that the MPCA and the ACE continue to work together in developing section 404 permit/section 401 certification applications to satisfy the requirements of both agencies.

Some of the information needed for antidegradation determinations that is missing from (or lacks clarity in) the current joint application includes the following:

- The narrow scope of waters (wetlands and public waters) covered in the permit application, which does not adequately address waters of the state. The focus of the joint application is on public waters which are lakes, wetlands, and watercourses over which MDNR has regulatory jurisdiction. The statutory definition of "*public waters*" and "*public waters wetlands*" are found at Minn. Stat. § 103G.005**,** subd. 5, and Minn. Stat. § 103G.005, subd. 5a**.** Although there is considerable overlap in water body types, the definition of "*public waters*" is different than the definition of "*waters of the state*" found in Minn. Stat. § 115.01, subd. 22 or Minn. R. 7050.0130, subp. 2.
- A clear description of alternatives that avoid, minimize or mitigate impacts to waters other than wetlands.
- A description of existing water quality and resulting impacts to that quality.
- A description of impacts outside of the immediate project area (e.g., impacts to downstream waters).
- Justification for impacts based on economic or social development needs.

Detailed information requested in the proposed antidegradation assessment will only be required of the applicant if a section 401 certification of an individual section 404 permit is required and antidegradation procedures are triggered. It would be unreasonable for an applicant to spend effort in providing a detailed assessment if the project merits only general permit coverage or does not trigger antidegradation procedures. The elements required in the proposed provision are the same as those required of applicants under proposed Minn. R. 7050.0280. The need and reasonableness of each element is provided in Section 5.G.2.

There is one additional element not found in the assessment under proposed Minn. R. 7050.0280 – that the applicant may propose compensatory mitigation for the loss of an existing use resulting from physical alteration. Inclusion of this element is reasonable because section 404 permits which regulate physical alterations include allowance for compensatory mitigation, while NPDES permits do not.

Federal regulations at 33 CFR § 332, jointly developed by the ACE and the EPA, govern compensatory mitigation for the losses of aquatic resources. The requirements described in the proposed provision, and shown below, are reasonable because they comport with these regulations.

- Applicant's responsibility for proposing a mitigation plan

  > *Permit applicants are responsible for proposing an appropriate compensatory mitigation option to offset unavoidable impacts.* 33 CFR § 332.3(a)(1) (Exhibit 88)
  >
  > *For individual permits, the permittee must prepare a draft mitigation plan and submit it to the district engineer for review*. 33 CFR § 332.4(c)(1)(i) (Exhibit 113)[113]

- The plan includes baseline information regarding the water bodies which will be impacted and the water bodies in which mitigation will occur

  > *Baseline information. A description of the ecological characteristics of the proposed compensatory mitigation project site and, in the case of an application for a DA permit, the impact site. This may include descriptions of historic and existing plant communities, historic and existing hydrology, soil conditions, a map showing the locations of the impact and mitigation site(s) or the geographic coordinates for those site(s), and other site characteristics appropriate to the type of resource proposed as compensation.* 33 CFR § 332.4(c)(5) (Exhibit 113)

- The plan includes a description of how compensatory mitigation will be accomplished

  > *Objectives. A description of the resource type(s) and amount(s) that will be provided, the method of compensation (i.e., restoration, establishment, enhancement, and/or preservation), and the manner in which the resource functions of the compensatory mitigation project will address the needs of the watershed, ecoregion, physiographic province, or other geographic area of interest.* 33 CFR § 332.4(c)(2) (Exhibit 113)

- The plan includes a proposal for monitoring the changes in water quality of the water bodies in which mitigation has occurred

  > *Monitoring requirements. A description of parameters to be monitored in order to determine if the compensatory mitigation project is on track to meet performance standards and if adaptive management is needed. A schedule for monitoring and reporting on monitoring results to the district engineer must be included.* 33

CFR § 332.4(c)(10) (Exhibit 113) (Also see CFR § 332.6 (Exhibit 114)[114] for more detail.)

3. Subpart 3. Antidegradation review.

Subp. 3. **Antidegradation review.** The commissioner shall conduct an antidegradation review based on the information provided under subpart 2 and other reliable information available to the commissioner concerning the proposed activity and other activities that cause cumulative changes in existing water quality in the surface waters. The purpose of the antidegradation review is to evaluate whether issuing the section 401 certification for the proposed activity will satisfy the antidegradation standards in part 7050.0265.

This provision is nearly identical to the antidegradation review proposed in the previous procedures. The only difference is that the MPCA does not provide notification to the applicant when the MPCA finds that the applicable antidegradation standards will not be satisfied. Rather, the MPCA places conditions on the license or permit to ensure antidegradation standards are satisfied. In situations where they cannot be satisfied, even with additional conditions, the certification will be denied. Under the section 401 program, the MPCA has the authority to include conditions that become part of a federal permit or license or deny certification to ensure standards are met.

4. Subpart 4. Preliminary antidegradation determination.

Subp. 4. **Preliminary antidegradation determination.** Based upon the review described in subpart 3, the commissioner shall prepare a written preliminary antidegradation determination as to whether the antidegradation standards described in part 7050.0265 are satisfied or can be satisfied by issuing a section 401 certification with conditions. The preliminary antidegradation determination must be included with the commissioner's preliminary determination to issue or deny the section 401 certification according to part 7001.0100 and, if applicable, include the conditions necessary to satisfy antidegradation standards. If, in the commissioner's judgment, the antidegradation standards are not satisfied, reasons why they are not satisfied must be included in the preliminary antidegradation determination.

The requirements for preliminary determinations under these procedures are the same as that found in the previous procedures, the need and reasonableness for which was discussed in Section 5.G.4. As noted above, the MPCA has the authority to include conditions or deny certification to ensure standards are met.

5. Subpart 5. Opportunity for comment.

Subp. 5. **Opportunity for comment.** The commissioner shall prepare and distribute a public notice of the preliminary antidegradation determination with the preliminary determination to issue or deny the section 401 certification through the procedures described in part 7001.1440, except that part 7001.1440, subpart 2.

The need and reasonableness of providing an opportunity for comment is addressed in Section 5.G.5. The proposed provision reasonably utilizes existing procedures found in Minn. R. 7001.1440 to obtain comments through the section 401 certification process. However, the proposed provision contains one exception to the procedures found in Minn. R. 7001.1440. Subpart 2 of this rule states that:

> *The commissioner is not required to prepare and distribute a public notice pursuant to part 7001.0100, subpart 4, if the commissioner finds that a federal agency or department has prepared and distributed or will prepare and distribute a public notice concerning a section 401 certification in accordance with the public notice requirements applicable to the federal agency or department under federal statutes or regulations, so long as the notice is actually prepared and distributed.* Minn. R. 7001.1440, subp. 2

Proposed subpart 5 requires the MPCA to provide a separate public notice of the preliminary determination. Federal authorities generally issue public notices of receipt of a project application, prior to the MPCA's review of the proposed activity. Relying on a federal authority's public notice will not allow the public to comment on whether the proposed project, with or without conditions, meets antidegradation standards. This is particularly true regarding the MPCA's responsibilities for the protection of high water quality. Federal antidegradation regulations at 40 CFR § 131.12(a)(2) require the MPCA to make a finding that lowering of high water quality is necessary to accommodate important economic or social development after the opportunity for public participation. Ultimately, it is the MPCA, not the federal authority, which is responsible for implementing antidegradation requirements and making antidegradation determinations. Therefore the public should have the opportunity to weigh in on MPCA's determinations.

6. Subpart 6. Final antidegradation determination.

Subp. 6. **Final antidegradation determination.** The commissioner shall consider comments received under subpart 5 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement of whether the proposed activity achieves or fails to achieve the antidegradation standards specified in part 7050.0265. The final antidegradation determination must be included with the commissioner's final determination according to part 7001.1450.

The need and reasonableness of providing a final determination was addressed in Section 5.G.6. It is reasonable that the final antidegradation determination be included with the MPCA's final determination to issue or deny the CWA section 401 certification through existing procedures found in Minn. R. 7001.1450.

I. Procedures for individual NPDES permits for municipal separate storm sewer systems. (Proposed Minn. R. 7050.0290)

This part is needed to implement antidegradation provisions through the issuance of individual NPDES permits for municipal stormwater activities.

1. Subpart 1. Antidegradation procedures required.

Subpart 1. **Antidegradation procedures required.** The antidegradation procedures in this part apply to new, reissued, or modified individual NPDES permits for municipal separate storm sewer systems, as defined under part 7090.0080, subpart 8, that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters.

This subpart is needed to describe the circumstances that trigger antidegradation procedures for activities regulated under individual NPDES permits for municipal stormwater activities. The specific circumstances that trigger antidegradation procedures are the same as proposed procedures for other control documents. The need and reasonableness for the trigger is found in Section 5.G.1.

Further clarification may be helpful to explain how procedures are actually triggered under this type of control document. Because municipal stormwater permits, both general and individual, provide coverage for activities that impact multiple surface waters within a municipality's jurisdiction, a question arises as to whether antidegradation procedures are triggered based on aggregate loadings to all surface waters within the jurisdiction or whether procedures are triggered when there are anticipated increased loadings to any of the individual surface waters within the municipality's jurisdiction. The MPCA believes that latter approach better aligns with the intent of antidegradation policies to provide protection to individual surface waters. Therefore antidegradation procedures will be required when a net increase in loading or other causes of degradation are anticipated for any surface water within the municipality's jurisdiction.

2. Subpart 2. Applicant's antidegradation assessment.

Subp. 2. **Applicant's antidegradation assessment.** The applicant must include the following information with the written permit application specified in part 7001.0050:

A. a list of Class 2 surface waters identified as impaired pursuant to section 303(d) of the Clean Water Act within the applicant's jurisdiction;
B. a list of surface waters listed in part 7050.0335 within the applicant's jurisdiction;
C. an analysis of prudent and feasible prevention, treatment, or loading offset alternatives that avoid or minimize net increases in loading or other causes of degradation to high water quality;
D. identification of prudent and feasible prevention, treatment, or loading offset alternatives that result in the least net increase in loading or other causes of degradation to high water quality; and
E. an evaluation of whether net increases in loading or other causes of degradation to high water quality accommodates important economic or social change in the geographic area in which high water quality degradation is reasonably anticipated.

The general need and reasonableness of including an applicant's antidegradation assessment is discussed in Section 5.G.2. This subpart is similar to the assessment requirements found in the two previous procedures in that the applicant is required to provide an alternatives analysis that evaluates whether net increases in loading or other causes of degradation can prudently and feasibly be avoided. The alternatives analysis differs from the previous procedures by requiring the applicant to identify alternatives which prudently and feasibly minimize net increases in loading or other causes of degradation, rather than minimizing degradation. The reason for this difference is that, as further explained in Section 5.E.1., requiring municipal stormwater permit applicants to provide assessments of existing water quality and impacts to existing water quality of individual surface waters is not reasonable.

Because water quality assessment of individual surface waters is not reasonable, Item A requires the applicant to provide a list of Class 2 impairments within the applicant's jusisdictionThis is important because the MPCA will need to include different permit conditions depending on whether or not the impacted water is impaired. Permit conditions to protect impaired waters must avoid net increases in loading, or align with EPA-approved TMDLs. Conditions for waters that are of high quality will need to ensure that net increases in loading are minimized to the extent prudent and feasible.

The applicant is also required to provide a list of ORVWs within the applicant's jurisdiction (Item B). The reasoning is similar to that stated above – so that permit conditions may be developed to provide for the maintenance and protection of the exceptional ORVW characteristics.

Item C and D are needed to determine whether the net increase in loading or other causes of degradation can prudently and feasible be avoided, and, when this is not possible, identify alternatives that minimize net increases in loading or other causes of degradation. Providing this information is reasonable because it will assist the MPCA in the determination of whether the increased loading is necessary.

Item E requires the applicant to provide an evaluation of whether the increased loading or other causes of degradation accommodate important economic or social development. This provision is needed to help the MPCA in its determination of whether the increased loading is important. Note that this provision does not require the applicant to justify high water quality degradation because of the impracticality in measuring changes to existing water quality under situations where very large number of surface waters are covered under a given control document.

3. Subpart 3. Antidegradation review.

   Subp. 3. **Antidegradation review.** The commissioner shall conduct an antidegradation review based on the information provided under subpart 2 and other reliable information available to the commissioner concerning the proposed activity and other activities that cause cumulative changes in existing water quality in the surface waters. The purpose of the antidegradation review is to evaluate whether the proposed activity will satisfy the antidegradation standards in part 7050.0270. If, in the commissioner's judgment, the antidegradation standards described in part 7050.0270 will not be satisfied, the commissioner shall provide written notification to the applicant of the deficiencies and provide recommendations necessary to satisfy the antidegradation standards in part 7050.0270.

This subpart is similar to the antidegradation review proposed for other individual NPDES permits (proposed Minn. R. 7050.0280, subpart 3). The difference is that this review looks at whether the proposed activity will satisfy the antidegradation standards specific to control documents where individual water quality assessments are not reasonable (proposed Minn. R. 7050.0270). The need for and reasonableness of conducting an antidegradation review is provided in Section 5.G.3.

4. Subpart 4. Preliminary antidegradation determination.

Subp. 4. **Preliminary antidegradation determination.** Based upon the review described in subpart 3, the commissioner shall prepare a written preliminary antidegradation determination as to whether the antidegradation standards described in part 7050.0270 are satisfied. The preliminary antidegradation determination must be included with the commissioner's preliminary determination to issue or deny the permit according to part 7001.0100. If, in the commissioner's judgment, the antidegradation standards are not satisfied, reasons why they are not satisfied must be included in the preliminary antidegradation determination.

Again, this provision is similar to the preliminary determination proposed for other individual NPDES permits (proposed Minn. R. 7050.0280, subpart 4). The difference is that this preliminary determination is based on the antidegradation standards specific to control documents where individual water quality assessments are not reasonable (proposed Minn. R. 7050.0270). The need for and reasonableness of providing a preliminary determination is provided in Section 5.G.4.

5. Subpart 5. Opportunity for comment.

Subp. 5. **Opportunity for comment.** The commissioner shall:

A. include the preliminary antidegradation determination with the public notice to issue or deny the permit according to part 7001.0100, subpart 4;
B. distribute the public notice according to part 7001.0100, subpart 5; and
C. provide opportunity for comment on the preliminary antidegradation determination according to part 7001.0110.

This provision is identical to proposed Minn. R. 7050.0280, subpart 5. The proposed rule language is repeated here because referencing the previous provision would not shorten the rule. The need for and reasonableness of providing an opportunity for comment is provided in Section 5.G.5.

6. Subpart 6. Final antidegradation determination.

Subp. 6. **Final antidegradation determination.** The commissioner shall consider comments received under subpart 5 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement of whether the proposed activity achieves or fails to achieve the antidegradation standards specified in part 7050.0270. The final antidegradation determination must be included with the commissioner's final determination to authorize or not authorize the proposed activity according to part 7001.0140.

This provision is similar to the final antidegradation determination proposed for other individual NPDES permits (proposed Minn. R. 7050.0280, subpart 6). The difference is that in this case the final determination is made regarding whether the proposed activity will satisfy the antidegradation standards specific to control documents where individual water quality assessments are not reasonable (proposed Minn. R. 7050.0270). The need for and reasonableness of providing a final determination is provided in Section 5.G.6.

J. Procedures for general NPDES permits. (Proposed Minn. R. 7050.0295)

General NPDES permits are issued to categories of permittees whose operations, emissions, activities, discharges, or facilities are the same or substantially similar (Minn. R. 7001.0010, subp. 4). The issuance of general permits provides for administrative efficiency where there are large numbers of permittees. This part is needed to implement antidegradation through the issuance of general NPDES permits.

1. Subpart 1. Antidegradation procedures required.

Subpart 1. **Antidegradation procedures required.** The antidegradation procedures in this part apply to new, reissued, or modified general NPDES permits that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters.

This subpart is needed to describe the circumstances that trigger antidegradation procedures for activities regulated under general NPDES permits. The specific circumstances that trigger antidegradation procedures are the same as proposed procedures for other control documents. The need and reasonableness for the trigger is found in Section 5.G.1.

2. Subpart 2. Antidegradation review.

Subp. 2. **Antidegradation review.** The commissioner shall conduct an antidegradation review during the development of general NPDES permits. The purpose of the antidegradation review is to develop permit conditions that will ensure that the antidegradation standards in part 7050.0270 are satisfied.

Unlike the three previous procedures for individual authorizations, these procedures do not require applicants to provide antidegradation assessments. Subpart 2 requires the MPCA to conduct an antidegradation review during the development of general permits. This is reasonable because it mediates the tensions between the administrative efficiency of general permit programs and federal antidegradation requirements. Requiring each applicant seeking coverage under a general permit to prepare an antidegradation assessment and the MPCA to conduct a review on each assessment is impractical. For example, between 2008 and 2012, the MPCA provided coverage under the NPDES general construction stormwater permit for 2,023 permittees each year on average.

The review evaluates whether the issuance of the permit will satisfy the antidegradation standards specified in proposed Minn. R. 7050.0270. These standards include all of the required antidegradation protection elements required in federal regulations. In order to satisfy the standards, the MPCA must analyze the pollution control measures that avoid and minimize net increases in loading or other causes of degradation. The evaluation of alternatives and the identification of pollution control measures that minimize net increases in loading or other causes of degradation are reasonable because it fits well with current permit development practices. The selection of pollution control measures which avoid and minimize impacts to surface waters and their incorporation into permit conditions is currently practiced through an adaptive management process. Adaptive management allows the MPCA to evaluate the effectiveness of control measures over sequential permit cycles. Control measures that prove to be effective will likely be included in subsequent permit conditions and those that are ineffective will likely be dropped. In addition, our understanding of practices that improve and protect water quality is continually growing. Conducting evaluations of pollution control measures during the development of each general permit allows the MPCA to better protect the State's waters. The evaluation of alternatives is also reasonable because it creates transparency in the MPCA's decision-making process. Although the evaluation of pollution control measures is currently practiced, it is not formally called an "*alternatives analysis.*" This provision gives the practice a title, provides a framework for the evaluation and provides for greater transparency through the public comment.

Best management practices (BMPs), often employed in stormwater permits to achieve compliance with water quality standards, are one set of control measures the MPCA may consider in the evaluation of alternatives. However, the alternatives analysis is not limited strictly to BMPs and may include other means, such as design standards, to minimize water quality impacts. For example, to promote low impact development the Minnesota legislature in 2008 authorized the MPCA to develop design standards:

> *The agency shall develop performance standards, design standards, or other tools to enable and promote the implementation of low-impact development and other storm water management techniques. For the purposes of this section, "low-impact development" means an approach to storm water management that mimics a site's natural hydrology as the landscape is developed. Using the low-impact development approach, storm water is managed on-site and the rate and volume of predevelopment storm water reaching receiving waters is unchanged. The calculation of predevelopment hydrology is based on native soil and vegetation.* Minn. Stat. § 115.03*, subd. 5c(c)*

One of the outcomes of this legislation is an effort to develop minimal impact design standards (MIDS) with the objectives of:

- reducing runoff volumes and rates;
- improving runoff quality;
- developing a unified crediting system for practitioners and the MPCA to document pollutant load reductions.

The MIDS concept was initiated by a partnership among the Minnesota Cities Stormwater Coalition, regulated stormwater entities, the League of Minnesota Cities, the Builder's Association of the Twin Cities, environmental advocacy organizations, local watershed districts, the Stormwater Steering Committee of the MPCA, and state legislators interested in water quality protection. From this partnership a MIDS workgroup was formed to develop performance goals, a credit calculator and model ordinances. Elements of the workgroup's efforts resemble an antidegradation alternatives analysis through which design standards were identified to minimize impacts to water quality. Where appropriate, the MPCA may be able to utilize some of these elements into future alternatives analyses.

