

Milestones (Action Steps)
from
Minnesota's 2008
Nonpoint Source Management Program Plan

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Chapter 4.1 Ground Water

Needs, Priorities and Milestones Action Plan

The action plan provided below summarizes the goals and milestones for this planning period. Many of the milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement.

Goal 1: Enhance Coordination among Ground Water Management Efforts within the State.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Support the Inter-agency Ground Water Coordination Group with the purposes of coordinating activities, sharing information, setting priorities, and guiding implementation efforts.	X	X	X	X	X	CWA (319), state	MPCA, MDA, USGS
2. Improve consideration of ground water management within regional, basin, watershed, and local water management efforts.	X	X	X	X	X	CWA (319), state	EQB, MPCA, BWSR, MDA, USGS
3. Support an inter-agency working group with the purpose of coordinating information and data management needs for ground water protection; including: developing and disseminating data management standards and coordinating development of web based applications.	X	X	X	X	X	CWA (319), state	EQB, MPCA, MDA, BWSR, MetC, USGS

Goal 2: Promote Education and Outreach Efforts for Implementing NPS Management Measures that Protect Ground Water.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Evaluate the effectiveness of existing ground water protection outreach tools with target audiences.	X	X	X			CWA (319), state	UM, MPCA, MDA
2. Develop and test model programs, projects, or materials, with specific target audiences to evaluate the effectiveness of new education and outreach programs for ground water protection.	X	X	X	X	X	CWA (319), state	UM, MPCA, MDA
3. Develop and maintain a comprehensive communication resource (Web site, Forum, Newsletter, etc.) where implementation experiences, educational and program materials, and technical expertise can readily be shared.	X	X	X	X	X	CWA (319), state	UM, MPCA, MDA

Goal 3: Continue Identification of Geologically Sensitive Areas to Help Prioritize Protection Efforts where Ground Water is Susceptible to Contamination from NPS Pollution.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Continue to develop and refine tools and procedures for the evaluation of geologic sensitivity and ground water vulnerability to NPS.	X	X	X	X	X	CWA (319), state	DNR, USGS
2. Provide for the continued implementation and refinement of mapping of geologically sensitive areas.	X	X	X	X	X	CWA (319), state	DNR, MGS, USGS
3. Establish a working group to develop criteria and prioritize needs for areas where ground water is identified as vulnerable to NPS.	X	X	X	X	X	CWA (319), state	MPCA, MDA, DNR

Goal 4: Support Local Government Units in Development and Implementation of Ground Water Protection Programs.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Assist local units of government in identifying geologically sensitive areas and areas where ground water may be vulnerable to NPS.	X	X	X	X	X	CWA (319), state, local	DNR, MGS
2. Coordinate with local units of government in the implementation of BMPs for ground water protection.	X	X	X	X	X	CWA (319), state, federal	MPCA, MDA, MDH, USDA
3. Incorporate consideration of ground water protection in programs and plans implemented at the local government level.	X	X	X	X	X	CWA (319), state, local	MPCA, MDA, MDH, BWSR
4. Develop tools and guidance to assist local units of government in the management of data associated with ground water protection efforts and the evaluation of those efforts.		X	X	X	X	CWA (319), state	MPCA, MDA, MDH, BWSR
5. Support local units of government addressing NPS through state approved well head protection plans.	X	X	X	X	X	CWA (319), SDWA, state	MDH

Goal 5: Research and Support Development of Effective Management Measures for Specific Practices that may Impact Ground Water.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Develop a working group to prioritize management practice development needs and provide technical review in BMP development for practices specific to ground water. Establish a list of priorities that will be reviewed and updated by the working group on an annual basis.	X	X	X	X	X	CWA (319), state	MPCA, MDA
2. Test source specific BMPs in various hydrogeological, ecological, and climatic settings at appropriate research scales to determine effectiveness across varying conditions applicable within the State.	X	X	X	X	X	CWA (319)	MPCA, MDA, UM, USGS
3. Evaluate stormwater practices that promote infiltration and have the potential to transport contaminants to ground water.		X	X	X		CWA (319)	MPCA, UM, USGS