Also implicit in the review is the MPCA's evaluation of whether net increases in loading or other causes of degradation to high water quality resulting from the activities covered by a general permit accommodates important economic or social development. Because of the impracticality of determining impacts to the existing water quality of individual water bodies covered under general permits, the evaluation of importance must be made in a general sense. In the case of general permits, the MPCA will need to evaluate the benefits of issuing a general permit and the types of activities it covers despite not knowing which waters will be degraded and by how much. This is a reasonable approach given the numerous water bodies and activities covered under general permits.

Note that the MPCA has the ability to require individual permit coverage when it determines that coverage under a general permit is not appropriate.

> *If the agency finds that the operations, emissions, activities, discharges, or facilities of a permit applicant or a permittee covered by a general permit would be more appropriately controlled by an individual permit, the agency shall issue an individual permit to the applicant or the permittee. Upon issuance of the individual permit, a general permit previously applicable to the permittee no longer applies to that permittee. In considering whether it is appropriate to issue an individual permit, the agency shall consider:*
>
> A. *whether the operations, emissions, activities, discharges, or facilities of the permit applicant or permittee have characteristics creating the potential for significant environmental effects;*
> B. *whether the permittee has been in compliance with the terms of the general permit and applicable statutes and rules;*
> C. *whether the operations, emissions, activities, discharges, or facilities have been altered such that they no longer fit within the category covered by the general permit.* Minn. R. 7001.0210, subp. 6

3. Subpart 3. Preliminary antidegradation determination.

Subp. 3. **Preliminary antidegradation determination.** Based upon the review described in subpart 2, the commissioner shall prepare a written preliminary antidegradation determination as to whether the permit conditions will satisfy the antidegradation standards described in part 7050.0270. The preliminary antidegradation determination must be included with the commissioner's fact sheet according to part 7001.0100, subpart 3.

The preliminary determination is needed and reasonable because it provides those interested in the issuance of a general NPDES permit with adequate information to enable them to comment as to whether the antidegradation standards will be satisfied.

4. Subpart 4. Opportunity for comment.

Subp. 4. **Opportunity for comment.** The commissioner shall:

A. include the preliminary antidegradation determination with the public notice of intent to issue a general permit according to part 7001.0210, subpart 4;
B. distribute the public notice according to part 7001.0100, subpart 5; and
C. provide opportunity for comment on the preliminary antidegradation determination according to part 7001.0110.

This provision is similar to proposed provisions for opportunities to comment on individual NPDES permits (subparts 5 of proposed Minn. R. 7050.0280 and 7050.0290). The only difference is that under this provision the preliminary determination is reasonably included with the public notice of intent to issue the permit according to general permit procedures in Minn. R. 7001.0210, subp. 4.

5. Subpart 5. Final antidegradation determination.

Subp. 5. **Final antidegradation determination.** The commissioner shall consider comments received under subpart 4 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement that issuing the general NPDES permit achieves or fails to achieve the antidegradation standards specified in part 7050.0270. The final antidegradation determination must be included with the commissioner's final determination according to part 7001.0140.

This provision is similar to the final antidegradation determination proposed for individual NPDES permits for municipal stormwater activities (proposed Minn. R. 7050.0290, subpart 6) because both permit types are subject to the same antidegradation standards. The difference is that in this case the final determination is made regarding whether the issuance of the general permit itself will satisfy the antidegradation standards under proposed Minn. R. 7050.0270.

6. Subpart 6. Further antidegradation procedures not required.

Subp. 6. **Further antidegradation procedures not required.** Except as provided in part 7050.0325, if the commissioner's final antidegradation determination states that issuing a general NPDES permit will achieve the antidegradation standards specified in part 7050.0270, further antidegradation procedures are not required when a person seeking coverage under the general NPDES permit certifies that the permit conditions can and will be met.

Subpart 6 is needed to clarify that individual antidegradation procedures are not required when a person seeking coverage under a general NPDES permit meets the conditions of the permit. This is reasonable because the review will have already been conducted, the public will have had an opportunity to weigh in on the MPCA's preliminary determination and a final determination will have been made that the standards are satisfied when permit conditions are met. The only exception to this, as provided in proposed Minn. R. 7050.0325, is when an activity covered under a general NPDES permit is also regulated under a control document where assessments of impacts to existing water quality are reasonable. In such cases it is reasonable that an individual evaluation of the proposed activity occur and the more protective standards (i.e., proposed Minn. R. 7050.0265) apply.

K. Procedures for section 401 certifications of general section 404 permits. (Proposed Minn. R. 7050.0305)

This part is needed to implement antidegradation requirements through CWA section 401 certifications of section 404 general permits. Section 404 of the CWA authorizes the ACE to issue general permits on a state, regional or nationwide basis for activities which are similar in nature, will cause only minimal adverse environmental effects when performed separately, and will have only minimal cumulative adverse effect on the environment. Just as with section 404 individual permits, section 404 general permits must be based on section 404(b)(1) guidelines found in 40 CFR § 230 (Exhibit 84) and the public interest review (PIR) requirements found in 33 CFR § 320.4 (Exhibit 111).

1. Subpart 1. Antidegradation procedures required.

   Subpart 1. **Antidegradation procedures required.** The antidegradation procedures in this part apply to section 401 certifications of new, reissued, or modified general section 404 permits that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters, unless the federal permitting authority is notified that the commissioner is waiving the agency's authority to certify the permit under part 7001.1460.

   This subpart is needed to describe the circumstances that trigger antidegradation procedures for section 401 certifications of section 404 general permits. The specific circumstances that trigger antidegradation procedures are the same as proposed procedures for other control documents. The need and reasonableness for the trigger is found in Section 5.G.1. The exception is for when section 401 certifications that are waived under Minn. R. 7001.1460. This is reasonable because the MPCA should not needlessly undergo a review process for a permit for which a section 401 certification is ultimately waived.

2. Subpart 2. Antidegradation review.

   Subp. 2. **Antidegradation review.** Upon public notice of a draft general section 404 permit, the commissioner shall review the determinations specified in Code of Federal Regulations, title 33, part 320, subpart 4, and Code of Federal Regulations, title 40, part 230, subpart 7. The purpose of the antidegradation review is to evaluate whether issuing the section 401 certification for the general section 404 permit will satisfy the antidegradation standards in part 7050.0270.

   The need and reasonableness of not requiring applicants for general authorizations to provide antidegradation assessments and for the MPCA to conduct reviews without those assessments was provided in Section 5.J.2.

   For general section 404 permits, 40 CFR § 230.7 (Exhibit 75) requires the ACE to provide a determination that activities covered under the permit meet certain requirements that are similar to antidegradation requirements. For example, conditions for section 404 general permit issuance include that the activities will only have a minimal impact on water quality and will not cause or contribute to violations of states' water quality standards. The regulations require the ACE to make a determination that the discharges will not result in significant adverse effects on special aquatic sites, (e.g., ORVWs, Tier 3 antidegradation protection) or economic values. Federal regulations at [33 CFR § 320.4](a) (Exhibit 111) also require the ACE to conduct a PIR and make a determination that the issuance of a section 404 permit is not contrary to the public interest. This is very similar to the antidegradation demonstration that when high water quality is degraded, the lowering of that quality must be necessary to accommodate important economic or social development.

The ACE's determinations on section 404 general permits are prepared at the time of permit issuance rather than for each subsequent discharge allowed under the authority of that permit ([40 CFR § 230.12](b) (Exhibit 115)[115]. Thus, the applicant needs merely to comply with the permit conditions and no further evaluation is required of individual projects covered under the permit ([40 CFR § 230.5](b) (Exhibit 116)[116]. This approach aligns with the proposed approach for applying antidegradation requirements though general authorizations.

The ACE is required to provide public notice of section 404 general permits ([33 CFR § 325.3](b) (Exhibit 117)[117]. It is at this time that the MPCA has the opportunity to review the draft permit to ensure the issuance of the section 404 permit will result in compliance with water quality standards. It is reasonable for the MPCA to use this time to include conditions in the section 401 certification that will ensure antidegradation requirements are satisfied. The MPCA's inclusion of permit conditions is supported by the ACE regulations, which state that:

> *District engineers will add special conditions to Department of the Army permits when such conditions are necessary to satisfy legal requirements or to otherwise satisfy the public interest requirement. Permit conditions will be directly related to the impacts of the proposal, appropriate to the scope and degree of those impacts, and reasonably enforceable.*
>
> *(1) Legal requirements which may be satisfied by means of Corps permit conditions include compliance with the 404(b)(1) guidelines, the EPA ocean dumping criteria, the Endangered Species Act, and requirements imposed by conditions on state section 401 water quality certifications.* [33 CFR § 325.4](a) (Exhibit 118)[118]

3. <u>Subpart 3. Preliminary antidegradation determination.</u>

<u>Subp. 3. **Preliminary antidegradation determination.** Based upon the review described in subpart 2, the commissioner shall prepare a written preliminary antidegradation determination as to whether the antidegradation standards described in part 7050.0270 are satisfied or can be satisfied by issuing a section 401 certification with conditions. The preliminary antidegradation determination must be included with the commissioner's preliminary determination to issue or deny the section 401 certification according to part 7001.0100 and, if applicable, include the conditions necessary to satisfy antidegradation standards. If, in the commissioner's judgment, the antidegradation standards are not satisfied,</u>

reasons why they are not satisfied must be included in the preliminary antidegradation determination.

This provision is similar to the preliminary antidegradation determinations required in procedures under proposed Minn. R. 7050.0280 and 7050.0285. The difference is that the preliminary determination made under this provision is that the antidegradation standards under proposed Minn. R. 7050.0270 (not the standards in proposed Minn. R. 7050.0265) are satisfied. The preliminary determination is needed to provide those interested in the issuance of a general section 404 permit with adequate information on which to comment.

4. Subpart 4. Opportunity for comment.

   Subp. 4. **Opportunity for comment.** The commissioner shall prepare and distribute a public notice of the preliminary antidegradation determination with the preliminary determination to issue or deny the section 401 certification through the procedures described in part 7001.1440, except that part 7001.1440, subpart 2, does not apply.

   This provision is the same as the opportunity for comment on preliminary determinations for section 401 certifications of individual federal licenses and permits. The need for and reasonableness is the same (Section 5.H.5).

5. Subpart 5. Final antidegradation determination.

   Subp. 5. **Final antidegradation determination.** The commissioner shall consider information received under subpart 4 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement of whether issuing the general section 404 permit achieves or fails to achieve the antidegradation standards specified in part 7050.0270. The final antidegradation determination must be included with the commissioner's final determination according to part 7001.1450.

   The need and reasonableness of including a final antidegradation determination is provided in Section 5.G.6. This provision is similar to the final antidegradation determination for general NPDES permits, except that the determination is reasonably made through the MPCA's final determination to issue or not issue section 401 certifications (Minn. R. 7001.1450).

6. Subpart 6. Further antidegradation procedures not required.

   Subp. 6. **Further antidegradation procedures not required.** Except as provided in part 7050.0325, if the commissioner's final antidegradation determination states that issuing a general section 404 permit will achieve the antidegradation standards specified in part 7050.0270, further antidegradation procedures are not required when a person seeking coverage under the general section 404 permit certifies that the permit conditions can and will be met.

   Like the provision under proposed Minn. R. 7050.0295, subp. 6 for general NPDES permits, antidegradation procedures for activities covered under general section 404 permits will generally not be required when applicants for the general section 404 permits meet permit conditions. The exception to, the need for, and the reasonableness of this exception is discussed in Section 5.M.

L. Procedures for Section 401 Certifications of General Federal Licenses and Permits Other Than Section 404 Permits. (Proposed Minn. R. 7050.0315)

This part is needed to implement antidegradation requirements though CWA section 401 certifications of general federal licenses and permits other than general section 404 permits. While general section 404 permits requirements are similar to those of antidegradation protection, other general federal license and permit requirements may differ. It is therefore reasonable to include a separate set of procedures for general federal licenses and permits other than section 404 permits.

1. Subpart 1. Antidegradation procedures required.

   Subpart 1. **Antidegradation procedures required.** The antidegradation procedures in this part apply to section 401 certifications of new, reissued, or modified general federal licenses and permits that are not section 404 permits that the commissioner anticipates will result in net increases in loading or other causes of degradation to surface waters, unless the federal licensing or permitting authority is notified that the commissioner is waiving the agency's authority to certify the license or permit under part 7001.1460.

   This subpart is needed to describe the circumstances that trigger antidegradation procedures for section 401 certifications of federal licenses and permits other than for section 404 general permits. The specific circumstances that trigger antidegradation procedures are the same as proposed procedures for other control documents. The need and reasonableness for the trigger is found in Section 5.G.1.

2. Subpart 2. Antidegradation review.

   Subp. 2. **Antidegradation review.** Upon public notice of a draft general federal license or permit, the commissioner shall review the draft general federal license or permit to evaluate whether issuing the section 401 certification for the general federal license or permit will satisfy the antidegradation standards in part 7050.0270.

   The need and reasonableness of not requiring applicants seeking general authorization coverage to provide antidegradation assessments, and for the MPCA to conduct reviews without those assessments, is provided in Section 5.J.2. The antidegradation review under these procedures differs from those proposed for general section 404 permits, which rely in part on the ACE's determinations. Other federal agencies do not make equivalent determinations. Thus the MPCA must reasonably rely on review of the draft general federal license or permit itself in the evaluation of whether the issuance of the license or permit will satisfy antidegradation standards.

3. Subpart 3. Preliminary antidegradation determination.

   Subp. 3. **Preliminary antidegradation determination.** Based upon the review described in subpart 2, the commissioner shall prepare a written preliminary antidegradation determination as to whether the antidegradation standards described in part 7050.0270 are satisfied or can be satisfied by issuing a section 401 certification with conditions. The preliminary antidegradation determination must be included with the commissioner's preliminary determination to issue or deny the section 401 certification according to part 7001.0100 and, if applicable, include the conditions necessary to satisfy antidegradation standards. If, in the commissioner's judgment, the antidegradation standards are not satisfied, reasons why they are not satisfied must be included in the preliminary antidegradation determination.

The need and reasonableness of the MPCA providing a preliminary antidegradation determination is provided in Section 5.G.4.

4. Subpart 4. Opportunity for comment.

   Subp. 4. **Opportunity for comment.** The commissioner shall prepare and distribute a public notice of the preliminary antidegradation determination with the preliminary determination to issue or deny the section 401 certification through the procedures described in part 7001.1440, except that part 7001.1440, subpart 2, does not apply.

   The need and reasonableness of the MPCA providing an opportunity for comment is provided in Section 5.H.5.

5. Subpart 5. Final antidegradation determination.

   Subp. 5. **Final antidegradation determination.** The commissioner shall consider information received under subpart 4 before preparing a written final antidegradation determination. The final antidegradation determination must include a statement of whether issuing the general federal license or permit achieves or fails to achieve the antidegradation standards specified in part 7050.0270. The final antidegradation determination must be included with the commissioner's final determination according to part 7001.1450.

   The need and reasonableness of including a final antidegradation determination is provided in Section 5.G.6.

6. Subpart 6. Further antidegradation procedures not required.

   Subp. 6. **Further antidegradation procedures not required.** Except as provided in part 7050.0325, if the commissioner's final antidegradation determination states that issuing a general federal license or permit will achieve the antidegradation standards specified in part 7050.0270, further antidegradation procedures are not required when a person seeking coverage under the general federal license or permit certifies that the license or permit conditions can and will be met.

   The need and reasonableness for not requiring antidegradation review on individual projects covered general authorizations is addressed in Section 5.J.6.

M. Procedures for Multiple Control Documents. (Proposed Minn. R. 7050.0325)

Items A and B apply to proposed activities requiring more than one control document:

A. when the proposed activity requires compliance with standards in both parts 7050.0265 and 7050.0270, the commissioner shall require procedures for which standards in part 7050.0265 apply; and

B. when the proposed activity requires compliance with standards in part 7050.0265 and is subject to more than one procedure, only the procedure that is most protective of existing water quality, as specified by the commissioner, is required.

This provision is needed to address how antidegradation requirements will be satisfied when a single activity is regulated under more than one control document.

Item A provides procedures for situations where the activity requires more than one control document: one for which the antidegradation standards in proposed Minn. R. 7050.0270 apply (i.e., existing water quality impacts not reasonably quantified), and one for which standards in proposed Minn. R. 7050.0265 apply (i.e., existing water quality impacts are reasonably quantified). In these situations the MPCA will require that the applicant follow the procedures applicable to the latter set of standards. For example, a given activity may be covered under a general NPDES stormwater permit, but may also require a section 401 certification for an individual section 404 permit. In this case the applicant would not be exempt from antidegradation procedures, but must complete those required for the section 401 certification. This approach is reasonable and more protective of the resource because the impacts to existing water quality can reasonably be quantified.

Item B provides procedures for situations where an activity requires more than one control document, both of which are subject to standards in proposed Minn. R. 7050.0265 (i.e., existing water quality impacts are reasonably quantified). In these situations only one procedure will be required. This reduces redundancy and effort in the applicant's preparation of antidegradation assessments and the MPCA's review of those assessments. It is reasonable that the MPCA make the decision of which control document under which the procedures will occur because it is the MPCA that is accountable for antidegradation water quality protection. An example of this situation is where a project requires both an individual Coast Guard permit and an individual section 404 permit.

N. Designated Outstanding Resource Value Waters (Proposed Minn. R. 7050.0335)

This part is needed to identify waters of the state which receive the highest levels of antidegradation protection.

1. Subpart 1. Restricted outstanding resource value waters.

Subpart 1. **Restricted outstanding resource value waters.** For the purposes of parts 7050.0250 to 7050.0335, the following surface waters are restricted outstanding resource value waters:

A. Lake Superior, except those portions identified in subpart 3, item B, as a prohibited outstanding resource value waters;

B. those portions of the Mississippi River from Lake Itasca to the southerly boundary of Morrison County that are included in the Mississippi Headwaters Board comprehensive plan dated February 12, 1981;

C. lake trout lakes, both existing and potential, as determined by the commissioner in conjunction with the Department of Natural Resources, outside the boundaries of the Boundary Waters Canoe Area Wilderness and Voyageurs National Park and identified in parts 7050.0460 to 7050.0470;

D. the following state and federal designated scenic or recreational river segments:

 (1) Saint Croix River, entire length;
 (2) Cannon River from northern city limits of Faribault to its confluence with the Mississippi River;
 (3) North Fork of the Crow River from Lake Koronis outlet to the Meeker-Wright county line;
 (4) Kettle River from north Pine County line to the site of the former dam at Sandstone;
 (5) Minnesota River from Lac qui Parle dam to Redwood County State-Aid Highway 11;
 (6) Mississippi River from County State-Aid Highway 7 bridge in Saint Cloud to northwestern city limits of Anoka;
 (7) Rum River from State Highway 27 bridge in Onamia to Madison and Rice Streets in Anoka; and

E. the following surface waters associated with calcareous fens. The number following the name of the fen is the occurrence number assigned by the Department of Natural Resources that uniquely identifies the record of information for the particular fen:

 (1) Becker County: Spring Creek WMA NHR fen, 34 (T.142, R.42, S.13);
 (2) Carver County: Seminary fen, 75 (T.116, R.23, S.35);
 (3) Clay County:
  (a) Barnesville Moraine fen, 44 (T.137, R.44, S.18);
  (b) Barnesville WMA fen, 10 (T.137, R.45, S.1);
  (c) Barnesville WMA fen, 43 (T.137, R.44, S.18);
  (d) Felton Prairie fen, 28 (T.142, R.46, S.36);
  (e) Felton Prairie fen, 36 (T.141, R.46, S.13);
  (f) Felton Prairie fen, 48 (T.142, R.45, S.31);
  (g) Felton Prairie fen, 53 (T.141, R.46, S.24);
  (h) Haugtvedt WPA North Unit fen, 54 (T.137, R.44, S.28, 29); and
  (i) Spring Prairie fen, 37 (T.140, R.46, S.11);
 (4) Clearwater County: Clearbrook fen, 61 (T.149, R.37, S.17);

(5) Dakota County:
(a) Black Dog Preserve fen, 63 (T.27, R.24, S.34);
(b) Fort Snelling State Park fen, 25 (T.27, R.23, S.4); and
(c) Nicols Meadow fen, 24 (T.27, R.23, S.18);
(6) Goodhue County:
(a) Holden 1 West fen, 3 (T.110, R.18, S.1);
(b) Perched Valley Wetlands fen, 2 (T.112, R.13, S.8); and
(c) Red Wing fen, 72 (T.113, R.15, S.21);
(7) Houston County: Houston fen, 62 (T.104, R.6, S.26);
(8) Jackson County:
(a) Heron Lake fen, 45 (T.103, R.36, S.29); and
(b) Thompson Prairie fen, 20 (T.103, R.35, S.7);
(9) Le Sueur County:
(a) Ottawa Bluff fen, 56 (T.110, R.26, S.3);
(b) Ottawa WMA fen, 7 (T.110, R.26, S.11); and
(c) Ottawa WMA fen, 60 (T.110, R.26, S.14);
(10) Lincoln County: Hole-in-the-Mountain Prairie fen, 6; Pipestone (T.108, R.46, S.1; T.109, R.45, S.31);
(11) Mahnomen County: Waubun WMA fen, 11 (T.143, R.42, S.25);
(12) Marshall County:
(a) Tamarac River fen, 71 (T.157, R.46, S.2);
(b) Viking fen, 68 (T.155, R.45, S.18);
(c) Viking fen, 70 (T.155, R.45, S.20); and
(d) Viking Strip fen, 69 (T.154, R.45, S.4);
(13) Martin County: Perch Creek WMA fen, 33 (T.104, R.30, S.7);
(14) Murray County: Lost Timber Prairie fen, 13 (T.105, R.43, S.2);
(15) Nicollet County:
(a) Fort Ridgely fen, 21 (T.111, R.32, S.6); and
(b) Le Sueur fen, 32 (T.111, R.26, S.16);
(16) Nobles County: Westside fen, 59 (T.102, R.43, S.11);
(17) Norman County:
(a) Agassiz-Olson WMA fen, 17 (T.146, R.45, S.22);
(b) Faith Prairie fen, 15 (T.144, R.43, S.26);
(c) Faith Prairie fen, 16 (T.144, R.43, S.35);
(d) Faith Prairie fen, 27 (T.144, R.43, S.25); and
(e) Green Meadow fen, 14 (T.145, R.45, S.35, 36);
(18) Olmsted County:
(a) High Forest fen, 12 (T.105, R.14, S.14, 15); and
(b) Nelson WMA fen, 5 (T.105, R.15, S.16);
(19) Pennington County:
(a) Sanders East fen, 65 (T.153, R.44, S.7);
(b) Sanders East fen, 74 (T.153, R.44, S.7); and
(c) Sanders fen, 64 (T.153, R.44, S.18, 19);
(20) Pipestone County:

(a) Burke WMA fen, 57 (T.106, R.44, S.28); and
(b) Hole-in-the-Mountain Prairie fen, 6 (see Lincoln County, subitem (10);

(21) Polk County:
(a) Chicog Prairie fen, 39 (T.148, R.45, S.28);
(b) Chicog Prairie fen, 40 (T.148, R.45, S.33);
(c) Chicog Prairie fen, 41 (T.148, R.45, S.20, 29);
(d) Chicog Prairie fen, 42 (T.148, R.45, S.33);
(e) Kittleson Creek Mire fen, 55 (T.147, R.44, S.6, 7);
(f) Tympanuchus Prairie fen, 26 (T.149, R.45, S.17); and
(g) Tympanuchus Prairie fen, 38 (T.149, R.45, S.16);

(22) Pope County:
(a) Blue Mounds fen, 1 (T.124, R.39, S.14, 15);
(b) Lake Johanna fen, 4 (T.123, R.36, S.29); and
(c) Ordway Prairie fen, 35 (T.123, R.36, S.30);

(23) Redwood County:
(a) Swedes Forest fen, 8 (T.114, R.37, S.19, 20); and
(b) Swedes Forest fen, 9 (T.114, R.37, S.22, 27);

(24) Rice County:
(a) Cannon River Wilderness Area fen, 18 (T.111, R.20, S.34); and
(b) Cannon River Wilderness Area fen, 73 (T.111, R.20, S.22);

(25) Scott County:
(a) Savage fen, 22 (T.115, R.21, S.17);
(b) Savage fen, 66 (T.115, R.21, S.16); and
(c) Savage fen, 67 (T.115, R.21, S.17);

(26) Wilkin County:
(a) Anna Gronseth Prairie fen, 47 (T.134, R.45, S.15);
(b) Anna Gronseth Prairie fen, 49 (T.134, R.45, S.10);
(c) Anna Gronseth Prairie fen, 52 (T.134, R.45, S.4);
(d) Rothsay Prairie fen, 46 (T.136, R.45, S.33);
(e) Rothsay Prairie fen, 50 (T.135, R.45, S.15, 16); and
(f) Rothsay Prairie fen, 51 (T.135, R.45, S.9);

(27) Winona County: Wiscoy fen, 58 (T.105, R.7, S.15); and

(28) Yellow Medicine County:
(a) Sioux Nation WMA NHR fen, 29 (T.114, R.46, S.17); and
(b) Yellow Medicine fen, 30 (T.115, R.46, S.18).

The list of waters in subpart 1 is identical to those listed as restricted ORVWs in the current rule found at Minn. R. 7050.0180, subps. 6, 6a and 6b. The proposed provision improves upon the current provision by consolidating the list of designated water bodies into one subpart. The MPCA does not propose to make changes to the list of restricted ORVWs through this rulemaking.

2. Subpart 2. Unlisted restricted outstanding resource value waters.

Subp. 2. **Unlisted restricted outstanding resource value waters.** Until such time that surface waters identified as state or federally designated scenic or recreational river segments and state designated calcareous fens are designated in rule as restricted outstanding resource value waters, the commissioner shall restrict any proposed activity in order to preserve the existing water quality necessary to maintain and protect their exceptional characteristics.

As with the current rule governing nondegradation of ORVWs, this subpart provides for the protection of unlisted ORVWs. The majority of ORVWs are specifically designated through the administrative rulemaking process after being designated by the MDNR as state wild, scenic or recreation river segments, scientific and natural areas, or calcareous fens; or by the federal government as federal wild, scenic or recreation river segments. The purpose of including provisions for unlisted ORVWs is to provide antidegradation protection in the time period between when a water body is designated by the MDNR or federal government and when the water body is adopted into the proposed rules.

The current rule's provision for unlisted ORVWs (Minn. R. 7050.0180, subp. 7) does not identify the types of waters that are eligible for unlisted ORVW protection, but simply states that they are "*not specified.*" This could be construed as being arbitrary. The proposed provision is needed to clearly identify the kinds of unlisted waters which will receive ORVW protection.

Restricted ORVWs listed in proposed Minn. R. 7050.0335, subp. 1, include waters specifically protected by the federal government or the MDNR. Scenic or recreational river segments protected under the federal Wild and Scenic Rivers Act are designated by Congress or, if certain requirements are met, the Secretary of the Interior. Minnesota's scenic or recreational river segments are designated by a MDNR commissioner's order (Minn. Stat. § 103F.325, subd. 4). Regarding the State's scenic and recreational river segments, the Minnesota legislature may at any time designate additional rivers, exclude rivers previously included, or change the classification of rivers classified by the commissioner (Minn. Stat. § 103F.325, subd. 5). Calcareous fens are designated by the MDNR through written order published in the *State Register* (Minn. Stat. § 103G.223).

This provision reasonably provides the same protection afforded to restricted ORVWs listed in Minn. 7050.0335, subp. 1, to scenic and recreational river segments and calcareous fens in the time period between when the water bodies are designated by the MDNR or federal government and when they are adopted into antidegradation rules.

3. Subpart 3. Prohibited outstanding resource value waters.

Subp. 3. **Prohibited outstanding resource value waters.** For the purposes of parts 7050.0250 to 7050.0335, the following surface waters are prohibited outstanding resource value waters:

A. waters within the Boundary Waters Canoe Area Wilderness;
B. those portions of Lake Superior north of latitude 47 degrees, 57 minutes, 13 seconds, east of Hat Point, south of the Minnesota-Ontario boundary, and west of the Minnesota-Michigan boundary;
C. waters within Voyageurs National Park;
D. the following scientific and natural areas:
    (1) Boot Lake, Anoka County;
    (2) Kettle River in Sections 15, 22, 23, T.41, R.20, Pine County;

(3) Pennington Bog, Beltrami County;
(4) Purvis Lake-Ober Foundation, Saint Louis County;
(5) waters within the borders of Itasca Wilderness Sanctuary, Clearwater County;
(6) Iron Springs Bog, Clearwater County;
(7) Wolsfeld Woods, Hennepin County;
(8) Green Water Lake, Becker County;
(9) Black Dog Preserve, Dakota County;
(10) Prairie Bush Clover, Jackson County;
(11) Black Lake Bog, Pine County;
(12) Pembina Trail Preserve, Polk County;
(13) Falls Creek, Washington County; and

E. the following state and federal designated wild river segments:

(1) Kettle River from the site of the former dam at Sandstone to its confluence with the Saint Croix River; and
(2) Rum River from Ogechie Lake spillway to the northernmost confluence with Lake Onamia.

The list of waters in subpart 3 is identical to those listed as prohibited ORVWs in the current rule found at Minn. R. 7050.0180, subps. 3, 4 and 5. The proposed provision improves upon the current provision by consolidating the list of designated water bodies. The MPCA does not propose to make changes to the list of restricted ORVWs through this rulemaking.

4. Subpart 4. Unlisted prohibited outstanding resource value waters.

Subp. 4. **Unlisted prohibited outstanding resource value waters.** Until such time that surface waters identified as state or federally designated wild river segments and surface waters necessary to maintain state designated scientific and natural areas are designated in rule as prohibited outstanding resource value waters, the commissioner shall prohibit any proposed activity that results in a net increase in loading or other causes of degradation.

The need to protect unlisted ORVWs in general is described in Section 5.N.2.

Prohibited ORVWs listed in proposed Minn. R. 7050.0335, subp. 3, include waters specifically protected by the federal government or the MDNR. This list includes:

- wild river segments under the federal Wild and Scenic Rivers Act (16 U.S.C. §§ 1271-1287) (Exhibit 72);
- state wild river segments under Minn. Stat. ch. 103F; and
- water bodies necessary to maintain state designated scientific and natural areas under Minn. Stat. § 84.033.

This provision reasonably provides the same protection afforded to prohibited ORVWs listed in proposed Minn. R. 7050.0335, subp. 3, to wild river segments and SNAs in the time period between when the water bodies are designated by the MDNR or federal government and when that listing is adopted into antidegradation rules.

5. Subp. 5. **Public hearing.** The commissioner shall provide an opportunity for a hearing before:

   A. identifying and establishing additional outstanding resource value waters; or
   B. changing the effective date of an outstanding resource value water according to part 7050.0255, subpart 13, item B, subitems (1) and (2).

   Both the current rule governing nondegradation of ORVWs and the proposed rules include provisions for public participation regarding the treatment of ORVWs. The current rule reads:

   > *The agency shall provide an opportunity for a hearing before identifying and establishing additional outstanding resource value waters, before determining the existence or lack of prudent and feasible alternatives under subpart 6, and before prohibiting or restricting new or expanded discharges to outstanding resource value waters under subparts 3, 6, 6a, 6b, and 7.* Minn. R. 7050.0180, subp. 8

   Minn. R. 7050.0180, subp. 8 provides an opportunity for a public hearing "*before determining the existence or lack of prudent and feasible alternatives*" for activities impacting restricted ORVWs and "*before prohibiting or restricting new or expanded discharges to outstanding resource value waters.*" These provisions are not included in proposed Minn. R. 7050.0335, subp. 5 because the opportunity for public comment on the MPCA's preliminary determinations regarding impacts to all waters, including ORVWs, is already provided in procedures specified for each type of control document.

   Item A retains the requirement for the MPCA to provide an opportunity for a hearing when the MPCA intends to add a water body to the ORVW list. This is reasonable because ORVWs are designated through the rulemaking process and the MPCA is required to provide an opportunity for a hearing when "*…25 or more persons submit to the agency a written request for a public hearing of the proposed rule.*"(Minn. Stat. § 14.25)

   Item B requires the MPCA to provide an opportunity for a hearing when the effective date of an ORVW is changed. This requirement is reasonable because it provides an opportunity for entities interested in the treatment of the state's most valuable surface water resources to weigh in on the MPCA's decisions. The justification for changing ORVW effective dates is provided in Section 5.B.13.

O. Permitting requirements (Proposed Amendments to Minn. R. 7001)

The proposed rules (subparts 2 of proposed Minn. R. 7050.0280 and Minn. R. 7050.0290) require applicants for individual NPDES permits to provide the MPCA with an antidegradation assessment as part of the written application. This requirement is reasonable because it allows the MPCA enough time to review the assessment and make a preliminary determination within the 150-day period set as a goal for issuing or denying permits (Minn. Stat. § 116.03, subd. 2(b)).

Amendments to rules governing NPDES permits found in Minn. R ch. 7001 are needed to ensure consistency with the proposed rules. The proposed amendments are contained in

Minn. R. 7001.0050 (Written application), Item I, which will require the application to include:

> *I. other information relevant to the application as required by parts 7001.0550 to 7001.0640, 7001.1050, 7001.1290, 7001.3175 to 7001.3475, 7001.4200, ~~or~~ 7041.0700~~.~~, 7050.0280, subp. 2 or 7050.0290, subp. 2.* Minn. R. 7001.0050, item I

6. Proposed housekeeping changes to other Minnesota Rules

Housekeeping changes are needed to Minnesota Rules referencing the nondegradation rules (Minn. R. 7050.0180 and Minn. R. 7050.0185) which will be repealed through this rulemaking.

A. Reference to the definition of "toxic pollutant" found in Minn. R. 7050.0218

Minn. R. 7050.0218, subp. 3(DD) references the term "toxic pollutant" found in Minn. R. 7050.0185, subp. 2(F). Because Minn. R. 7050.0185 will be repealed and the proposed rules do not define "toxic pollutant", the term needs to be defined in Minn. R. 7050.0218, subp. 3(DD). The definition of this term in current nondegradation rules is as follows:

> *"Toxic pollutant" means a pollutant listed as toxic under section 307(a)(1) of the Clean Water Act, United States Code, title 33, section 1317(a)(1), or as defined by Minnesota Statutes, section* 115.01*, subdivision 20.* Minn. R. 7050.0185*, subp. 2(F)*

The proposed change is as follows:

> *"Toxic pollutant" ~~has the meaning given it in part 7050.0185, subpart 2, item F.~~ means a pollutant listed as toxic under section 307(a)(1) of the Clean Water Act, United States Code, title 33, section 1317(a)(1), or as defined by Minnesota Statutes, section* 115.01 *subdivision 20. Proposed change to Minn. R. 7050.0218, subp. 3(DD)*

B. Proposed changes to Minn. R. 7052.0300

Minn. R. 7052.0300 establishes nondegradation standards for surface waters of the state within the Lake Superior Basin. Subparts 1 and 2 of this rule contain numerous references to both Minn. R. 7050.0180 and Minn. R. 7050.0185. Because the current nondegradation rules will be repealed the following changes are needed:

> ***7052.0300 NONDEGRADATION STANDARDS.***
> *Subpart 1.* ***Applicability.*** *This part and parts ~~7050.0180 and 7050.0185~~ 7050.0250 to 7050.0335 establish the nondegradation standards and implementation procedures for surface waters of the state in the Lake Superior Basin. For the purposes of this part and parts 7052.0310 to 7052.0330, lowering of water quality means a new or expanded point source discharge of a BSIC to an outstanding international resource water, or a new or expanded point or nonpoint source discharge, for which there*

is a control document, of a BCC [bioaccumulative chemical of concern] *to a high quality water. The nondegradation standards established in this part and parts ~~7050.0180 and 7050.0185~~ 7050.0250 to 7050.0335 for surface waters of the state in the Lake Superior Basin apply as follows:*

A. Parts 7052.0300 to 7052.0330 apply to the following discharges:

(1) new and expanded point source discharges of BSICs to waters designated as outstanding international resource waters (OIRWs) under subpart 3; and

(2) new and expanded point and nonpoint source discharges of BCCs to waters designated as high quality waters under subpart 4.

B. ~~Part 7050.0180 applies~~ Parts 7050.0250 to 7050.0335 apply to new or expanded discharges of any pollutant to surface waters. ~~of the state designated as ORVWs as described in parts 7050.0460 and 7050.0470. Part 7050.0180, subpart 9, applies to new and expanded discharges upstream of an ORVW.~~

(1) For discharges of BCCs directly to ORVWs or upstream of ORVWs in the Lake Superior Basin, the actions or activities that may trigger a nondegradation demonstration are listed in part 7052.0310, subpart 4, and actions or activities that are exempt from nondegradation requirements are listed in part 7052.0310, subpart 5.

~~C. Part 7050.0185 applies to the discharge of non-BCCs to all surface waters of the state in the Lake Superior Basin not designated as ORVWs, and to the discharge of BCCs to waters not designated as ORVWs or high quality waters. Part 7050.0185~~

(2) Parts 7050.0250 to 7050.0335 also ~~applies~~ apply to the discharge of pollutants to Class 7 waters, except that ~~the following requirements also apply in the indicated circumstances:~~

~~(1) any new or expanded discharge to a Class 7 water upstream of an ORVW must meet the requirements of part 7050.0180, subpart 9; and~~

~~(2)~~ any new or expanded discharge to a Class 7 water upstream of an OIRW or a high quality water must meet the requirements of parts 7052.0310 to 7052.0330 as necessary to ensure compliance with the standards established in subparts 3 and 4.

Subp. 2. ***Maintenance of existing water quality.*** *Existing water uses under ~~part 7050.0185~~ parts 7050.0265, subpart 2 and 7050.0270, subpart 2 and the level of water quality necessary to protect existing uses must be maintained and protected. Where designated uses of the waterbody are impaired, there must be no lowering of the water quality with respect to the GLI pollutants causing the impairment.*
Proposed changes to Minn. R. 7052.0300, subps. 1 and 2.

Minn. R. 7052.0300, subp. 1, references both the current nondegradation rules (Minn. R. 7050.0180 and 7050.0185). Replacing "*7050.0180 and 7050.0185*" with "*7050.0250 to 7050.0335*" is needed eliminate the reference to the current rules and to reference the proposed rules.

While the current rules contain two parts governing nondegradation for ORVWs (Minn. R. 7050.0180) and all waters (Minn. R. 7050.0185), the proposed rules contain 14 parts that govern all waters, including ORVWs. Minn. R. 7052.0300, subp. 1(B) and (C) reference the current ORVW rule and all waters rules, respectively. Therefore removing reference to individual rule parts and replacing it with a reference to the entirety of the proposed rules (Minn. R. 7050.0250 to 7050.0335) is needed. Note that subpart 1(C)(1) is not needed and therefore eliminated because Minn. R. 7050.0250 to 7050.0335 provide for the protection of ORVWs whether the discharge is to an upstream Class 7 water or not.

Minn. R. 7052.0300, subp 2, makes reference to the maintenance and protection of existing uses under Minn. R. 7050.0185. The proposed rules contain two sets of antidegradation standards. One set (proposed Minn. R. 7050.0265) apply to activities for which changes in existing water quality can reasonable be quantified and the other (proposed Minn. R. 7050.0270) for activities where these assessments are not reasonable. Each set of standards contains requirements for the maintenance and protection of existing uses found in subparts 2 of proposed Minn. R. 7050.0265 and 7050.0270. Therefore it is necessary to replace reference to "*part 7050.0185*" with reference to "*parts 7050.0265, subp. 2 and 7050.0270, subp. 2.*"

C. Proposed renumbering

There are 13 rules which reference the current nondegradation rules. Changes to these rules are needed as a result of repealing the current rules and adopting new ones. Table 1 and associated notes describe the needed changes for each case.