Goal 6: Implement Evaluation Tools Appropriate to Measure the Effectiveness of Programs and Practices in Reducing or Preventing the Impacts of NPS to Ground Water.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Support ground water monitoring projects at scales appropriate to measure the effectiveness of practices implemented to protect ground water.	X	X	X	X	X	CWA (319), state	MPCA, MDA
2. Support the assessment of adoption of voluntary BMPs in conjunction with ground water monitoring.	X	X	X	X	X	CWA (319), state, federal	MPCA, MDA, USGS, USDA
3. Provide guidance and training for programs that develop, collect, and manage ground water data at the state and local level, leading to more consistent and effective information from ground water survey, assessment, and monitoring programs.		X	X	X	X	CWA (319), state	MPCA, MDA, BWSR, USGS

Chapter 4: Overall Strategy for Each Water Resource

Strategy 4.2 Lakes Needs, Priorities, Milestones, Action Plan

The action plan provided below summarizes the goals and milestones identified in the preceding sections. Many of the milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement.

Goal 1: Finalize the Development of Ecoregion-Based Nutrient Criteria and Promulgate into Water Quality Standards.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Participate in Regional Technical Assistance Group & National work group.	X	X	X	X	X	USEPA, 104(b) 3	MPCA
2. Complete promulgation of lake standards.	X					State General Funds	MPCA
3. Share information on development and use of nutrient criteria. Ensure criteria are integrated into 305(b) and 303(d) assessments and local water planning efforts.	X	X	X				MPCA, BWSR
4. Begin work on promulgation of nutrient standards for rivers. Apply for grants as needed.		X	X	X	X	Nutrient Criteria Grants	MPCA

Goal 2: Promote Lake Monitoring, Protection and Prioritization at the Local Level - Including Local Comprehensive Plan Development And Implementation and Source Water Protection.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Provide grants to local water plans for additional monitoring & prioritization.		X	X			319, 314	BWSR, MDH, LUG
2. Collaborate on prioritization with local water plans – develop management tools for LGUs to prioritize lake protection efforts.		X	X			319, 104(b)3	BWSR, LUG, MPCA
3. Conduct LAP-level assessments in support of protection-oriented projects.	X	X	X	X	X	319, 104(b)3, state general fund	MPCA



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Link comp. plans to NSMPP.	X	X	X	X	X	319	BWSR
5. Encourage and support comprehensive lake management planning.	X	X					MLA
6. Train Lake Associations on development and implementation of monitoring plans.	X	X					MLA

Goal 3: Provide Funding and Technical Assistance to Lake Watershed Management Projects where Lake and Watershed Evaluations have been Conducted and Lake Water Quality Improvements are Projected Based on Implementation of Specific Best Management Practices (with an emphasis on protection whenever possible).

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Support projects proposed through local water plan.	X	X	X	X	X	319, 314, CWP	BWSR, MPCA, LUG
2. Compile case studies on current and past projects (e.g. CWP) to evaluate success of projects.		X	X			319, 104(b)3	MPCA, BWSR
3. Integrate protection-oriented prioritization concepts into project selection.		X	X			319	MPCA, BWSR, LUG

Goal 4: Promote Prioritization Scheme as a Basis for Scheduling 303(D) TMDL Assessments and Develop Guidance for Developing TMDLS for Nutrient-Impaired Lakes.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Share and modify prioritization scheme to allow for its acceptance.	X	X				319, CWP	MPCA
2. Develop guidance manual.	X	X				319, 104(b)3	MPCA
3. Do training as needed on TMDL development.	X	X				319	MPCA

Goal 5: Expand State's Lake Water Quality Database Via Conventional and New Technologies and use of Citizen Volunteers. Focus On Those Lakes Most Likely to be Impacted by Development and Other Land Use Changes.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Conduct a targeted effort, in cooperation with local water plans and volunteers, to acquire trophic status data on all lakes of 100 acres or more.	X	X				319, 314	MPCA, local water plan, COLA, MLA, lake associations U of M
2. Increase amount of information in STORET, state water quality database and access to it.	X	X	X	X	X	State General Funds	MPCA, USEPA
3. Employ remote sensing and other techniques to improve characterization of state's lakes. Mainstream use of some of these techniques (allow for routine application).	X	X				LCCMR, 319	MPCA, U of M
4. Establish a set of trend and intensive study lakes.	X	X				319, LCCMR	MPCA, MDNR
5. Report on status and trends, include intensive study lakes.		X	X			State General Funds	MPCA
6. Expand and promote Citizen Lake-Monitoring Program.	X	X	X	X	X	State General Funds	MPCA
7. Expand and promote Monitoring Plan Design Trainings.	X	X					MLA