Table 1: Renumbering changes to Minnesota Rules which reference current nondegradation rules. In each rule referred to in Column A, the reference in Column B will be deleted and the reference in Column C will be inserted:

Change #	Column A	Column B	Column C
1	Minn. R. 4410.0200	7050.0180	7050.0335
2	Minn. R. 6115.0211	7050.0180	7050.0335
3	Minn. R. 7002.0253	7050.0180, 7050.0185	7050.0250 to 7050.0335
4	Minn. R. 7037.1000	7050.0180, subpart 2, Item A	7050.0255, subpart 30
5	Minn. R. 7050.0170	7050.0180 and 7050.0185	7050.0250 to 7050.0335
6	Minn. R. 7050.0222	7050.0180 and 7050.0185	7050.0250 to 7050.0335
7	Minn. R. 7050.0460	7050.0180, subpart 3 or 6	7050.0265, subpart 6; 7050.0265, subpart 7; 7050.0270, subpart 5; or 7050.0270, subpart 6
8	Minn. R. 7050.0460	7050.0180, subpart 3	7050.0265, subpart 7 or 7050.0270, subpart 6
9	Minn. R. 7050.0460	7050.0180, subpart 6	7050.0265, subpart 6 or 7050.0270, subpart 5
10	Minn. R. 7052.0260	7050.0180, 7050.0185	7050.0250 to 7050.0335
11	Minn. R. 7077.0105	7050.0180, subpart 2, Item A	7050.0255, subpart 30
12	Minn. R. 7090.1010	7050.0180, subpart 3 and 6	7050.0335
13	Minn. R. 8420.0515	7050.0180	7050.0335

Table 1 Notes:

Change #1. Minn. R. ch. 4410 are Environmental Review rules administered by the Environmental Quality Board. [Minn. R. 4410.0200], subp. 79a.(E), makes reference to "*…outstanding resource value waters designated pursuant to part 7050.0180…*" Replacing "*7050.0180*" with "*7050.0335*" provides reference to where ORVWs are actually identified in the proposed rules.

Change #2. Minn. R. ch. are Public Water Resources rules administered by the MDNR. [Minn. R. 6115.0211], subp. 6B.(D), makes reference to "*…an outstanding resource value water as defined in part 7050.0180…*" Replacing "*7050.0180*" with "*7050.0335*" provides reference to where ORVWs are actually identified in the proposed rules.

Change #3. Minn. R. ch. 7002 are Permit Fee rules administered by the MPCA. [Minn. R. 7002.0253], subp. 2(C), makes reference to "*…a nondegradation review under parts 7050.0180, 7050.0185…*". The current rules separate the protection of ORVWs and all waters into two rules. The proposed rules address all waters including ORVWs. It is therefore appropriate to change the reference to "*7050.0250 to 7050.0335.*"

Change #4. Minn. R. ch. 7037 are Petroleum Contaminated Soil Management rules administered by the MPCA. [Minn. R. 7037.1000], subp. 2(B), makes reference to "*…any outstanding resource value water as defined in part 7050.0180, subpart 2, Item A…*" which is the current rules' definition of ORVWs. Replacing "*7050.0180, subpart 2, Item A*" with "*7050.0255, subp. 30*" provides the correct reference to the definition of ORVWs in the proposed rules.

Change #5. Minn. R. ch. 7050 are Waters of the State rules which provide water quality standards and classifications of water bodies, and are administered by the MPCA. [Minn. R. 7050.0170] makes reference to the "*…requirements under parts 7050.0180 and 7050.0185…*" The current rules separate the protection of ORVWs and all waters into two rules. The proposed rules address all waters including ORVWs. It is therefore appropriate to change the reference to "*7050.0250 to 7050.0335*".

Change #6. Minn. R. ch. 7050 are Waters of the State rules which provide water quality standards and classifications of water bodies, and are administered by the MPCA. [Minn. R. 7050.0222] makes reference to "*…the nondegradation requirements in parts 7050.0180 and 7050.0185…*" in subparts 2a.(B)(1), 3a.(C)(1) and 4a.(C)(1). The current rules separate the protection of ORVWs and all waters into two rules. The proposed rules address all waters including ORVWs. It is therefore appropriate to change the reference to "*7050.0250 to 7050.0335*".

Change #7. Minn. R. ch. 7050 are Waters of the State rules which provide water quality standards and classifications of water bodies, and are administered by the MPCA. [Minn. R. 7050.0460], subp. 3, makes reference to "*…the applicable discharge restrictions in part 7050.0180, subpart 3 or 6…*". Subparts 3 and 4 of [Minn. R. 7050.0180] describe requirements for the protection of prohibited and restricted ORVWs. The proposed rules contain two sets of antidegradation standards. One set (proposed Minn. R. 7050.0265) apply to activities for which changes in existing water quality can reasonable be quantified and the other (proposed Minn. R. 7050.0270) for activities where these assessments are not reasonable. Each set of standards contains requirements for the protection of both restricted and prohibited ORVWs. The proposed standards for the protection of restricted ORVWs are found at Minn. R. 7050.0265, subp. 6 and Minn. R. 7050.0270, subp. 5, while the proposed standards for prohibited ORVW protection are located at Minn. R. 7050.0265, subp. 7 and Minn. R. 7050.0270, subp. 6. Replacing "*7050.0180, subpart 3 or 6*" with "*7050.0265, subpart 6; 7050.0265, subpart 7; 7050.0270, subpart 5; or 7050.0270, subpart 6*" is needed to ensure the correct references are used for ORVW protection.

Change #8. Minn. R. ch. 7050 are Waters of the State rules which provide water quality standards and classifications of water bodies, and are administered by the MPCA. [Minn. R. 7050.0460], subp. 3, makes reference to "*…the prohibited discharges provision in part 7050.0180, subpart 3…*".Replacing "*7050.0180, subpart 3*" with "*7050.0265, subpart 7 or 7050.0270, subpart 6*" ensures the correct reference is used for the protection of prohibited ORVWs.

Change #9. Minn. R. ch. 7050 are Waters of the State rules which provide water quality standards and classifications of water bodies, and are administered by the MPCA. [Minn. R. 7050.0460], subp. 6, makes reference to "*…the restricted discharges provision in part 7050.0180, subpart 6…*". Replacing "*7050.0180, subpart 6*" with "*7050.0265, subpart 6 or 7050.0270, subpart 5*" ensures the correct reference is used for the protection of restricted ORVWs.

Change #10. Minn. R. ch. 7052 are Lake Superior Basin Water Standards administered by the MPCA. Minn. R. 7052.0260, subp. 6, makes reference to "*…nondegradation standards and implementation procedures in parts 7050.0180, 7050.0185…*" The current rules separate the protection of ORVWs and all waters into two rules. The proposed rules address all waters including ORVWs. It is therefore appropriate to change the reference to "*7050.0250 to 7050.0335*".

Change #11. Minn. R. ch. 7077 are Wastewater and Stormwater Treatment Assistance rules administered by the MPCA. Minn. R. 7077.0105, subp. 28, makes reference to the definition of ORVW as "*…those waters defined in part 7050.0180, subpart 2, Item A…*" Replacing "*7050.0180, subpart 2, Item A*" with "*7050.0255, subp. 30*" provides the correct reference to the definition of ORVWs in the proposed rules.

Change #12. Minn. R. ch. 7090 are Stormwater Regulation Program rules administered by the MPCA. Minn. R. 7090.1010, subp. 2(B)(8), makes reference to ORVWs "*…as identified in part 7050.0180, subparts 3 and 6…*". Subparts 3 and 4 of Minn. R. 7050.0180 describe **requirements** for the protection of prohibited and restricted ORVWs, not **where** ORVWs are identified in rule. Replacing "*7050.0180, subparts 3 and 6*" with "*7050.0335*" is needed to provide the correct reference to the location in the proposed rules where ORVWs are actually identified.

Change #13. Minn. R. ch. 8420 are Wetland Conservation rules administered by the MBWSR. Minn. R. 8420.0515, subp. 7, makes reference to "*…outstanding resource value waters listed in part 7050.0180…*" Replacing "*7050.0180*" with "*7050.0335*" is needed to provide the correct reference to where ORVWs are listed in the proposed rules.

7. Rulemaking requirements

A. Background

The process for adoption of administrative rules in Minnesota is regulated under the Administrative Procedures Act (Minn. Stat. ch. 14) and also Minn. R. ch. 1400. These rulemaking requirements establish the rulemaking process and obligations of state agencies conducting rulemaking and ensure that adequate notification is provided to all interested or affected persons and entities. These include the general public and affected stakeholders, but also various state agencies and departments, including the legislature and the Office of the Governor. An additional requirement of Minn. Stat. §14.131 is that a SONAR "*must also describe the agency's efforts to provide additional notification under section 14.14, subdivision 1a , to persons or classes of persons who may be affected by the proposed rule or must explain why these efforts were not made*". This Section of the SONAR will address:

- how the MPCA has provided required notifications;
- how the MPCA has addressed the requirement to provide additional notice.

B. Required Notice

The MPCA must provide notification to the following as appropriate:

- Office of the Governor
- Parties who specifically requested notification (Minn. Stat. § 14.14, subd. 1a)
- Office of Management and Budget (Minn. Stat. § 14.131)
- Legislators (Minn. Stat. §§ 14.116, 14.127 and 14.131)
- Department of Agriculture (Minn. Stat. § 14.111)
- Governing bodies of municipalities bordering affected waters (Minn. Stat. § 115.44, subd. 7)

1. Office of the Governor

   Under Minn. Stat. § 14.05, subd. 6, the Governor may veto adopted administrative rules prior to their effective date. In order to minimize the possibility of a veto at the end of the rulemaking process, the Governor's office has developed a protocol to keep the Governor apprised of rulemaking activities throughout the rulemaking process. At the start of the rulemaking process the MPCA notified the Governor's office of the MPCA's general rulemaking intentions. The second Governor's notification coincides with the completion of the SONAR and will be sent prior to publication of the proposed rules in the *State Register*.

2. Parties who have registered with the MPCA for purposes of receiving notice of rule proceedings

   Minnesota Statute section 14.14, subdivision 1a requires that agencies maintain such lists and notify those parties at the time a rule is proposed for public comment or hearing. The MPCA maintains such a list and for this rulemaking has also provided notification to these parties at numerous points in the early phases of rule development.

   The MPCA published three RFCs in the *State Register* to obtain public input into the development of the proposed rules and to develop a list of interested parties. The notices were published in the January 29, 2007, May 29, 2007 and February 25, 2013 *State Register*. In the first request (Exhibit 119)[119] the MPCA identified its intention to review and amend the nondegradation rules and sought public comment on that subject. The second RFC (Exhibit 120)[120], re-stated that intent and extended the time period for submittal of comments for an additional four months. The third RFC (Exhibit 121)[121] provided notice of MPCA's intent to propose supporting changes to Minn. R. ch. 7001 that are necessary to reflect the proposed rules. The comments received in response to those RFCs included a petition for rulemaking (Exhibit 1) and comments from the Builders Association of the Twin Cities (Exhibit 122)[122], MNDNR (Exhibit 123)[123], Rochester, Minnesota Public Works Department (Exhibit 124)[124] and Minnesota Cities Stormwater Coalition (Exhibits 125[125] and 126[126]).

   When each RFC was published the MPCA provided notification to the parties that were identified as requesting notice of rulemaking activities and also to a number of additional parties that had indicated a general interest in water quality-related rulemaking. For the first two RFCs, these notifications were sent by US mail. In 2012 the MPCA transitioned to the GovDelivery system to provide electronic notifications. The GovDelivery system allows registrants to self-register to receive notices of interest and, as a result, reaches a more current list of addressees and much larger number of interested parties than were previously identified to receive the required notices under Minn. Stat. § 14.14, subd. 1a. The MPCA maintains that providing notice through the GovDelivery system meets the requirements of Minn. Stat. § 14.14, subd. 1a. The MPCA used the most current GovDelivery mailing lists to provide notice of the third RFC and for all subsequent notifications.

3. Office of Management and Budget

   Minnesota Statute § 14.131 requires state agencies to consult with the Commissioner of Management and Budget to help evaluate the fiscal impact and fiscal benefits of proposed rules on local units of government. The MPCA will send the required information, including this SONAR, to the designated staff person at the Office of

Management and Budget at the time they are approved to be published for public comment.

4. Legislative notification

Minnesota Statute §14.116 requires specific notification of interested legislators. The MPCA will provide this notification at the time the proposed rules will be published for public comment. The MPCA plans to send the required information to the chairs and ranking Republican members of the Senate Environment and Energy Committee; Senate Environment, Economic Development and Agriculture Finance Division; and to the chairs and Democratic Leads of the House Environment and Natural Resources Policy and Finance Committee. (Note that the statutory authority to adopt the proposed rules is not a new grant of rulemaking authority and therefore the additional notification requirements of Minn. Stat. § 14.116 are inapplicable.)

Minnesota Statute §14.127 requires that an agency evaluate the cost of compliance with a proposed rule in the first year after the rule takes effect. If that cost exceeds $25,000 for any business that has less than 50 full-time employees or for any city that has less than ten full-time employees, and if a small business or municipality files for an exemption from the rules, then specific additional legislative approval is required. The MPCA has provided a discussion of the proposed rules in relation to this statute in Section 8.J. Because the MPCA has determined that it is possible that the cost threshold could be exceeded in the first year after the rule takes effect, a small business or city may file a written statement requesting a temporary exemption. If that occurs, the MPCA will take the necessary steps as required under Minn. Stat. §14.127.

Minnesota Statute section 14.131 also requires state agencies to send a copy of the SONAR to the Legislative Reference Library when the notice of hearing is mailed. This MPCA will provide this notification at that time.

5. Department of Agriculture

Minnesota Statute section 14.111 requires that if proposed rules will affect farming operations, an agency must provide a copy of the proposed rule changes to the Commissioner of the Minnesota Department of Agriculture (MDA) no later than 30 days prior to publication of the proposed rules in the *State Register*. The proposed rules do not change the applicability of antidegradation requirements related to farming practices under current regulatory or statutory authority. However, the MPCA believes it is prudent to keep the MDA informed regarding this rulemaking and staff of the MDA has been kept informed. Staff from the MPCA has met with MDA staff to discuss the proposed rules and MDA staff has participated in general stakeholder meetings. The MPCA will provide a 30 day review period to the Commissioner of MDA prior to publication.

6. Department of Health

There is no statutory requirement for the MPCA to notify the Minnesota Department of Health (MDH) of its rulemaking efforts, although because of the shared responsibility for water issues, the MPCA frequently provides special notice of rulemaking involving water standards. Although the MPCA does not believe that there is a need to provide special notification of the Commissioner of MDH for this rulemaking, MDH staff who are registered with GovDelivery will be notified at the time the rules are published for public comment.

7. Local government affected by the standards

Minnesota Stat. § 115.44, subd. 7 requires:

> *For rules authorized under this section, the notices required to be mailed under sections 14.14, subdivision 1a, and 14.22 must also be mailed to the governing body of each municipality bordering or through which the waters for which standards are sought to be adopted flow.*

The intent of this statute is to ensure that local governments are notified when the standards that apply to local waters are being changed. Because the proposed amendments will apply statewide and to all surface waters of the state the MPCA believes it is appropriate to provide notice to all municipalities. The MPCA will obtain a current list of all city administrators from the League of Minnesota Cities when the rules are proposed for public comment. Sending notice to this list of 800+ municipal officials will meet the requirements of Minn. Stat. § 115.44, subd. 7.

C. Additional notice

Minnesota Statute section 14.131 requires the MPCA to include in its SONAR a description of its efforts to provide additional notification to persons or classes of persons who may be affected by the proposed rules, or the MPCA must explain why these efforts were not made.

The MPCA's efforts to provide additional notice consist of:

- the development of an extensive mailing list of actively interested parties;
- early stage efforts to provide opportunities to interested parties to participate in the rule development process;
- efforts at the time the rules are published for comment.

1. Extensive mailing list

The current list of parties interested in the antidegradation rulemaking was developed over a number of years through a very broad outreach effort to a variety of sources. The original invitation to participate in this rulemaking was sent to approximately 700 organizations and individuals the MPCA expected to have an interest in antidegradation. These mailing lists were composed of NPDES/SDS permittees, persons who were active in past water quality standards rulemakings and persons and organizations known to have an interest in water-related issues. The individuals who indicated their interest in the antidegradation rulemaking were placed on a mailing list to receive invitations to the early phase stakeholder meetings. In 2012, the MPCA transitioned to a GovDelivery system for the distribution of rulemaking notices. The individuals who had previously indicated their interest in the antidegradation rulemaking were automatically entered into the GovDelivery system to receive future notices. In addition, a number of efforts were made to encourage others to register with the GovDelivery system with the result that, at the time of the development of this SONAR, more than 1,500 interested parties have registered with GovDelivery to receive notifications specifically about the antidegradation rulemaking and 2,000 have also registered to be notified of changes to the state water quality standards in general. This extensive list of self-registered interested parties far exceeds the requirement of Minn. Stat. § 14.14, subd. 1a and when notice of the publication of the proposed rules is sent, will constitute significant "additional" notification.

2. Stakeholder activities

a. Meetings

The MPCA initiated this rulemaking with a commitment to extensive public engagement. Before rules were drafted, the MPCA held a series of stakeholder meetings to discuss fundamental aspects of antidegradation policy and implementation. Formal meetings were held in 2008 and 2009 and interested parties had the opportunity to attend meetings held in three locations, St. Paul, Duluth and Rochester. Following that series of general interest meetings, MPCA staff continued to meet with specific groups and individuals to discuss issues associated with the antidegradation rulemaking. A list of meetings is provided in Attachment 1.

After receiving extensive stakeholder input, MPCA staff began the process of drafting rule language and resolving specific implementation issues. A meeting to re-engage stakeholders and to explain the MPCA's preliminary intentions regarding antidegradation rules was held on September 10, 2012. This meeting was held in the MPCA's offices in St. Paul, but was also simultaneously webcast to all interested parties. The MPCA provided a 25-day advance notice of that meeting and following the meeting, provided an additional 30 days to submit comments. The webcast remains available for review and a link to it is provided on the rulemaking webpage.

b. Webpages

The MPCA uses webpages to provide information about rulemaking activities and access to rulemaking information.

The MPCA maintains a general public notice webpage at https://www.pca.state.mn.us/public-notices. On this webpage the MPCA posts official notices of rulemaking activity, including each of the Request for Comments (RFCs) published in the *State Register* and the Notice of Hearing when it is published in the *State Register*. Notices that are published on the public notice remain available for viewing during the entire term of the comment period.

The MPCA also maintains a webpage (http://www.pca.state.mn.us/oxpg919) to provide information specifically about this rulemaking. This webpage was developed at the start of the rulemaking and is periodically updated to include new information about the MPCA's activities. As the MPCA completed the initial round of stakeholder meetings, the background materials, issue papers and the comments and notes from each meeting were posted. The MPCA has also posted "pre-proposal draft rule language" on this webpage for review. Three revisions to the pre-proposal draft rule language have been posted and each time the MPCA sent GovDelivery notices to notify interested parties. The MPCA intends to post this SONAR, the proposed rule language, exhibits and ongoing rulemaking documents (e.g., comments) on this webpage.

c. Board Meetings

MPCA staff provided an informational briefing at the January, 2015 meeting of the MPCA Citizens' Board. This meeting was webcast and advance notice of the meeting and agenda was provided to all persons registered to receive notice of Board meetings and also through a Govdelivery notice to all persons registered to receive information about the antidegradation rules.

3. Additional notice when rules are proposed

When the MPCA publishes the Notice of Hearing in the *State Register* and conducts all statutorily required notifications, the following additional notice will be provided:

- An extended pre-hearing comment period will be provided.
- GovDelivery notice of hearing will be sent to all persons who have registered their interest in antidegradation or water quality standards.
- Notice of hearing and proposed rule language will be posted on the MPCA's public notice webpage as well as the antidegradation webpage.
- A "plain English" version of the Notice and a simplified summary of the amendments being proposed will be posted on the rulemaking webpage.
- Notice of hearing and proposed rule language will provided to the city administrators of all Minnesota municipalities.
- Participation in the rulemaking hearings will be encouraged by providing interactive access to the hearings through video-links to multiple regional locations. Information about regional access opportunities and directions to the videoconference sites will be provided as part of the Notice of Hearing.