Goal 6: Enhance Incentives Program for Protection of Shoreland (Aquatic and Terrestrial) Vegetation and Broader Implementation of BMPs.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Fund projects through local water plan process.	X	X	X	X	X	319, state match	MDNR, BWSR, Extension, LUG
2. Increase efforts to protect vegetation through easement and other incentives.	X	X	X	X		State General Funds USDA funds	MDNR, BWSR, Extension
3. Continue and expand education.	X	X	X			State General Funds	Extension, MDNR, MLA

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Increase number of baseline GIS vegetation maps for trend assessment purposes.	X					LCCMR	MDNR
5. Mainstream application of these techniques at the local level (move past demonstration).	X	X				319, State General Fund, LCCMR	Extension, MDNR, MLA
6. Improve shoreland zoning practices and standards.	X	X					DNR, MLA, LUG

Goal 7: Expand Information and Education on Appropriate BMPs, Ordinances and Strategies for Lake Protection.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Share experience of zoning administrators and provide training as needed for ordinance development and implementation.		X	X			319	MPCA, BWSR, Extension, MLA
2. Address growth-related issues as they relate to lake protection and responsibilities of LGU.	X	X				LCCMR	State Planning, BWSR
3. Educate realtors and developers on lake-friendly techniques for development and maintenance.		X				319	Extension, BWSR, MLA
4. Reconvene the Lake Forum on a routine basis to address issues at a statewide scale. Consider relationship with Clean Water Cabinet.	X	X				319, LCCMR	ILCC, MLA, U of M
5. Conduct outreach to local decision-makers on lake planning, shoreland BMP projects, etc. Assist with ordinance development as needed.		X	X	X		319	BWSR, MLA, Extension

Goal 8: Promote Monitoring and Compilation of Bacteria at Beaches and Education of Toxic Algae Blooms.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Develop a comprehensive database for compiling and reporting beach monitoring data.		X	X			319, EPA Great Lakes Funds, Beach Act	MPCA, LGU

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
2. Complete changes to bacteria criteria in triennial rules revision.	X					State General Funds	MPCA, U of M Extension
3. Assess beach data as a part of 305(b) swimmable use assessment.			X		X	305(b)	MPCA
4. Determine strategies for addressing beach bacteria problems.	X	X				State General Funds	MPCA
5. Continue education, distribution of posters, press releases, and fact sheets on toxic blue-green algae. Conduct related monitoring & research as needed.	X	X	X			State General fund, 319	MPCA, MDH, MDNR, MN Association of Veterinarian Medicine
6. Train volunteers and LGUs in E. coli bacteria monitoring to assess water quality.		X	X			LCCMR funds	U of M

Goal 9: Minimize the Impact of Urban Storm Water Runoff to Lakes.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Ensure awareness of stormwater rules and regulations for communities outside Metro Area.	X	X	X	X	X	State General Funds	MPCA, LGU
2. Enforce stormwater rules as needed to ensure compliance with Phase II.	X	X	X			State General Funds	MPCA, LGU, Met Council
3. Encourage development of erosion control and stormwater ordinances to prevent problems.	X	X				State General Funds	BWSR, MPCA, LGU, U of M
4. Ensure lake protection is built into MS4 permits. Promote ordinances as needed.	X	X	X	X	X		MPCA, LUG
5. Develop additional sampling techniques and modeling tools to aid in assessment of stormwater impacts on lakes.	X	X				State general fund, 319	MPCA, Met Council

Goal 10: Review Impacts to Downstream Lakes from Ditched/Drained Wetlands.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Develop alternative designs for ditch projects that incorporate nutrient and sediment reduction strategies.		X	X			319	MDA
2. Evaluate significance of phosphorus loss from partially drained or ditched wetlands.	X	X				LCCMR	MDA MPCA,
3. Develop techniques for monitoring impact of drained wetlands on lakes and for rehabilitating impacted wetlands.	X	X	X				MPCA, MDA, BWSR

Goal 11: Advance Use of Sediment Diatom Reconstruction in Efforts to Protect or Restore Lakes

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Complete development of predictive models for applying sediment diatom data.	X	X				319, LCCMR	MPCA, Science Museum
2. Collect further sediment cores as deemed necessary to complete development of technique – with an emphasis on regional surveys.		X	X	X		LCCMR	MPCA, LGUs, Science Museum
3. Promote proper use of sediment core data in TMDL and related projects.	X	X	X				MPCA

Chapter 4: Overall Strategy for Each Water Resource

Strategy 4.3 Rivers and Streams Needs, Priorities, And Milestones, Action Plan

The action plan provided below summarizes the goals and milestones identified in the preceding sections. Many of the milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement

Goal 1: Promote a Healthy Hydrological Regime for Minnesota's Streams and Rivers.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Promote a basic understanding of channel evolution, hydrology and available tools to use when making decision at the Local Governmental Unit (LGU) level and certain levels of land management. Emphasize the connection between downstream effects and significantly increased hydrographs or shortening the return frequency of the event.	X	X	X	X	X	319 funds	MDNR, MPCA, NRCS, U of M
2. Develop/adopt a methodology for assessing hydrologic "health" for rivers, including hydraulic geometry regional curves, and an index of physical integrity (IPI).	X	X	X	X	X	319 funds, LCCMR	MPCA, MDNR, NRCS, USGS, U of M
3. Assess Minnesota's major river systems to identify rivers unaltered and free-flowing and systems where the hydrologic has been disrupted.	X	X	X	X	X	319 funds	MPCA, USGS
4. Identify causes of disruption to hydrologic regimes and determine which problems should be fixed first.	X	X	X	X	X	319 funds	USGS, MDNR, MPACA, U of M

Goal 2: Promote Healthy Sediment Regime for Minnesota's Streams and Rivers.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Promote stream restoration projects that restore connectivity between rivers and their flood plains. Remove artificial in-channel barriers (obsolete dams, etc.).	X	X	X	X	X	319 funds	MPC MDNR, Watershed District (WD)

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
2. Promote full funding for REP and other programs that can provide mechanisms for restoring overland runoff	X	X	X	X	X	319 funds	MPCA, MDNR, BWSR
3. Require the implementation of appropriate storm water management practices by local units of government		X	X	X	X	319 funds	USEPA, MPCA
4. Promote BMPs in upland areas which enhance water storage/hydrograph characteristics (e.g.) controlled drainage, conservation tillage, surface tile intake alternatives).	X	X	X	X	X	319 funds EQIP	MPCA, BWSR, MDA, NRCS
5. Through an interagency work group develop training materials and provide training to policy makers, local governmental officials, etc. on incorporating hydrologic principles into local and state decision making		X	X	X	X	319 fund EQIP	BWSR, MPCA, MDA, MDNR, NRCS
6. Prioritize rivers for restoration		X	X	X	X	319 funds	MPCA, MDNR
7. Develop/adopt a methodology for assessing sediment “health” for rivers	X	X	X	X	X	319 funds	MPCA, MDNR, NRCS, USGS, U of M
8. Identify rivers with excessive sediment budgets (loads).	X	X	X	X	X	319 funds	USGS, MPCA
9. Establish sediment TMDLs for impaired rivers.		X	X	X	X	319 funds CWLA funds	MPCA
10. Identify and categorize causes of excessive sediment in affected rivers	X	X	X	X	X	319 funds EQIP	NRCS, MPCA, U of M
11. Develop an interagency program to assess/control streambank erosion and gully erosion	X	X	X	X	X	319 funds EQIP	MPCA, MDNR, BWSR, MDA, NRCS
12. Promote Conservation Reserve Enhancement Program (CREP) and Conservation Reserve Program (CRP) and similar programs.	X	X	X	X	X	319 funds EQIP	BWSR, MDNR, MPCA, MDA, FSA
13. Promote conservation tillage on steeper landscapes and vulnerable agroecoregions	X	X	X	X	X	319 funds EQIP	NRCS, SWCD, U of M, MDA