D. Summary of notifications

The activities identified above meet the MPCA's mandatory notification requirements and also additional notice, ranging from the early stages of the rule drafting process through publication of the Notice of Hearing. The most important aspect of the MPCA's additional notice plan is the development of a current and extensive GovDelivery mailing list of interested parties. Throughout the rule development process the MPCA has provided opportunities for interested parties to be informed of the MPCA's rulemaking plans and to provide input into the development of the proposed amendments. In addition to publishing three RFCs in the *State Register*, the MPCA provided mailed and electronic notifications to interested parties and numerous opportunities for review and comment. The RFCs, plus draft rule language and additional information, were also regularly posted on MPCA's websites related to rulemaking and public information. The MPCA has met all statutory requirements for providing required and additional notice.

8. Regulatory analysis

Several Minnesota statutes establish requirements that must be addressed in the SONAR. Minn. Stat. § 14.131 requires that an Agency include a discussion on economic effect of the proposed rule amendments on the regulated community, regulatory entities and other affected parties. An Agency proposing a rule must also consider the effect of the rule on local government, and provide a discussion of how it has addressed additional specific legislative directives in the development of the rule. The following discussion addresses each of the statutory requirements of Minn. Stat. §§ 14.127, 14.128 and 14.131 to the extent they specifically relate to the proposed amendments.

A. Classes of persons who probably will be affected by the proposed rules

The MPCA is required to provide:

> *A description of the classes of persons who probably will be affected by the proposed rule, including classes that will bear the costs of the proposed rule and classes that will benefit from the proposed rule.* [Minn. Stat. § 14.131](#) *(1)*

The main classes of persons who will benefit from the proposed rules are the users and persons who have an interest in and reliance on the quality of Minnesota's surface waters and the biological communities those waters support. This is an extensive and significant class that includes any person who uses Minnesota waters for drinking water, recreation (swimming, fishing, boating, etc.), commerce, scientific, educational, cultural, and aesthetic purposes. The sustainable maintenance of the state's surface water quality benefits not only this generation, but generations to come. Those that will use the proposed rules, including the regulated community, consultants, concerned citizens, the MPCA and other governmental agencies, will benefit from their clear description of purpose and scope, standards, and procedures.

As with the current rules, there are costs associated with the implementation of the proposed antidegradation procedures. Applicants for individual permits will bear the cost of gathering information for their antidegradation assessments, the MPCA will bear the cost of conducting antidegradation reviews for both individual and general authorizations, and concerned citizens and other entities will bear the cost of participating in the MPCA's antidegradation determinations. Regulated parties will bear most of the cost associated with minimizing impacts to high water quality.

The EPA has an interest in the proposed rules. The EPA Regional Administrator (EPA Region 5 in Chicago) must approve all changes to Minnesota's water quality standards (see 40 CFR § 131.5)) (Exhibit 127)[127].

B. Probable costs to the MPCA and to any other agency and any anticipated effect on state revenues

The MPCA is required to provide an analysis of:

> *The probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenues.* Minn. Stat. § 14.131 *(2)*

1. Probable costs to the MPCA

The MPCA will expend additional effort in conducting antidegradation reviews when the proposed rules are implemented and enforced. The increased effort will be due to an increase in the number of reviews: 1) as a result of removing the significance threshold; and 2) as a result of including implementation procedures specific to different types of control documents. Attachment 2 provides details on how the following estimates were made.

As illustrated in Table 2, the MPCA conservatively estimates that it will expend $108,185 annually to conduct antidegradation reviews where they have not been conducted previously.

Table 2: Summary of the estimated number of additional antidegradation reviews and associated costs to the MPCA as a result implementing the proposed rules

Control document type	Anticipated annual increase in the number of reviews	Total increase in annual cost to conduct reviews
Individual NPDES wastewater permits	14.3	$44,416
Individual NPDES industrial stormwater permits	2.0	$6,212
Individual NPDES construction stormwater permits	0	0
Individual NPDES municipal stormwater permits	0	0
Section 401 actions on individual section 404 permits	15.5	$48,143
Section 401 actions on individual federal licenses and permits other than section 404 permits	0.8	$2,485
General NPDES wastewater permits	2.0	$4,778
General NPDES stormwater permits	0.2	$478
Section 401 actions on general section 404 permits	0.5	$1,195
Section 401 actions on general federal licenses and permits other than section 404 permits	0.2	$478
TOTAL	**35.5**	**$108,185**

The MPCA expects that it will need to conduct 14.3 additional antidegradation reviews on applications for individual NPDES wastewater permits each year as a result of removing the significance threshold. The additional cost to the MPCA associated with these reviews is estimated at $44,413 annually.

The probable increased cost to the MPCA associated with the inclusion of additional procedures (i.e., procedures other than those for individual NPDES wastewater permits) is estimated at $63,769 annually. This estimate requires some additional explanation. As discussed in Section 4.B.5., antidegradation requirements are and will continue to be applicable to all regulated activities that are required to comply with water quality standards. However, the current nondegradation rules do not contain implementation procedures for specific types of control documents and are difficult to apply to regulated activities other than wastewater treatment covered under individual NPDES permits. Because of these limitations, until recently the MPCA has not implemented nondegradation requirements through control documents other than individual NPDES wastewater permits. (Not including control document-specific implementation procedures in the current rules does not, in and of itself, exempt other regulated activities from antidegradation requirements.) The proposed rules will be more clearly applicable and readily implemented to other regulated activities than the current rules and, as a result, the MPCA expects to increase the number of antidegradation reviews when the proposed rules are adopted. However, except for removing the significance thresholds discussed above, the proposed rules do not increase the actual universe of entities subject to antidegradation review.

Although the MPCA expects that there will be an increase in the number of future antidegradation reviews, the MPCA believes that the increase cannot be attributed to any new requirement of the proposed rules but instead is the result of removing the obstacles to the proper implementation of the current rules. If the MPCA were indeed implementing nondegradation provisions through control document issuance for all regulated activities subject to water quality standards, the proposed rules would not increase the scope of antidegradation implementation and thus not increase costs to the MPCA or regulated community simply by including implementation methods.

Including control document-specific implementation procedures in the proposed rules does, however, force the issue of which activities are subject to antidegradation procedures. Although the MPCA is not considering that the proposed rules will impose a significant "new" cost to the MPCA, the MPCA finds it prudent to discuss the costs associated with conducting reviews for activities in addition to the wastewater activities previously reviewed in association with individual permits.

The level of effort necessary for conducting the reviews will be absorbed into the normal staff complement and current budgets. Importantly, long-term costs to the MPCA surface water programs as a whole may actually decrease as a result of the clearly articulated implementation procedures and improved water quality protection, especially in regard to costs currently expended to restore waters not attaining water quality standards. This is further explained in Section 8. E., which addresses the probable costs or consequences of not adopting the proposed rules.

As with the current rules, the proposed procedures provide for public input on the MPCA's antidegradation determinations through existing provisions in Minn. R. ch. 7001. The proposed rules provide more opportunity for comment as a result of the increase in the number of preliminary antidegradation determinations. However, the proposed rules also create much greater transparency and consistency, which may, in fact, result in fewer comments. Costs associated with reviewing comments, whether under existing or proposed provisions, vary depending on the level of interest and the complexity of the proposed activity. Based on these considerations the MPCA cannot reasonably determine whether there will be an increase in cost as a result of the proposed changes.

2. Probable costs to other agencies

Antidegradation is currently and will continue to be an integral part of Minnesota's water quality standards and is implemented and enforced through MPCA-issued control documents that require compliance with those standards. Other agencies do not implement or enforce antidegradation as it relates to the protection of the state's water quality. Other agencies may, however, have an interest in and provide comment on the MPCA's preliminary antidegradation determinations. Estimates of the costs to other agencies for developing comments cannot reasonably be made because they will vary widely depending on whether other agencies have an interest in a given activity, the level of interest and the complexity of the proposed activity.

3. Anticipated effects on state revenues

The MPCA does not anticipate that implementation and enforcement of the proposed rules will directly affect state revenues. There may, however, be indirect effects to public funds where those funds are used to financially assist public projects. For example, the Public Facilities Authority (PFA) provides financial assistance to wastewater facilities based on a proposer's ability to pay for a project. It is possible that the proposed rules' requirements to implement prudent and feasible alternatives that minimize high water quality degradation may incur costs that will need to be covered by PFA funding. Predicting these costs is not possible given the situation-specific nature of antidegradation implementation.

C. Assessment of alternative methods for achieving the purpose of the proposed rules, including those that may be less costly or less intrusive

The MPCA is required to provide:

> *A determination of whether there are less costly methods or less intrusive methods for achieving the purpose of the proposed rule.* Minn. Stat. § 14.131 *(3)*

and;

> *A description of any alternative methods for achieving the purpose of the proposed rule that were seriously considered by the agency and the reasons why they were rejected in favor of the proposed rule.* Minn. Stat. § 14.131 *(4)*

The MPCA is addressing both of these statutory requirements in the same discussion because the MPCA's efforts are similar. The discussion of how the MPCA considered less costly or less intrusive methods is very similar to the discussion of the MPCA's consideration of how to alternatively achieve the purpose of the proposed rules.

1. The differences between the purpose of the current nondegradation rules and the purpose of the proposed rules

The stated purpose of the proposed rules is to "*…achieve and maintain the highest possible quality in surface waters of the state.*"(Proposed Minn. R. 7050.0250) This purpose is different than the stated purpose of the current nondegradation rules. The current rule (Minn. R. 7050.0185, subp. 1) states that "*it is the policy of the state of Minnesota to protect all waters from significant degradation from point and nonpoint sources and wetland alterations, and to maintain existing water uses, aquatic and wetland habitats, and the level of water quality necessary to protect these uses.*" The proposed purpose of achieving and maintaining the highest possible quality of waters of the state is fundamental to the federal standard of antidegradation. Federal regulations at 40 CFR § 131.12 require that states and authorized tribes adopt antidegradation policy that is consistent with the levels of protection specified in the same regulations. These levels of protection are plainly articulated in the proposed rule's purpose statement. Meeting this stated purpose is accomplished by strictly prohibiting water quality degradation where that water quality is necessary to maintain outstanding characteristics of ORVWs or to maintain an existing use. For waters that are of high quality, the proposed rules allow for degradation when necessary to accommodate important social or economic development.

2. Determination of whether there are less costly or less intrusive methods for achieving the purpose

The MPCA cannot achieve the purpose of meeting the federal antidegradation standard without requiring those new elements of the proposed rules that are specifically designed to meet those federal standards. For example, the MPCA cannot meet the federal expectation of protecting assimilative capacity of high quality waters without eliminating the current exemptions for significance thresholds.

In this rulemaking the MPCA is proposing to repeal Minn. R. 7050.0180 and Minn. R. 7050.0185, which have been the basis of the state's nondegradation program for decades, and replace them with new rules. The MPCA has carefully considered the potential costs of the proposed antidegradation requirements and does not believe that there are any less costly or less intrusive methods that meet the needs identified for this rulemaking.

3. Determination of whether there are alternatives to achieving the purpose

The MPCA spent considerable effort in reviewing other states' antidegradation policy and implementation procedures, as well as antidegradation-related case law. States' antidegradation provisions vary considerably due, in part, to each state's unique regulatory framework and the water resources they protect. For example, implementation procedures for water-rich states tended to differ from states with fewer water resources. Applicable concepts from other states and court decisions were important factors in the development of the proposed rules.

As discussed in Section 1.C.1., the MPCA's approach to this rulemaking was to first obtain an independent evaluation of the current rules in relation to the federal antidegradation standards and those in other states. This evaluation revealed the areas the MPCA needed to address in establishing the scope of the proposed rules. The MPCA then obtained significant external and internal stakeholder input through multiple reiterations of draft rules.

The MPCA considered simply amending the current nondegradation rules. The last major revisions to the nondegradation rules occurred in 1988. Since that time there have been significant changes in understanding of water quality protection, state and federal regulatory programs, and EPA guidance concerning the implementation of antidegradation policy. The inadequacies of the current rules have resulted in legal challenges (see Section 4.B.4.), resulting in substantial costs to both the MPCA and the regulated community. (A detailed analysis of the shortcomings of the current rules is provided in Section 4.B., while detailed analysis of specific provisions in the proposed rule is provided in Section 5.) The current rules have such significant omissions and are so significantly out of date, the MPCA determined it would be clearer to simply repeal the existing nondegradation rules and propose entirely new rules that met the current needs.

The MPCA considered retaining some form of *de minimis* exemptions from antidegradation procedures, but this concept was rejected due to reasons provided in Section 5.G.1.b.

An alternative the MPCA also considered was using ACE's determinations made under section 404(b)(1) guidelines (Exhibit 84) to satisfy antidegradation requirements for those activities involving physical alterations to water bodies. The determinations made under section 404(b)(1) guidelines are based on a broad range of considerations, only one of which is water quality. The MPCA found this option to be unacceptable because of the inadequacy of the review factors. Furthermore, this idea was rejected because the ACE relies on the MPCA to ensure water quality standards are met through CWA section 401 certification processes.

D. Probable costs of complying with the proposed rules

The MPCA is required to provide:

> *The probable costs of complying with the proposed rule, including the portion of the total costs that will be borne by identifiable categories of affected parties, such as separate classes of governmental units, businesses, or individuals.* Minn. Stat. § 14.131 *(5)*

The following discussion addresses the probable costs of complying with the proposed rules, beyond those associated with implementing current rule requirements, borne by entities other than the MPCA. Costs to the MPCA are discussed in Section 8.B.

Due to the length of this discussion, the following outline may help readers find a particular topic of interest:

Sub-section and topic **Page Number**

1. Summary

Probable costs of complying with the proposed rules will be borne by the regulated community as a result of 1) providing the information the MPCA needs to make antidegradation determinations, and 2) minimizing high water quality degradation. Costs will also be incurred by entities interested in the MPCA's antidegradation assessments as a result of reviewing assessments and preparing comments.

a. *Probable costs to the regulated community (summary)*

(1) Preparation of antidegradation assessments (summary)

The proposed rules require applicants seeking coverage under an individual control document to provide an antidegradation assessment – information the MPCA needs to make antidegradation determinations. (Note: applicants seeking coverage under general authorizations will not be required to provide assessments.) **Probable annual cost to applicants regulated through individual control documents resulting from the preparation of antidegradation assessments is conservatively estimated at $2,175,155.** These costs are summarized in the table below:

Table 3: Summary of estimated annual costs to the regulated community for preparing antidegradation assessments as a result of implementing the proposed rules.

Applicants for the following control documents:	Anticipated annual increase in the number of assessments prepared	Estimated total annual costs for preparing assessments
Individual NPDES wastewater permits	14.3	$ 925,939
Individual NPDES industrial stormwater permits	2.0	$ 129,502
Individual NPDES construction stormwater permits	0	$ 0
Individual NPDES municipal stormwater permits	0.4	$ 23,470
Individual section 404 permits	15.5	$ 1,003,641
Individual federal licenses or permits other than section 404 permits	0.8	$ 92,603
TOTAL	**33.0**	**$2,175,155**

(2) Minimizing high water quality degradation (summary)

The proposed rules do not specify which pollution control measures will result in minimizing degradation of high quality water because those determinations, made through the review process, are situation-specific. Considerations include the nature of the discharge, the characteristics of the impacted waters and which control measures are considered to be prudent and feasible for a given regulated entity. The availability and reliability of pollution control measures change over time – what is considered to be infeasible today may be found to be feasible in the future. The economic realities (e.g., ability to pay for a given control measure) of one applicant may not be the same for another. Given the situation-specific nature of antidegradation considerations, cost estimates for minimizing degradation of high quality water cannot reasonably be made.

b. *Probable costs to entities commenting on preliminary antidegradation determinations (summary)*

The proposed rules will provide more opportunity for comment as a result of the increase in the number of activities subjected to antidegradation procedures, which would be expected to result in a greater number of comments. Conversely, the procedure also creates much greater transparency and consistency, which may in fact result in a fewer number of comments. Costs associated with reviewing assessments and preparing comments, whether under existing or proposed rules, vary depending on the level of interest and the complexity of the proposed activity. The MPCA considers that overall there will be no increase in the cost to entities commenting on antidegradation determinations.

2. Explanation of probable costs

The following discussion, presented in a question and answer format, will aid the reader in understanding how the MPCA arrived at the conclusions provided in the above summary.

a. *What differences between the proposed rules and the current rules will increase probable costs of compliance?*

Probable costs of implementing the proposed rules are the result of the following changes to the current provisions.

- An increase in the number of reviewable activities due to removing the significance threshold.
- An increase in the number of reviewable activities due to the inclusion of viable implementation procedures for specific types of control documents. As previously discussed (see Section 4.B.5.), antidegradation provisions are applicable to regulated activities which require compliance with surface water quality standards. Because the current rules are outdated, they are written in a way making it difficult to apply them to activities other than wastewater activities regulated under individual NPDES permits. Until recently the MPCA has not actively applied nondegradation provisions to activities other than individually-permitted wastewater facilities. The proposed rules do not create additional regulatory authority, but rather provide procedures through which antidegradation requirements are to be applied to regulated activities which must already comply with water quality standards. The MPCA argues that the proposed rules will not create additional costs simply by including activity-specific procedures. However, for the sake of completeness, the MPCA is providing a discussion of the probable costs to impacted entities.
- An increased opportunity for comment on the MPCA's preliminary determinations due to the wider range of activities explicitly subject to antidegradation procedures.

b. *What are the general categories of parties who will bear the probable cost of complying with the proposed rules?*

In regard to the increases in reviewable activities due to removing the significance threshold, the affected parties will be owners and operators of proposed new or expanding wastewater facilities covered under individual NPDES permits that would not have been considered significant under the current rules. These include both municipal and industrial facilities. The PFA may also incur costs in situations where facilities request financial assistance.

In regard to the increase in the number of reviewable activities due to the inclusion of viable implementation procedures for specific types of control documents, the affected parties include applicants for NPDES stormwater permits for MS4s, construction and industrial activities. Affected parties will also include applicants for federal licenses and permits requiring CWA section 401 certification actions. These same parties, plus all those who may be affected, either positively or adversely, by the proposal, will also bear some degree of cost by participating in the increased opportunity for comment in the proposed rules. To the extent that there is a cost associated with participating in the public involvement phase of the antidegradation review, citizens, environmental groups, industry representatives and persons interested in a particular water resource may all bear some part of the cost of participation.

c. *What specific requirements in the proposed rules will cause the regulated community to expend resources beyond those expended under the current rules?*

(1) Antidegradation assessments – applicants for individual authorizations

The proposed rules require that applicants for individual authorizations (i.e., individual NPDES permits and section 401 certifications of individual federal licenses and permits) provide the MPCA with antidegradation assessments. The assessments will include an analysis of alternatives which avoid net increases in loading or other causes of degradation. If there is no prudent and feasible alternative that avoids net increases in loading or other causes of degradation, the applicant will need to identify the alternative that prudently and feasibly minimizes high water quality degradation, assess impacts to existing high water quality, and provide a justification for degrading high water quality based on the economic and/or social needs of the community. Applicants for individual municipal stormwater permits will be less affected. They will need to provide the same demonstration as other applicants for individual authorizations, except that the assessment of existing water quality and resulting impacts to that quality will not be required.

There are challenges in determining the additional level of effort spent in developing antidegradation assessments beyond current practices and/or other regulatory requirements. For example, the planning processes for new or expanding wastewater facilities generally include a review of pollution control measures with the goal of identifying those that are the most cost-effective. The antidegradation assessment requires an alternatives analysis that may consider cost-effectiveness, but is focused on identifying alternatives which prudently and feasibly minimize high water quality degradation. Some of the effort required in existing facility planning processes will be applied to the preparation of antidegradation assessments. In another example, the ACE is required to make determinations that proposed projects regulated under CWA section 404 permits have avoided or minimized impacts (see [40 CFR § 230]) (Exhibit 84) and that the proposed project is in the public interest (see [33 CFR § 320.4]) (Exhibit 111). Some of the information provided by section 404 permit applicants to the ACE will be applicable in developing antidegradation assessments.