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
14. Promote conversion of tile intakes to blind inlets	X	X	X	X	X	319 funds EQIP	NRCS, SWCD, U of M, MDA, MPCA
15. Target restoration programs according to resources.	X	X	X	X	X	319 funds EQIP	MPCA, NRCS
16a. Assemble inter-agency committee to study & report the effect and enforcement of mandatory vegetative buffer strips on protected waters (Shoreland Management) and public drainage ditch projects.	X	X				319 funds	MDNR, BWSR, MPCA, MDA, WD's
16b. Utilizing the results of the study and a survey of how buffer strips have been used in other areas, develop recommendations on how they can be improved in Minnesota.		X	X			319 funds	MDNR, BWSR, MPCA, MDA, WD's, LGUs
16c. Implement recommended changes. (Changes may include enhanced enforcement of existing controls, rule changes or other mechanisms identified by the committee).			X	X	X	319 funds	MDNR, BWSR, MPCA, MDA, WD's, LGUs
17. Monitor effectiveness of changes. Develop Sentinel watersheds.				X	X	319 funds, CWLA	MDNR, BWSR, MPCA, MDA, WD's, LGUs
18. Provide funding to the University of MN to conduct additional research, and to compile a synthesis of existing research on the effects of surface tile intakes.		X	X			319 funds LCCMR	MPCA, USEPA
19. Establish an interagency work group to initiate the compilation of minimum performance standards (e.g. conservation tillage) for agricultural operations.		X				319 funds	MPCA, MDNR, MDA, BWSR, NRCS
20. Enhance the understanding of sediment sources, by inventorying problems, surveying managers, and monitoring. Develop sediment budgets for select river segments, partitioning sediment by source categories and associated loads.		X	X	X	X	319 funds EQIP	NRCS, MPCA, BWSR

Goal 3: Promote Healthy Nutrient Regime For Minnesota's Streams and Rivers.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Adopt Sentinel Watershed Systems methodology for assessing nutrient regime "Health of a River."	X	X	X	X	X	319 funds	MPCA, UGSG, MDNR, NRCS, U of M
2. Identify rivers with unbalanced nutrient budgets (loads)	X	X	X	X	X	319 funds	MPCA, USGS
3. Identify sources of nutrients in affected rivers	X	X	X	X	X	319 funds, EQIP	MPCA, MDA, USGS, NRCS
4. Accelerate development of ecoregion specific nutrient standards, and minimum effluent requirements for nutrients			X	X	X	319 funds	MPCA, U of M
5. Develop/promote nutrient management planning tools and BMPs in affected river drainage areas.	X	X	X	X	X	319 funds	MPCA, NRCS, MDA, U of M
6. Target restoration programs.	X	X	X	X	X	319 funds, EQIP	MPCA, NRCS, MDA, SWCDs

Goal 4: Promote Healthy Biological Communities for Minnesota's Streams and Rivers.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. To the extent possible/practical, ensure full funding for MPCA initiatives for establishing the Index of Biotic Integrity (IBI) for all river basins of the state, leading to biological criteria for water quality standards.	X	X	X	X	X	EPA/State	MPCA
2. Identify rivers with most unhealthy biological communities using IBI.	X	X	X	X	X	319 funds	MPCA, MDNR
3. Identify causes of unhealthy biological communities with IBARDS.	X	X	X	X	X	319 funds	MDNR, MPCA, USGS, U of M
4. Develop assessment protocols and a manual for restoring healthy biological communities in each river basin.	X	X	X	X	X	319 funds	MPCA, MDNR, USGS, U of M
5. Target restoration programs.	X	X	X	X	X	319 funds Farm Bill	MPCA, USDA

Goal 5: Promote Wise Goal-Setting for Citizens and Government

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Establish an interagency task force to work with the Governor's office to provide NPS guidance to the 2008 Farm Bill and other major policy initiatives.	X	X	X	X	X	319 funds	MPCA, MDNR, MDA, BWSR, NRCS, USGS, USFWS, FSA
2. Establish interagency tracking system linking implementation programs and funding to reductions in pollutant loads.	X	X	X	X		319 funds	BWSR, NRCS, MPCA, MDA
3. Develop review committees to oversee targeting and implementation strategies for all Clean Water Partnership projects.	X	X	X	X		319 funds	MPCA
4. Encourage incentives to incorporate river friendly practices in zoning ordinances, county local water plans, watershed district plans and ditch projects.	X	X	X	X	X	319 funds	MDNR, BWSR, LGUs, WDs, MPCA, U of M - Extension
5. Use MPCA basin plans to identify river friendly practices for each drainage basin.		X	X	X	X	319 funds	MPCA
6. Use comprehensive plans, watershed district plans and Local Water Planning to implement the goals and objectives of this plan.	X	X	X	X	X	319 funds	MPCA, BWSR, MDNR, WDs,

Goal 6: Support Infrastructure for NPS Pollution Management that is Holistic, Comprehensive and Watershed-Based, and Provides Access to Decision - Making for all Residents and Users.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Based on Sentinel Watershed knowledge, develop an instruction manual on procedures for targeting restoration efforts to most vulnerable locations in a watershed.	X	X	X	X	X	319 funds, EQIP	MPCA, U of M, NRCS
2. State agencies work together, with constituents and the Governor's office to provide effective input for drafting of the Farm Bill.	X	X				319 funds	MPCA, MDNR, BWSR, MDA, Governor's Office

Goal 7: Research, Demonstration and Education that Encourages Understanding of Origin and Remedy for NPS Pollution Problems.

Milestone (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Support river friendly farmer program	X	X	X	X	X	319 funds	MDA, MPCA, BWSR, U of M
2. Develop instruction manual to identify most appropriate BMPs by basin, ecoregion, and agroecoregion.	X	X	X	X	X	319 funds	MDA, MPCA
3. Develop case studies on downstream impacts of NPS pollution (Lake Pepin, Gulf of Mexico, etc).	X	X	X	X	X	319 funds	MPCA, U of M, MDA, NRCS
4. Establish paired watershed demonstration projects to illustrate impacts of BMPs on water quality and crop productivity.	X	X	X	X	X	319 funds	MDA, U of M, MPCA
5. Study and begin development of ecologically based water quality standards; including phosphorus in rivers and the bioavailability of particulates.	X	X	X	X	X	319 funds	MPCA, U of M
6. Conduct watershed modeling studies to assist in targeting restoration efforts, evaluation of policy, and development of TMDLs.	X	X	X	X	X	319 funds, EQIP, CWLA funds	NRCS, U of M, MPCA, USGS
7. Study potential for denitrification of tile drain effluent nitrate in ditches and wetlands.	X	X	X	X	X	319 funds CIG	MPCA, U of M, NRCS
8. Study the current relationship between cumulative drainage practices and downstream channel stability	X	X	X	X	X	319 funds	U of M, NRCS, MPCA, USGS, MDNR
9. Study alternative drainage ditch designs.	X	X	X	X	X	319 funds	U of M
10. Study alternative tile drainage management systems.	X	X	X	X	X	319 funds	U of M
11. Evaluate assignment of a point source definition for surface tile intakes as part of the state water quality rule.		X	X			319 funds	MPCA
12. Study gully erosion along streams and rivers to determine the contribution of sediment and nutrients from this source.		X	X	X	X	319 funds	MPCA, U of M, MDA, NRCS
13. Evaluate BMPs for the control of gully erosion and for reducing the amount of sediment and nutrients from gullies.			X	X	X	319 funds	MPCA, U of M, MDA, NRCS
14. Assess urban/suburban channel stability in association with BMP implementation to protect water quality.				X	X	319 funds	MPCA

Chapter 4 Overall Strategy for Each Water Resource

Strategy 4.4 Wetlands

Needs, Priorities and Milestones, Action Plan

The Action Plan provided below summarizes the milestones identified in the preceding sections. Many of the milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement.

Please note: The three highest priority needs, priorities and milestones within each goal are indicated by an*.

Goal 1: Improve our Knowledge about Wetland Quantity: Complete or Update Wetland and Related Inventories.