Applicants seeking coverage under general authorizations will not be required to provide antidegradation assessments, which will reduce their costs. The MPCA will be responsible for conducting the necessary antidegradation reviews during the development of general authorizations. Antidegradation requirements are satisfied when an applicant demonstrates that the terms and conditions of the general authorization can and will be met.

(2) Minimizing degradation of high water quality

Permittees will be required to implement the alternative, identified through the alternatives analysis, which prudently and feasibly avoids or minimizes high water quality degradation. This requirement applies to entities covered under both individual and general authorizations.

d. What are the probable costs to applicants seeking individual control document authorization for preparing antidegradation assessments?

The MPCA estimates the following number of applicants (by control document type) will be required to provide antidegradation assessments each year. These estimates identify those applicants that do not currently provide antidegradation assessments, but would under the proposed rules either because of removing the significance threshold or because the proposed rules' inclusion of procedures for specific types of control documents.

- 14.3 applicants for individual NPDES wastewater permits
- 2.0 applicants for individual NPDES industrial stormwater permits
- 0 applicants for individual NPDES construction stormwater permits
- 0.4 applicants for individual NPDES municipal stormwater permits
- 15.5 applicants for individual section 404 permits where the MPCA provides or denies a section 401 certification
- 0.8 applicants for individual federal licenses and permits (other than section 404 permits) where the MPCA provides or denies a section 401 certification

The total number of applicants that will be required to provide assessments each year is estimated to be 33. Note that these numbers are similar to those estimated for the number of reviews conducted by the MPCA (Section 8.B.). The difference is in the number of reviews versus assessments for individual NPDES municipal stormwater permits. The discussion in Section 8.B. stated that there will be no increase in the number of **reviews** for these permit types because the most-recent (and only) nondegradation procedures entailed the MPCA (not the applicant) gathering the information needed to make its determination. In other words, the MPCA essentially conducted what is equivalent to the antidegradation assessment in the past. Because the proposed rules explicitly require applicants for individual NPDES municipal stormwater permits to provide antidegradation assessments and because the MPCA conducted these activities in the past, the MPCA is considering this a new activity.

Costs for preparing assessments will be dependent upon the complexity of the project, and the availability of both water quality data and information needed for the social and economic justification. Therefore predicting the exact cost of preparing assessments is difficult because the MPCA cannot reasonably predict who will apply for permits and the complexity of the proposed activities.

The costs of learning how to conduct an assessment will be minimized by previous experience. Although the current rules do not explicitly require that an applicant provide an antidegradation assessment, they or their consultants provide similar information to the MPCA for nondegradation reviews of significant discharges. In addition, applicants seeking financial assistance for municipal wastewater and stormwater treatment systems have, since 2007, submitted plans that include alternative analyses, which are in many ways similar to those required in the proposed rules. (Minn. R. 7077.0272, subp. 2(D))

The discussion below provides the estimated costs for each type of applicant. The MPCA understands that the cost estimates use very broad assumptions and that the effort required for completing assessments depends greatly upon the size and complexity of the project and the associated environmental risks. Estimating the effort and expense to establish existing water quality and the impacts to existing water quality is difficult. Variables associated with the determination of existing water quality include the parameter in question and the availability of existing water quality information. When previously-gathered data are insufficient to establish existing water quality, the applicant will likely make an assessment of existing water quality by conducting monitoring and/or modeling.

(1) Individual NPDES wastewater permits

The MPCA reviewed the economic impacts analyses from three states which recently adopted antidegradation rules (Table 4). The analyses for all three states addressed the costs to NPDES regulated wastewater treatment facilities for providing what is equivalent to the proposed rules' antidegradation assessment.

Table 4: Analyses from three states' rulemaking activities on estimated costs and levels of effort to prepare antidegradation assessments for wastewater treatment activities regulated under individual NPDES permits.

	Simple Assessments		Complex Assessment	
State	**Cost/Assessment**	**Hours/Assessment**	**Cost/Assessment**	**Hours/Assessment**
Iowa	$4,125	41	$16,025	160
Indiana	$4,000	(not provided)	$16,000 - $48,000 (using hourly rates of $100 and $300, respectively)	160
Missouri	$11,200	115	$94,300	759

Table 4 notes:

Information sources:

Iowa: A Fiscal Impact Statement Associated with the Notice of Intended Action, Antidegradation – Water Quality Standards (Chapter 61), Department of Natural Resources (September 2, 2008, Revised October 27, 2008) (Exhibit 128)[128]

Indiana: Fiscal Impact Statement, Title 327, Water Pollution Control Board, Indiana Register, December 7, 2011 (Exhibit 129)[129]

Missouri: Proposed Amendment, Water Quality Standards (10 CSR 20-7.031), Missouri Register, Vol. 33, No. 2 (January 16, 2008) (Exhibit 130)[130]

The term "antidegradation assessment" denotes information provided by an applicant to the regulating agency for the purpose of informing an antidegradation determination.

"Simple assessments" for Iowa and Missouri represent those that resulted in the identification of alternatives that did not discharge to or degrade a water body. The MPCA assumes, in these cases, that when the applicant identified a no discharge/degradation alternative, additional information from the applicant was not required. For Indiana, a "simple assessment" was one in which the applicant provided information that the discharge does not meet the significance threshold (i.e. is *de minimis*) and therefore additional information is not required. (Note that Iowa's rules and the proposed rules do not provide exemptions for *de minimis* discharges.)

"Complex assessments" for each state require the applicant to provide information on how degradation or loading is to be minimized and how the benefits of the proposed activity accommodate important economic or social development. Missouri's "complex assessment" also requires the applicant to provide an assessment of existing water quality. Missouri's estimated time to complete a "complex assessment" does not include laboratory hours for water quality analyses. The cost for the analyses ($25,000) is reflected in the total cost per assessment ($94,300).

Iowa's analysis includes the costs and levels of effort for the applicant to provide a public notice of the assessment. Under the proposed rules, the cost of public notice will be incurred by the MPCA.

Indiana used the same level of effort as Iowa (160 hours) to prepare "complex assessments".

The proposed rules are similar to the rules of the above-mentioned states in a number of areas:

- Provisions for all three Tiers of antidegradation protection.
- Scope – antidegradation is implemented through the issuance of NPDES permits and section 401 actions.
- High water quality is determined on a parameter-by-parameter basis.
- Alternatives analyses, which consider non-degrading and minimally-degrading alternatives, are required, resulting in the identification of the alternative that reasonably minimizes impacts to high water quality.

- Antidegradation review is conducted when general permits are developed, eliminating individual reviews for each applicant seeking coverage under the general permit
- Antidegradation is implemented through section 401 considerations regarding section 404 permits.

There are, however, differences. Both Missouri and Indiana provide for *de minimis* exemptions, while Iowa and the proposed rules do not. Iowa requires the applicant to provide a public notice of the assessment, while the proposed rules require the MPCA to conduct this task. Like Missouri, the proposed rules clearly require the applicant to provide an assessment of existing high water quality before allowing degradation to occur.

Table 4 illustrates a wide range in estimated costs for developing antidegradation assessments. The MPCA is proposing to base its own cost estimation on Missouri's for the following reasons.

- Missouri's cost analysis is the most comprehensive and provides the greatest detail.
- Missouri's analysis includes information on assessing existing water quality, a requirement found in the proposed rules.
- The levels of effort spent for each part of Missouri's assessment are, in MPCA's opinion, conservative yet reasonable. Missouri's cost estimates are conservative not only because its costs are relatively higher than the estimates provided by other states, but also because Missouri's rules provide exemptions for *de minimis* discharges, while the proposed rules do not. Thus Missouri's estimates for an individual application will likely be higher than that experienced under the proposed rules because Missouri's antidegradation assessments are weighed toward more complex projects which are assumed to require more costly assessments.

  Based on Missouri's levels of effort (i.e., hours to complete a given task and laboratory costs for determining existing water quality), Table 5 provides conservative estimates for preparing antidegradation assessments under the proposed rules.

Table 5: Estimated increased costs that will be incurred by applicants for individual NPDES wastewater permits for the preparation of an antidegradation assessment as a result of implementing the proposed rules.

Low Cost (Less Complex) Scenario

Assessment Part	Estimated hours required	Estimated cost
Part 1. Analysis of alternatives which avoid net increases in loading	Engineer – 50 hrs.	$7,365
	Technician – 65 hrs.	$6,383
Estimated cost to complete less complex assessment (Part 1.)		$13,748

High Cost (More Complex) Scenario

Assessment Part	Estimated hours required	Estimated cost
Part 1. Analysis of alternatives which avoid net increases in loading	Engineer – 100 hrs.	$14,730
	Technician – 130 hrs.	$12,766
Estimated cost to complete Part 1.		$27,496
Part 2. Determining existing water quality.	Sampling labor – 100 hrs.	$1,841
	(Laboratory costs)	$30,687
	Consultant (sampling and analysis plan) -200 hrs.	$24,550
Estimated cost to complete Part 2.		$57,078
Part 3. Analysis of minimally degrading alternatives.	Engineer – 120 hrs.	$17,676
	Technician – 52 hrs.	$5,107
Estimated cost to complete Part 3.		$22,783
Part 4. Social/Economic Justification	Planner – 36 hrs.	$5,303
	Engineer – 21 hrs.	$3,094
Estimated cost to complete Part 4.		$8,397
Estimated cost to complete a more complex assessment		$115,754

Table 5 notes:

Costs are based on the economic impact analysis for Missouri's antidegradation rulemaking (Proposed Amendment, Water Quality Standards (10 CSR 20-7.031), Missouri Register, Vol. 33, No. 2 (January 16, 2008). (Exhibit 130)

Missouri's 2008 cost estimates were adjusted to reflect:

- A 13% increase for higher wages in Minnesota. According the U.S. Department of Labor, Bureau of Labor Statistics, the average wage for all occupations in 2012 was approximately 13% higher in Minnesota compared to Missouri (http://www.bls.gov/oes/current/oessrcst.htm).
- Inflation from 2008 to 2013 using the U.S. Department of Labor, Bureau of Labor Statistics CPI Inflation Calculator (http://www.bls.gov/data/inflation_calculator.htm)

The "Low Cost (Less Complex) Scenario" represents situations where the applicant identifies a prudent and feasible alternative that avoids a net increase in loading or other causes of degradation. In these cases the applicant will not be required to provide information of existing water quality, minimally degrading alternatives, or social/economic justification.

The "High Cost (More Complex) Scenario" represents situations where prudent and feasible alternatives are not available to avoid a net increase in loading or other causes of degradation. In these cases the applicant will be required to provide information of existing water quality, minimally degrading alternatives, and social/economic justification.

In Missouri's analysis, antidegradation assessments are equally divided between the "Low Cost (Less Complex) Scenario" and the "High Cost (More Complex) Scenario." Following this same assumption, the MPCA estimates the average cost of preparing an assessment will be $64,751 (($13,748 + $115,754)/2).

Therefore, the MPCA estimates that the increased total cost of preparing antidegradation assessments to those applying for individual NPDES wastewater permits will be $925,939 per year ($64,751/assessment X 14.3 additional assessments per year). Note that this is a conservative estimate because it does not account for any shared costs applicants may incur with facility planning outside of what is required for antidegradation assessments.

A portion of the cost associated with the preparation of antidegradation assessments will be shared with the normal practice of developing of facility plans. The MPCA reviewed facility planning costs for applicants seeking PFA assistance and estimates an average of $43,000 (range = $4,000 - $176,000) is spent on the preparation of each plan (see Attachment 3). It is not possible to state with any accuracy what portion of these costs will be shared the preparation of antidegradation assessments, but the MPCA expects that they will be significant.

(2) Individual NPDES industrial stormwater permits

The MPCA estimates that two applicants for individual NPDES industrial stormwater permits will be required to provide antidegradation assessments each year. Industrial facilities with stormwater discharges are in some ways similar to wastewater facilities in that the discharges typically enter surface waters at relatively discrete locations and the facilities are owned and/or operated by a single entity. For both industrial stormwater and wastewater discharges regulated under individual permits, the discharges are to relatively few surface waters, which are identified at the time the assessments are prepared. Because of these similarities, the same antidegradation procedures will apply to both types of activities. The MPCA anticipates that the costs associated with preparing an antidegradation assessment ($64,751/assessment) will be similar to that of wastewater activities. **Therefore, the estimated annual**

cost to individual NPDES industrial stormwater applicants will be $129,502 ($64,751 per assessment X 2 assessments per year).

(3) Individual NPDES municipal stormwater permits

The MPCA currently issues two individual municipal stormwater permits – one for the city of Minneapolis and the other for the city of St. Paul. As other cities increase in size, it is conceivable that they could fall under individual permit coverage but the MPCA cannot predict if and when this will happen. Based on past permitting issuance, the MPCA estimates that, on average, annually 0.4 applications for individual NPDES municipal stormwater permits will include antidegradation assessments where they have not previously been provided by the applicant.

Even though pollution control measures used for wastewater and for stormwater are very different, the process of developing antidegradation assessments will be similar. Therefore, the costs identified in Table 5 may be used to roughly estimate those costs incurred by applicants for individual municipal stormwater permits. Note that the proposed rules do not require applicants for these permits to provide an assessment of existing water quality, which will reduce the cost of the antidegradation assessment. Assuming all antidegradation assessments are complex (high cost scenario), the average cost per assessment is estimated to be $58,676 ($115,754 average cost for complex assessments - $57,078 cost of assessing existing water quality). **Therefore, the estimated annual cost to individual NPDES municipal stormwater applicants is $23,470 per assessment ($58,676/assessment X 0.4 assessments per year).**

(4) Individual CWA section 404 permits

The MPCA estimates that 15.5 CWA section 401 actions will require applicants for individual section 404 permits to provide antidegradation assessments to the MPCA each year. Section 404 dredge and fill permits are issued by the ACE and are subject to states' section 401 actions.

The proposed rules require an applicant to determine impacts to existing water quality, minimize degradation, meet water quality standards, ensure that adequate mitigation is provided for loss of aquatic resources, ensure that proposed activities are in the public interest (i.e., important), and protect outstanding resources. These requirements are also found in federal regulations (see 40 CFR § 230 (Exhibit 84) and 33 CFR § 320.4) (Exhibit 111). The ACE is required to make factual determinations that the above requirements are satisfied when issuing a section 404 individual permit.

In an effort to streamline permitting processes the MPCA, ACE and other regulatory agencies have developed a joint application for projects involving physical alterations to wetlands and other water bodies. Some of the information needed to make MPCA's antidegradation determinations may be obtained from this application. The current application, however, is relatively simple and is used for a very wide range of projects including those that are covered under the ACE general permits. The MPCA expects that the MPCA will need additional information not provided in the joint application to make antidegradation determinations on complex projects. For example, the current joint application does not require information to address compensatory mitigation for impacts to waters other than wetlands. It also does not require the applicant to provide a justification for impacts based on the importance of economic or social development. It should be noted that the ACE and the MPCA are engaged in ongoing efforts to modify the joint application to meet the needs of both agencies.

Depending on a number of factors, including the type and complexity of the project and the sensitivity of the surface water, applicants may be required to provide additional information not currently found on the joint application. The costs associated with providing the additional information will vary accordingly and cannot be generally estimated.

Taking a conservative approach that assumes that none of the information provided by the applicant on the joint application is relevant to an antidegradation assessment and assuming that the average cost for developing an assessment is the same as for individual wastewater applicants ($64,751), the estimated annual cost for individual section 404 applicants to prepare antidegradation assessments is $1,003,641 ($64,751/assessment X 15.5 assessments/year). Using the average cost of $64,751 to prepare an assessment is reasonable because proposed projects will range from those that are relatively less complex to ones that are more complex.

(5) Individual federal licenses and permits other than CWA section 404 permits

Some section 401 actions, other than those taken on individual section 404 permits discussed above, will require an applicant to provide an antidegradation assessment to the MPCA. The MPCA estimates 0.8 of these types of assessments will be submitted annually. Non-section 404 individual federal licenses or permits that require a section 401 action are usually complex and require preparation of an Environmental Impact Statement (EIS). Some of the elements of an EIS are very similar to antidegradation assessments. In Minnesota a variety of independent statutory authorities carry out solutions suggested by an EIS. State agencies, including the MPCA, can reject the proposer's preference in favor of a "feasible and prudent" alternative if the former is "likely to cause pollution, impairment or destruction" of natural resources (Minn. Stat. § 116D.04, subd. 6).

Keeping with the conservative approach to estimating costs by assuming that none of the information provided in an EIS is applicable to the preparation of an assessment, the MPCA estimates the annual cost to applicants preparing assessments for federal licenses and permits (other than section 404 permits) to be $92,603 ($115,754 to prepare a complex assessment X 0.8 assessments/year).

e. *What are the probable costs of minimizing high water quality degradation to permittees regulated under individual authorizations?*

For significant discharges, the current rule governing nondegradation for all waters requires the MPCA to determine whether additional control measures beyond those necessary to comply with water quality standards and effluent limits can reasonably be taken to minimize the impacts (see Minn. R. 7050.0185, subp. 4.). In other words, the MPCA is currently not required to determine whether reasonable control measures can be taken to minimize impacts for discharges that are not significant. The proposed rules do not contain a similar *de minimis* exemption. The proposed provisions require the MPCA to approve high water quality degradation only when there is implementation of the alternatives that minimize the degradation. The proposed rules do not specify which pollution control measures will result in minimizing degradation. Those determinations, made through the review process, are situation-specific. Considerations include the nature of the discharge, the characteristics of the surface waters and the control measures considered to be prudent and feasible. The availability and reliability of pollution control measures change over time – what is considered to be infeasible today may be found to be feasible in the future. The economic realities (e.g., ability to pay for a given control measure) of one applicant may not be the same for another applicant. Given the situation-specific nature of antidegradation review, estimates of the costs of minimizing high water quality degradation cannot reasonably be made.

The MPCA reviewed the economic impacts analyses from three states, Iowa, Illinois, and Missouri (see Table 4) and found that the costs associated with implementing reasonable control measures that minimize high water quality degradation was not addressed in any of the states' analyses for the same reasons expressed above.

Although the MPCA cannot provide specific data on costs to implement alternatives that minimize high water quality degradation, the MPCA can provide examples of how alternatives analyses will be conducted and the associated costs of implementing the preferred alternatives under different circumstances. Attachment 4 provides examples.

f. *What are the probable costs of minimizing high water quality degradation to permittees regulated under general authorizations?*

Through the review process associated with general authorizations, the MPCA identifies alternatives that prudently and feasibly minimize net increases in loading or other causes of degradation. Permittees regulated under these authorizations will be required to implement these pollution control measures. The proposed rules are not prescriptive about which control measures will accomplish this requirement. Water quality protection through general permitting programs is achieved through an adaptive management process whereby control measures are constantly evaluated and reevaluated. Because of the selection of pollution control measures are made at the time general authorizations are made it is not possible to estimate associated probable costs.

g. *What are the probable costs of preparing comments on preliminary determinations?*

As required by federal antidegradation regulations, the proposed rules also provide an opportunity for interested entities to participate the MPCA's decision regarding the lowering of high water quality. Interested entities include individuals, environmental groups, industry associations and governmental agencies affected by potential changes in water quality. As with the current rule, the proposed rules provide for public input through existing provisions in Minn. R. ch. 7001. The proposed rules will increase the number of activities subjected to antidegradation procedures and therefore increase the number of possible opportunities for comment, but also create much greater transparency and consistency, which may result in a fewer number of comments or reduced effort needed to meaningfully participate in the public input process. Costs associated with preparing comments, whether under existing or proposed provisions, vary depending on the level of interest and the complexity of the proposed activity and cannot be reasonably estimated.

E. Probable costs or consequences of not adopting the proposed rules

The MPCA is required to provide:

> *The probable costs or consequences of not adopting the proposed rule, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals.* Minn. Stat. § 14.131 (6)

The consequence of not adopting the proposed rules is the continued application of the current nondegradation rules, including continued uncertainty in their implementation. Lack of clarity in the current rules has resulted in a number of legal challenges that, in addition to the legal costs, led to delays in permit issuance. Two cases illustrate such situations. In the first case, the city of Princeton in 2003 requested a permit for a wastewater treatment plant with a discharge capacity three times greater than the current facility. The MPCA's original review of Princeton's nondegradation assessment favored approval. However, an environmental group objected and sued for reconsideration, maintaining that meaningful alternatives to the increased discharge were overlooked and that the existing water quality was not adequately understood before the MPCA made its nondegradation determination. The Minnesota Court of Appeals found in favor of the plaintiffs:

> *Under Minnesota's nondegradation rules, the City of Princeton must analyze the prudence and feasibility of a downsized WWTP used in conjunction with acceptable decentralized treatment to meet additional anticipated population growth before such an alternative can be rejected by the city and MPCA as not prudent or feasible. The MPCA must establish the existing water quality of the Rum River and impose necessary requirements and restrictions on Princeton's proposed WWTP to protect that quality.* MCEA v. MPCA, City of Princeton, 696 N.W.2d 95, 108*109 (Minn. App. 2005) (Exhibit 60)

The Court said simply that Princeton's and the MPCA's evaluations were not good enough. It did not set a standard for nondegradation evaluations. The permit was ultimately issued, but only after the city revised its assessment to include an evaluation of additional alternatives to downsize the WWTP and an assessment of existing water quality.

The other case involved a legal challenge to the issuance of a general NPDES permit for municipal separate storm sewer system (MS4s) discharges. The Minnesota Court of Appeals in 2003 ruled that, although the use of general permits was appropriate to regulate municipal stormwater discharges, the existing rules were inadequate because they did not provide a means to determine whether nondegradation review was required (Exhibit 59). In other words, the rules did not address whether individual discharges covered under the general permit were in fact expanded discharges. A settlement was reached between the environmental group which brought the suit, the MPCA, and a group representing cities regulated by the NPDES program for stormwater discharges. The settlement required 30 MS4s to conduct nondegradation analyses. The analyses included loading assessments to estimate changes in average annual flow, phosphorus and total suspended solids from 1988-1990 to the present (2000-2005), and from the present to 2020. The information was then used to determine if stormwater discharges from a given MS4 was considered to be an expanded discharge. Those MS4s found to have expanded discharges were required to submit nondegradation reports which identified what additional control measures would be needed to bring the volume and/or loadings back to 1988 levels. Considerable effort and cost on behalf of both the MS4s and the MPCA was expended to make these determinations, all because the current rules do not adequately address the application of antidegradation through general permits.

Both of the above cases resulted in costs associated with litigation and significant delays in permit issuance due to the inadequacies of the current rules. If the proposed rule is not adopted, such legal challenges and delays are likely to continue. Regardless of the outcome of future legal challenges, there would be significant direct costs to the plaintiffs and the MPCA. The indirect costs from delays would result in the loss of productivity in the case of private enterprises, and costs to taxpayers when public projects are involved. To reduce the likelihood of future litigation, the proposed rules are written to clearly comport with federal antidegradation regulations and associated EPA guidance, and they contain implementation procedures for specific regulated activities.

There are also indirect costs and consequences of not adopting the proposed rules related to the value of foregone alternatives which minimize degradation of high quality water. Without the rigorous review standard of the proposed rules it is possible that some alternatives will be overlooked. If overlooked alternatives would have favored water quality improvements, some loss of resource value (i.e., cost) would result. On the other hand, if alternatives that would have favored local economic development are overlooked, there would be a resulting economic loss.

Adopting the proposed rules will reduce the risk of impairing high quality water and save the costs associated with water quality restoration. A water body is "impaired" if it fails to meet one or more water quality standards. Section 303(d) of the CWA (Exhibit 13) requires states to:

- assess all waters of the state to determine if they meet water quality standards;
- list waters that do not meet standards and update the list every even-numbered year;
- conduct TMDL studies in order to set pollutant reduction goals needed to restore water quality

Federal and state regulations also require implementation of restoration measures to meet TMDLs. MPCA responsibilities include monitoring and assessing water quality, listing impaired waters, and conducting TMDLs in Minnesota. The MPCA also coordinates closely with other state and local agencies on restoration activities.

Monitoring shows about 40% of Minnesota's lakes and streams are currently impaired for conventional pollutants, a level comparable to other states. According to MPCA's 2014 Proposed Impaired Waters List, (Exhibit 131)[131] the number of all impaired waters in Minnesota now totals 4,114. Some of the water bodies are listed for more than one pollutant or reach. The number of impairments includes those in need of TMDLs and those with EPA-approved TMDLs for waters that have not yet been restored. The vast majority of impairments, greater than 99%, are human-caused.

The CWA requirement for states to restore impaired waters has significant cost implications. A recent legislative report provides some perspective:

> *The U.S. has spent an average of $1 billion per year in stream restoration since 1990. In Minnesota, implementation plans for just 13 approved TMDL projects (out of a total of 76 projects approved so far) estimated approximately $530 million in restoration needs. Restoration needs for the South Metro Mississippi River and Minnesota River TMDLs are anticipated to total hundreds of millions of dollars alone.* Biennial Report of the Clean Water Council, Final Report, (2013), p. 17 (Exhibit 132)[132]

The requirement to restore impaired waters may have a direct impact on economic growth. Until a TMDL is completed, the CWA prohibits any new or expanded discharge to an impaired water, if the discharge negatively affects the impairment. This means if TMDLs do not move forward, communities and businesses may find themselves unable to expand.

The proposed rules reduce the risk of impairment by:

- Removing the current significance thresholds. The current thresholds are not based on the consumption of available assimilative capacity and the rules do not contain a cumulative cap to account for multiple impacts from activities that fall below the thresholds. As a result, there is a potential risk that multiple activities falling below the thresholds may cause water quality impairments.
- Requiring applicants for individual authorizations to provide an assessment of existing water quality and impacts to that quality as a result of the proposed activity. If degradation is allowed and existing water quality is not well understood, there is a real risk of causing water quality impairments.

Although adopting and implementing the proposed rules will reduce the risk of impairments, they will not entirely prevent them nor eliminate costs associated with restoration. The reason for this is that antidegradation provisions are enforceable through the issuance of control documents governing regulated sources – sources which contribute to only a portion of total water quality degradation. For example, the contribution from unregulated nonpoint sources for bacteria and turbidity degradation is very high compared to regulated point sources. Conversely, the sources of some parameters, such as polychlorinated biphenyls, come almost exclusively from regulated activities.

Determining the relative contributions from point and nonpoint sources for most parameters statewide is very difficult and has not been thoroughly studied. One exception, which has significant contributions from both sources, is phosphorus – the primary nutrient causing eutrophication of Minnesota's surface waters. Under average flow conditions, the point source total phosphorus contribution represents 31% of the loading to surface waters, statewide, whereas nonpoint sources contribute 59%. (Detailed Assessment of Phosphorus Sources to Minnesota Watersheds, Barr Engineering Company, February, 2004, p. 248 (Exhibit 133)[133]) There has also been recent interest in characterizing nitrogen loading to Minnesota's surface waters. In one study, the MPCA estimated 73% of statewide nitrogen entering surface waters is from cropland sources and 9% is from wastewater point sources, with several other sources adding the other 18%. (Nitrogen in Minnesota Surface Waters, Minnesota Pollution Control Agency, June 2013, p. 20 (Exhibit 134)[134])

Determining accurate costs of restoring water quality if the rules are not adopted is difficult because of an incomplete understanding of the relative contribution of degradation from regulated sources. However, given the overall high cost of restoration, preventing or reducing the contribution from regulated sources will result in significant cost savings.

In summary, the consequences of not adopting the proposed rule are:

- legal challenges and associated costs to all parties;
- delays in permit issuance, resulting in lost opportunity for municipal and industrial dischargers;
- inefficiency in administration of the antidegradation program and in the process of obtaining public input;
- environmental damage;
- cost of remediation of impaired waters.

F. Assessment of any differences among the proposed rules and existing federal regulations

The MPCA is required to provide:

> *An assessment of any differences between the proposed rule and existing federal regulations and a specific analysis of the need for and reasonableness of each difference.* Minn. Stat. § 14.131 *(7)*

Additionally:

> *The Commissioner of the Pollution Control Agency shall include, in any statement of need and reasonableness for rules to adopt air quality or hazardous waste or water quality standards, an analysis of proposed standards that are more stringent than similar federal standards, including justification for why the standards are needed to protect public health and the environment,…* Minnesota Executive Order 11-04, *January 24, 2011* (Exhibit 135)[135]

Federal antidegradation regulations at 40 CFR § 131.12 are quite broad and states and authorized tribes have a great deal of discretion in implementing the requirements. Attachment 5 provides a detailed comparison of federal regulations with the standards found in the proposed rules. To summarize, the proposed rules are not more stringent that federal regulatory requirements, but provide detail on how those requirements will be implemented.

Minnesota, like a number of other states, has elected to provide a fourth level of protection more stringent than Tier 2, yet less stringent than Tier 3. This extra Tier in states' antidegradation policy (referred to as Tier 2.5 in some states) is not found in 40 CFR 131.12, but its inclusion in rule is permissible under section 510 of the CWA (Federal Water Pollution Control Act, 33 U.S.C. § 1370 (1972, as amended) (Exhibit 74). In Minnesota, this level of protection is provided to water bodies specifically designated in the current rule as restricted ORVWs (Minn. R. 7050.0180, subp. 6 through subp. 6b). The MPCA is not proposing to add or remove restricted ORVWs in this rulemaking. Like the prohibited category of ORVWs, restricted waters possess extraordinary or unique characteristics. Whereas prohibited waters are designated because of outstanding water quality, some restricted ORVWs are designated for reasons other than their exceptional water quality. The proposed rules do not fundamentally change how restricted ORVWs are currently protected, but provide clarification. Section 5.D.6. provides additional detail on how restricted ORVWs will be protected.

The MPCA does not consider maintaining the level of protection afforded to restricted ORVWs as being more stringent than federal regulations. This is because the level of protection for restricted ORVWs is less stringent than Tier 3 protection of prohibited ORVWs (or, as stated in federal regulations – outstanding national resource waters). Maintaining restricted ORVWs protection provides reasonable protection of waters which may not have been designated strictly because of excellent water quality.

G. Assessment of the cumulative effect of the proposed rules with other federal and state regulations

The MPCA is required to provide:

> *An assessment of the cumulative effect of the rule with other federal and state regulations related to the specific purpose of the rule.* Minn. Stat. § 14.131 *(8)*

The specific purpose of antidegradation is "*to achieve and maintain the highest possible quality in surface of waters of the state*." Proposed Minn. R. 7050.0250. This broad goal aligns with those of the CWA and with federal water quality regulations, including antidegradation policy. The proposed rules improve the means by which the MPCA carries out its duties (see Minn. Stat. § 115.03). These improvements are accomplished by the proposed rules' reasonable standards and the inclusion of implementation procedures to address the various activities the MPCA regulates. Improving Minnesota's antidegradation provisions will, in turn, improve protection of the State's water quality. As addressed in Section 8.D., there will be costs associated with complying with the proposed rules, but there are also overall economic benefits to maintaining water quality as described in Section 4.A. If the proposed rules are implemented, the MPCA believes that long-term cost savings will result.

The MPCA has made an effort to ensure that the proposed rules do not add duplicative requirements. In many cases, the information and assessment required for an antidegradation review is already required by another program (e.g., publicly funded project, ACE, etc.). This may seem like a duplication of effort, but the MPCA is clear that even though the information may be used in different ways, the requirements are not cumulative. No other program conducts antidegradation reviews. The PFA, for example, may require information about alternatives to the proposed project, and that same information may also be used to meet the alternatives assessment requirement for the antidegradation review. But the two reviews are not cumulative, the outcome of the reviews are entirely separate. Using the same information to complete two types of reviews is not a cumulative effect; it is a reflection of the MPCA's efforts to make the most efficient use of the applicant's resources. Regarding section 401 certifications of 404 permits, the proposed rules provide compatibility with the ACE permitting processes. The MPCA is the CWA delegated authority to develop, implement and enforce water quality standards, including antidegradation requirements. As such, the ACE relies on the MPCA's section 401 actions to make sure that the issuance of CWA section 404 permits does indeed comply with those standards.

H. Consideration of legislative policy supporting performance-based regulatory systems

The MPCA is required to:

> *Describe how the agency, in developing the rules, considered and implemented the legislative policy supporting performance-based regulatory systems set forth in section 14.002.* Minn. Stat. § 14.131

Minnesota statutes state that:

> *…the legislature finds that some regulatory rules and programs have become over prescriptive and inflexible, thereby increasing costs to the state, local governments, and the regulated community and decreasing the effectiveness of the regulatory program. Therefore, whenever feasible, state agencies must develop rules and regulatory programs that emphasize superior achievement in meeting the agency's regulatory objectives and maximum flexibility for the regulatory party and the agency in meeting those goals.* Minn. Stat. § 14.002

The MPCA's mission is to work with Minnesotans to protect, conserve and improve our environment and enhance our quality of life. The proposed rules emphasize superior achievement in meeting this goal by providing a publically-informed decision-making process for the protection and sustainable use of the state's water quality. The MPCA is making an effort to be flexible and open minded in the implementation of regulatory programs and to seek solutions to problems in an atmosphere of freedom to "think outside the box." These efforts are consistent with the spirit of this statute.

There are strong and legitimate pressures to, on one hand, make rules very precise and prescriptive, and, on the other hand, to make them flexible and open to interpretation. Finding the balance in rulemaking between the ends of the prescriptive/flexible spectrum is not always easy; the balance the MPCA finds can be unsatisfactory to various outside parties. For some, flexibility means inconsistent application of rules and the granting of too much authority to the MPCA. To others, too much prescriptiveness means inability to deal with case-by-case variability and being forced into untenable bureaucratic positions and endless red tape. Also the office of the Revisor of Statutes, appropriately, applies certain conventions to rules that places limits on language that is deemed too flexible or "open ended." Finally, not all rules or provisions in rules require, or should have, the same level of prescriptiveness. A reasonable middle ground between the two ends of this spectrum varies depending on the proposed amendment and part of the rule being revised. In the rules being proposed, the MPCA has found a reasonable balance between detail and flexibility.

Federal regulations at 40 CFR § 131.12 lay out the minimum requirements that states must include in their antidegradation provisions. The states, however, are provided a certain degree of latitude in how these requirements are to be implemented.

The proposed rules provide flexibility for the regulated community and the MPCA in the following ways:

- Antidegradation standards

The proposed rules contain two sets of antidegradation standards. One set of standards applies to activities where impacts to existing water quality can reasonably be quantified and the other applies to activities where such assessments are not reasonable.

- Exemptions from antidegradation procedures

  The proposed rules exempt activities that impact Class 7 waters (provided that uses are maintained and downstream high water quality and ORVWs are protected) and activities that are temporary and limited in nature.

- Alternatives analysis

  Applicants seeking individual authorizations are provided the opportunity to evaluate and identify prudent and feasible pollution control measures that minimize degradation. This same flexibility is also provided for general authorizations.

- Social and economic justification

  Applicants seeking an individual authorization are provided the opportunity to demonstrate that degradation of high water quality is important for economic or social development. Likewise, in conducting an antidegradation review for a general authorization, the MPCA is provided the flexibility to demonstrate the need to increase loading to high quality waters for reasons of economic or social development.

The range of changes the MPCA is proposing in these rules represents a reasonable balance between detail and flexibility; that "balance" appropriately varies depending on the particular provision. The MPCA believes that the examples provided above are consistent with the intent of Minn. Stat. § 14.002.

I. Rules requiring local implementation

The MPCA is required to:

> *...determine if a local government will be required to adopt or amend an ordinance or other regulation to comply with a proposed agency rule.*
> Minn. Stat. § 14.128 *(1)*

The proposed rules will not directly require a local government to adopt or amend an ordinance. Antidegradation is not administered through local governments. Therefore, it is not necessary to incorporate the antidegradation requirements into local codes and the proposed amendments do not specify that certain activities must be undertaken to meet antidegradation standards. However, it may happen that in order for a community to demonstrate that it can meet the permit conditions that ensure that waters will not be degraded, changes to local ordinances may be needed. An example of this is for general NPDES stormwater permits. Communities that can meet the conditions of the general NPDES stormwater permit will not need to change any ordinances to meet the antidegradation conditions of that permit. However, if the community is not able to meet the conditions of the general NPDES stormwater permit, then it may need to make ordinance changes. These may be as simple as adopting an ordinance that prohibits raking leaves into the street or may require more extensive redesign of the stormwater system. Any changes a community must make to its ordinances will be a consequence of the permit conditions, not a direct consequence of the proposed amendments.

It is important to note that local government units subject to NPDES general permits will have the opportunity to provide comment on the MPCA's antidegradation review and determinations through public participation procedures specified in Minn. R. ch. 7001. Local government units are strongly encouraged to engage in discussions with the MPCA during the development of permits and before the formal request for comments.

Other than local government units affected by the antidegradation procedures for NPDES-regulated stormwater activities, the MPCA has determined that the rules proposed will not have any effect on local ordinances or regulation.

J. Determination regarding whether the cost of complying with the proposed rules in the first year after the rules take effect will exceed $25,000

Minnesota's Administrative Procedures Act was amended in 2005 to include a section on potential first-year costs attributable to proposed rule amendments. This amendment requires an agency to:

> *…determine if the cost of complying with a proposed rule in the first year after the rule takes effect will exceed $25,000 for: (1) any one business that has less than 50 full-time employees; or (2) any one statutory or home rule charter city that has less than ten full-time employees.* Minn. Stat. § 14.127*, subd. 1*

Based on past permitting history the MPCA anticipates that an additional 33 applicants per year will be required to submit antidegradation assessments (Table 3 and associated discussion in Section 8.D.). The MPCA expects at least one small business (i.e., one with less than 50 full-time employees) or one small city (i.e., statutory or home rule charter city with less than ten full-time employees) will be among these applicants.

Data compiled by the Minnesota Department of Employment and Economic Development and MPCA's DELTA database indicate that in 2012 there were 263 cities, townships and unorganized territories with less than 10 employees and which had NPDES permit coverage for wastewater discharges (see Attachment 6) If a city chooses to build a new facility or upgrade its existing facility resulting in an expanded loading, antidegradation procedures will be required. The MPCA does not know in advance which cities will ask for new or expanded loading during the proposed rule's first year of effect.

Data on small business firms are not as readily available. The Minnesota Department of Employment and Economic Development does not report employment information from individual firms. Small businesses comprise the largest number of all firms in all economic sectors from which the Census Bureau collects employment data. (U.S. Census Bureau website, County Business Patterns for Minnesota). The MPCA is able to identify certain economic sectors that are likely to have wastewater discharges (e.g., food processing). Although the data show the proportion of small firms that comprise an economic sector, it does not allow the MPCA to identify with any accuracy the number of small firms that might trigger antidegradation procedures.

The probable costs to the regulated community of complying with the proposed rules are addressed in Section 8.D. The type of small businesses or cities that may be impacted are those applying for NPDES permits, as well as those that require section 401 actions on federal licenses and permits. The costs to these businesses and cities will be associated with: 1) the preparation of antidegradation assessments (for individual authorizations); 2) the implementation of pollution control measures that minimize high water quality degradation; and 3) the preparation of comments on the MPCA's preliminary antidegradation determinations.

1) If an activity that triggers antidegradation procedures requires an individual authorization, the applicant will be required to provide an antidegradation assessment to the MPCA. As discussed in Section 8.D., the MPCA estimates the average cost of a typical assessment at $64,751. This is likely a high estimate for wastewater facilities because it includes costs that are intrinsic to facility planning, which will be conducted regardless of the antidegradation review. Also, this estimate is high because new or expanding facilities for small cities will be less complex, and therefore the antidegradation assessments will be less costly, than for larger cities. Antidegradation assessment costs for applicants for CWA section 404 permits are also expected to be much less than the average assessment cost because that figure does not take into account cost sharing with the ACE permitting processes and requirements.

2) Costs may be incurred by small businesses and cities as a result of implementing prudent and feasible pollution control measures which minimize high water quality degradation. These costs cannot reasonably be estimated because decisions on how impacts will be minimized are situation-specific and will need to be determined through the antidegradation review process for each small entity. Also, because of the lengthy planning, review and construction phases, the MPCA cannot determine when a small business or city will actually incur costs associated with pollution control measures. The MPCA expects that very few actual costs will be incurred during the first year after adoption of the proposed rules. In most instances the costs of implementing pollution control measures will not be incurred until after the planning and review phases of the facility.

3) Costs may be incurred by small businesses and cities if a given small entity decides it wants to comment on the MPCA's preliminary determination. The actual cost of preparing those comments will vary depending on each situation. And again, the timing of these costs will depend on whether the business or city has triggered the need for a permit revision and therefore an antidegradation review. A small business or city may also wish to comment on preliminary determinations regarding proposed activities of other entities. The MPCA cannot make a reasonable estimate of how many small entities will prepare comments, whether those comments will be prepared in the first year after adoption of the proposed rules and the costs associated with the preparation of those comments.

In summary, the cost to any one small business or city in the first year after the proposed rules take effect may exceed $25,000. However, more specific analysis of which and how many small entities will be impacted, and the site-specific costs associated with preparing assessments, implementing pollution control measures and the preparation of comments on antidegradation determinations is not possible.

K. Assessment of any differences among the proposed rules, existing federal standards and similar standards in states bordering Minnesota and EPA Region 5 states

For rulemakings which propose changes to standards for water quality under Minn. Stat. ch. 115, the SONAR must include:

> *(1) an assessment of any differences between the proposed rule and:*
> *(i) existing federal standards adopted under the Clean Air Act, United States Code, title 42, section 7412(b)(2); the Clean Water Act, United States Code, title 33, sections 1312(a) and 1313(c)(4); and the Resource Conservation and Recovery Act, United States Code, title 42, section 6921(b)(1);*
> *(ii) similar standards in states bordering Minnesota; and*
> *(iii) similar standards in states within the Environmental Protection Agency Region 5; and*
> *(2) a specific analysis of the need and reasonableness of each difference.*
> Minn. Stat. § 116.07 (2)(f)

An assessment between the proposed rules and federal regulatory requirements is provided in Section 8. F.

The process of comparing the proposed antidegradation standards and requirements to those of border and EPA Region 5 states is complicated because the wide range of policies and intricacies of each state's water quality standards program – as well as values, priorities and regulatory structure that are unique to each state. It is not as simple as comparing one numeric water quality standard to another. Although there are some differences between the proposed rules and other states' rules in how federal requirements are implemented, the proposed requirements do not represent a significant departure from requirements in other states. Attachment 7 provides a detailed comparison of the proposed requirements to those found in border and EPA Region 5 states. The antidegradation rules of EPA Region 5 and border states that were evaluated are:

- Illinois (IL), Illinois Administrative Code, Title 35, Section 302.105, (35 IAC 305.105) effective December 20, 2002 (Exhibit 136)[136]
- Indiana (IN), Indiana Administrative Code, Title 327, Article 2, Section 1.3, (327 IAC 2-1.3) effective June 28, 2012 (Exhibit 94)
- Iowa (IA), Iowa Administrative Code, 567, Chapter 61.2(2), (567 IAC 61.2(2) effective February 16, 2011 (Exhibit 104) (Note that IA's implementation procedures (Iowa Antidegradation Implementation Procedure), (effective February 17, 2010) (Exhibit 103) are incorporated into rule by reference.)
- Michigan (MI), Michigan Administrative Code: Water Resources Protection -- Part 4. Water Quality Standards, R 323.1098, effective December 13, 1973, revised April 2, 1999 (Exhibit 137)[137]
- North Dakota (ND), North Dakota Administrative Code, 33-16-02.1, effective June 1, 2001 (Exhibit 138)[138]

- Ohio (OH), Ohio Administrative Code, 3745-1-05, effective March 1, 2011 (Exhibit 139)[139]
- South Dakota (SD), Administrative Rules of South Dakota (ARSD) 74:51:01:34, effective July 20, 1997 (Exhibit 140)[140]; ARSD 74:51:01:35, effective January 27, 1999 (Exhibit 141)[141]; ARSD 74:51:01:36, effective January 27, 1999 (Exhibit 142)[142]; ARSD 74:51:01:37, effective January 31, 1993 (Exhibit 143)[143], ARSD 74:51:01:37.01, effective September 13, 2004 (Exhibit 144)[144]; ARSD 74:51:01:38, effective July 1, 1996 (Exhibit 145)[145], ARSD 74:51:01:39, effective July 20, 1997 (Exhibit 146)[146]
- Wisconsin (WI), Water Quality Standards for Wisconsin Surface Waters, Chapter NR 102, effective October 1, 1973 (Exhibit 147)[147]; Water Quality Antidegradation, Chapter NR 207, effective September 1, 1997 (Exhibit 148)[148]

The following aspects are common among the proposed rules and most (and in some cases, all) other states' rules:

- Antidegradation standards are applied through control documents regulating activities subject to the CWA.
- Antidegradation standards apply to surface waters of the state.
- Antidegradation procedures are triggered by net increases in loading.
- Exemptions to antidegradation procedures are provided.
- High water quality is determined on a parameter-by-parameter basis.
- The determination of whether a proposed activity is necessary is made through an analysis of reasonable alternatives that avoid or minimize degradation.
- The determination of whether a proposed activity is important is made through the evaluation of changes to a wide range of economic and social indicators. Like the proposed rules, other state rules do not include a threshold by which importance is ultimately determined.
- Public participation in decisions regarding the treatment of high water quality occurs through existing permitting procedures.

Two aspects that vary considerably among states' rules are: 1) exemptions for *de minimis* impacts to high water quality; and 2) the application of antidegradation requirements through the issuance of general permits.

1. Exemptions for de minimis impacts to high water quality

Some states' rules provide exemptions from Tier 2 procedures based on *de minimis* impacts to high water quality. If it is determined that the proposed activity would fall below a predetermined level or significant threshold, that activity would be considered not to be significant (i.e., *de minimis*) and a Tier 2 procedures would not be required. Environmental Protection Agency guidance (Tier 2 Antidegradation Reviews and Significance Thresholds, U.S. EPA memorandum from Ephraim S. King (Office of Science and Technology) to Water Management Division Directors, Regions 1-10, (2005) (Exhibit 55) recommends that "*significant*" lowering of water quality be defined in terms of a demonstrated projected lowering of water quality, specifically the available assimilative capacity of a water body. The memorandum defines "*available assimilative capacity*" as

"*...the difference between the applicable water quality criterion for a pollutant parameter and the ambient water quality for that pollutant parameter where it is better than the criterion...*" The memorandum supports the use of significant threshold set at 10% of available assimilative capacity, above which an activity would be required to receive "*a full tier 2 antidegradation review.*"

The proposed rule does not provide a *de minimis* exemption for reasons given in Section 5.G.1.b.

Illinois, Iowa, and South Dakota also do not provide this exemption. In some, but not all cases, Michigan and Indiana consider proposed discharges that consume less than 10% of the available assimilative or loading capacity to be *de minimis*. Indiana provides some *de minimis* exemptions for heat-related impacts.

In North Dakota, proposed discharges to Category 1 waters covered under nationwide permits are not considered significant when they would:

- lower the ambient water quality by less than 15%;
- reduce available assimilative capacity by less than 15%;
- increase the loading by more than 15%

In the determination of significance, North Dakota also considers the:

- nature, persistence, and potential effects of the parameter;
- potential for cumulative effects;
- predicted impacts to aquatic biota;
- degree of confidence in any modeling techniques utilized

Wisconsin determines a proposed discharge to be significant in one of two ways:

- The proposed new or increased discharge, along with all other new or increased discharges after March 1, 1989, taking into account any changes in assimilative capacity, results in an expected level of an indicator parameter in the water of either of the following:
    - greater than one–third multiplied by the assimilative capacity for any indicator parameter other than dissolved oxygen;
    - greater than the sum of the existing level multiplied by two–thirds and the water quality criterion multiplied by one–third for dissolved oxygen
- For a discharge to the Great Lakes system, the mass loading of any substance in the proposed new or increased discharge having a bioaccumulation factor greater than 1000 would be increased.

Ohio's determination of significance is more complex and is based on the surface water classification. For general high quality waters, any net increase in the discharge of a regulated pollutant that is less than 10% of the wasteload allocation to maintain water quality standards is not considered significant, provided the proposed lowering of water quality does not exceed eighty per cent of the wasteload allocation. For superior high quality waters, other than Lake Erie, and outstanding state waters, any net increase in the discharge of a regulated pollutant that results in less than a five per cent change in the ambient water quality concentration is not considered significant, provided the proposed lowering of water quality does not exceed the portion of the remaining available assimilative capacity. For Lake Erie, any net increase in the discharge of a regulated pollutant that is less than ten per cent of the water body pollutant assimilative capacity is not considered significant. For the discharge of primarily sanitary wastewaters, only ammonia-nitrogen is evaluated is used to determine significance.

2. Application of antidegradation requirements through the issuance of general permits

The proposed rules include specific antidegradation procedures for general permits. Under these procedures the MPCA conducts the antidegradation review during the development of the general permit. Like reviews for activities covered under individual permit, the public is given the opportunity to comment on the MPCA's review. Antidegradation review of individual activities covered under a general permit is not required as long as the terms and conditions of the permit are met.

North Dakota, South Dakota and Wisconsin rules do not provide specifics on how antidegradation is applied to general permits. In Illinois and Ohio, activities covered under general permits are not required to undergo review. In Indiana, the regulatory agency conducts the review of NPDES general permits and activities covered under that permit are not subject to additional review. In Michigan, (except for Outstanding State Resource Waters, or as the state determines on a case-by-case basis) new or increased loadings authorized by certificates of coverage under NPDES general permits and notices of coverage for stormwater from construction activities are not required to undergo review.

Iowa's rules are similar to what is being proposed here. In that state, activities authorized by general permits are not required to undergo a Tier 2 antidegradation review as part of the Notice of Intent process. However, new and reissued general permits must be evaluated to consider the potential for degradation as a result of the permitted discharges. All NPDES general permits require that permit conditions be met, including the general requirement that permitted discharges must ensure that water quality standards are not violated and BMPs contained in the permit are implemented. Compliance with the terms of the general permits issued by the department is required to maintain authorization to discharge under the general permit. Discharges covered by a general permit that cannot comply with general permit conditions or antidegradation requirements will be required to seek coverage under an individual permit.

L. Consideration of economic factors affecting the feasibility and practicality of the proposed rules

Minnesota statutes require that:

> *In exercising all its powers the pollution control agency shall give due consideration to the establishment, maintenance, operation and expansion of business, commerce, trade, industry, traffic, and other economic factors and other material matters affecting the feasibility and practicability of any proposed action, including, but not limited to, the burden on a municipality of any tax which may result therefrom, and shall take or provide for such action as may be reasonable, feasible, and practical under the circumstances.* Minn. Stat. § 116.07*, subd. 6*

The reader is referred to Sections 8.A., 8.B., 8.C., 8.D., 8.E., 8.I., and 8.J. for detailed discussions on how the MPCA considered economic factors and other material factors in proposing these rules.

As discussed in Section 8.B.1., including control document-specific implementation procedures in the proposed rules brings to light the issue of which activities are subject to antidegradation requirements. Control document applicants, which in the past did not undergo nondegradation procedures because of the current rules' lack of clarity, may now need to submit antidegradation assessments and implement control measures that prudently and feasibly minimize degradation of high water quality. In particular this will affect applicants for federal licenses and permits requiring section 401 actions because they have not historically been subject to nondegradation requirements. The vast majority of federal licenses and permits are CWA section 404 dredge and fill permits for one-time impacts – not like renewing NPDES permits which govern discharges over time. The vast majority of section 404 permits are also granted to private interests, not public or municipal projects. It is therefore unlikely that the inclusion of control document-specific implementation procedures will create a tax burden on municipalities.

The proposed rules will increase costs to applicants seeking individual NPDES permits for wastewater discharges due to the removal of the significance threshold. This change will affect small municipalities wishing to build new facilities or expand existing ones. Costs associated with this change will include the preparation of antidegradation assessments and minimizing high water quality degradation, to the extent prudent and feasible. The cost of assessment preparation will be incurred only when applying for a new or expanding discharge. The MPCA estimates that an additional 14.3 applicants per year will be required to prepare assessments and the total annual costs for doing this work will be approximately $925,939 (see Section 8.D.2.d.(1)).. The cost of preparing individual assessments will likely be spread out over the time period from when a project is initiated to when a request is made to further increase loading.

The cost of prudently and feasibly minimizing high water quality degradation will be an on-going cost. Because the determination of which alternatives will minimize high water quality degradation is situation-specific and is made through the permitting process, it is difficult to accurately predict if there will be a tax burden to a given municipality and, if so, how much burden that might impose.

In summary, the MPCA recognizes that in general, the proposed amendments will result in costs to regulated entities, by requiring more antidegradation reviews and more complete development antidegradation reviews. There will also be very real economic benefits to the regulated entities and also to other entities associated with the protection of water resources by providing a more predictable and transparent process for antidegradation review. In addition, there will be general benefits to Minnesota by providing a more effective process for implementing antidegradation standards, which will improve the condition of water resources. The MPCA is sensitive to the economic challenges currently facing the state and strives to be as reasonable and flexible as possible in implementing its regulatory programs. However, it is essential that regulated activities comply with state and federal laws and that the quality of Minnesota's waters is protected for the benefit of all citizens, both now and in the future. It is neither prudent nor consistent with federal and state law to allow the removal of existing uses, unnecessarily degrade high water quality or degrade water quality necessary to maintain the exceptional characteristics of ORVWs.

9. Comments received

The MPCA received a number of comments in response to the published Requests for Comments (RFC) and at the public informational meetings. These comments came from a range of non-government interested parties, as well as the Minnesota Departments of Health, Agriculture and Natural Resources. All the comments received were considered in the drafting of the proposed amendments. The comments received in the pre-proposal rulemaking period can be generally grouped into the following areas:

- Comments identifying deficiencies in the existing program and supporting changes to address those deficiencies.
- Comments relating to the scope of the rulemaking, specifically regarding the application of nondegradation to unregulated activities.
- Comments relating to the protection of ORVWs.
- Comments relating to the determination of a baseline to establish existing water quality, especially as it relates to the protection of high water quality.
- Comments relating to economic effects, particularly regarding the development of antidegradation assessments to determine the necessity for lowering high water quality to accommodate important economic or social development.
- Comments relating to the implementation of antidegradation requirements through stormwater permits.

10. Conclusion

In this SONAR the MPCA has established the need for and the reasonableness of each of the proposed amendments to Minn. R. ch. 7001 and 7050. The MPCA has provided the necessary notifications and in this SONAR documented its compliance with all applicable administrative rulemaking requirements of Minnesota statute and rules. Based on the forgoing, the proposed amendments are both needed and reasonable.

12/17/2015
Date

John Linc Stine, Commissioner
Minnesota Pollution Control Agency

11. **List of authors, witnesses, attachments and exhibits**

A. Author

1. William Cole, Supervisor, Environmental Assessment and Outcomes Division, MPCA

B. Witnesses

The MPCA anticipates the following witnesses may testify in support of the proposed amendments:

1. William Cole , Supervisor, Environmental Assessment and Outcomes Division, MPCA
2. Jean Coleman, Attorney, MPCA
3. Carol Nankivel, Rule Coordinator, Resource Management and Assistance Division, MPCA
4. Katrina Kessler, Manager, Environmental Assessment and Outcomes Division, MPCA
5. David Bael, Economist, Environmental Assessment and Outcomes Division, MPCA
6. Catherine Neuschler, Supervisor, Resource Management and Assistance Division, MPCA
7. Scott Fox, Hydrologist, Municipal Division, MPCA

C. Attachments

Attachment 1. List of meetings with external parties

Attachment 2. Probable costs to the Minnesota Pollution Control Agency associated with adopting the proposed antidegradation rules

Sub-Attachments within Attachment 2.

Sub-Attachment 2a. Nondegradation reviews conducted by the Minnesota Pollution Control Agency between 2003 and 2012 for proposed new or expanded wastewater discharges

Sub-Attachment 2b. Internal MPCA memorandum of the projected number of antidegradation reviews for individual wastewater NPDES permits as a result of implementing the proposed antidegradation rules

Sub-Attachment 2c. Internal MPCA memorandum of the estimated time to conduct nondegradation reviews

Sub-Attachment 2d. Section 401 actions conducted by the Minnesota Pollution Control Agency from 2007 through 2012

Attachment 3. Internal MPCA memorandum of estimated cost of wastewater facility planning and its relationship to preparing antidegradation assessments under the proposed antidegradation rules

Attachment 4. Conducting antidegradation alternatives analyses for individual NPDES municipal wastewater permits - a suggested approach

Attachment 5. Comparison of federal antidegradation regulatory requirements with standards in the proposed antidegradation rules

Attachment 6. Minnesota cities, townships and unorganized territories with fewer than ten total employees and with NPDES wastewater permits in 2012

Attachment 7. Assessment of differences between the proposed antidegradation rules and similar standards in states bordering Minnesota and EPA Region 5 states

D. Exhibits

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[1] Petition for Rulemaking to the Minnesota Pollution Control Agency, Petitioner: Minnesota Center for Environmental Advocacy (MCEA), April 30, 2007

[2] Minn. R. 7050.0180, Nondegradation for outstanding resource value waters. (1998)

[3] Minn. R. 7050.0185, Nondegradation for all waters. (2008)

[4] Technical Memorandum #1: Nondegradation Loading Assessment Evaluation and Recommendations for Selected Municipal Separate Storm Sewer Systems, Tetra Tech, Inc., August 20, 2007

[5] Technical Memorandum #2: Overview of State, Federal, and Judicial Guidance on Antidegradation, Tetra Tech, Inc., August 20, 2007

[6] Technical Memorandum # 3: Recommendations for Nondegradation Rulemaking, Tetra Tech, Inc., August 20, 2007

[7] Responses to Questions Raised in the Written Comments Received from Stakeholders Attending the Nondegradation Rulemaking Stakeholder Meetings, MPCA (2009)

[8] Proposed Antidegradation Rule and Implementation Changes, MPCA (2010)

[9] Draft Antidegradation Rule, MPCA (2011)

[10] Proposed Permanent Rules Relating to Antidegradation of State Waters, MPCA (2012)

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Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. For waters with multiple use designations, the criteria shall support the most sensitive use.

(2) *Toxic pollutants.* States must review water quality data and information on discharges to identify specific water bodies where toxic pollutants may be adversely affecting water quality or the attainment of the designated water use or where the levels of toxic pollutants are at a level to warrant concern and must adopt criteria for such toxic pollutants applicable to the water body sufficient to protect the designated use. Where a State adopts narrative criteria for toxic pollutants to protect designated uses, the State must provide information identifying the method by which the State intends to regulate point source discharges of toxic pollutants on water quality limited segments based on such narrative criteria. Such information may be included as part of the standards or may be included in documents generated by the State in response to the Water Quality Planning and Management Regulations (40 CFR part 35).

(b) Form of criteria: In establishing criteria, States should:

(1) Establish numerical values based on:

(i) 304(a) Guidance; or

(ii) 304(a) Guidance modified to reflect site-specific conditions; or

(iii) Other scientifically defensible methods;

(2) Establish narrative criteria or criteria based upon biomonitoring methods where numerical criteria cannot be established or to supplement numerical criteria.

§ 131.12 Antidegradation policy.

(a) The State shall develop and adopt a statewide antidegradation policy and identify the methods for implementing such policy pursuant to this subpart. The antidegradation policy and implementation methods shall, at a minimum, be consistent with the following:

(1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

(2) Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.

(3) Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

(4) In those cases where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with section 316 of the Act.

§ 131.13 General policies.

States may, at their discretion, include in their State standards, policies generally affecting their application and implementation, such as mixing zones, low flows and variances. Such policies are subject to EPA review and approval.

Subpart C—Procedures for Review and Revision of Water Quality Standards

§ 131.20 State review and revision of water quality standards.

(a) *State review.* The State shall from time to time, but at least once every three years, hold public hearings for