Milestones (Action Steps)	08	09	10	11	12	Funding Sources(s)	Lead Agency(ies)
1. Complete the NWI mapping and inventory components of the Comprehensive Wetland Assessment Monitoring and Mapping Strategy (CWAMMS).		X	X	X	X	319, other federal, state and local sources	USFWS, MDNR, BWSR, MPCA
2. Complete the RWI assuring conventional Geographic Information System (GIS) compatibility.	X	X	X	X	X	319, other federal, state and local sources	USFWS, MDNR, BWSR, MPCA
3. Develop a statewide inventory of public drainage systems.		X	X	X	X	319, other federal, state and local sources	MDA, MDNR, BWSR, LGUs, Acad. Comm.
4. In cooperation with United States Department of Agriculture (USDA), Minnesota Department of Agriculture (MDA) and producer organizations develop a comprehensive inventory of cropped wetlands managed within a GIS system.		X	X	X	X	319, other federal, state and local sources	USDA, MDA, MDNR, BWSR
5. Evaluate and apply remote sensing methods suitable for detecting underground tile lines to develop regional inventories.			X	X	X	319, other federal, state and local sources	MDA, NRCS, BWSR, LGUs, Acad. Comm.
6. Facilitate development of consistent statewide digital soils layer.	X	X	X	X	X	319, other federal, state and local sources	NRCS, LMIC, BWSR, Acad. Comm.
7. Complete development of high resolution digital elevation models (DEMs) county by county using Light Detection and Ranging (LIDAR) imagery. A priority for flood-prone regions.		X	X	X	X	319, other federal, state and local sources	MDNR, LGUs, MnDOT, FEMA



Goal 2: Improving Wetland Restoration Efforts.

Milestones (Action Steps)	08	09	10	11	12	Funding Sources(s)	Lead Agency(ies)
1. Develop and implement the Integrated Program Accounting System as recommended within CWAMMS. The geo-referenced database should include wetland restoration data from local, state and federal government projects and from private and on governmental projects.		X	X	X	X	319, other federal state and local sources	USFWS, MDNR, BWSR, MPCA
2. Complete and apply the RWI models for water quality and flood mitigation to better identify high priority wetland restoration/recreation sites to benefit watershed or other regional geographic targeting.	X	X	X			319, other federal, state and local sources	USFWS, MPCA, BWSR, Acad. Comm.
<p>3. Implement targeted leveraging of financial incentive payments (state or local incentives coupled to federal incentives) to amplify state and local impaired waters “TMDL” restoration efforts and priority, “Working Lands Initiative” undertaken by the US Fish and Wildlife Service (FWS), and the DNR initiative for grassland-wetland habitat complexes. Leveraging opportunities include:</p> <p>a. Target expiring general Conservation Reserve Program (CRP) “CP23” wetland contracts to encourage re-enrollment or conversion to other conservation program</p> <p>b. Enroll lands in Continuous CRP wetland practices Farmable wetlands (CP27-CP28) up to the 100,000 acre limit for Minnesota under the 2002 Farm Bill; Floodplain Wetlands (CP23) not subject to any state limits; Non-Floodplain Wetlands (CP23a) up to 36,000 acre limit for Minnesota; Marginal Pasture Wetland Buffers (CP30) and Bottomland Hardwood Establishment (CP31).</p> <p>c. Fully enroll Minnesota’s Conservation Reserve Enhancement Program (CREP II) and Wetland Reserve Enhancement Program (WREP) wetland acreage allotments under the 2002 Farm Bill.</p> <p>d. Inform landowners in Conservation Security Program (CSP) watersheds about opportunities to increase their CSP eligibility and CSP contracts by restoring or enhancing wetlands.</p>	X					319, other federal, state and local sources	USDA, MDA, BWSR, LGUs, MPCA, USFWS, MDNR

Milestones (Action Steps)	08	09	10	11	12	Funding Sources(s)	Lead Agency(ies)
<ul style="list-style-type: none"> e. Inform landowners about the availability of Environmental Quality Improvement Program (EQIP) and Wildlife Habitat Incentives Program (WHIP) offering cost-share incentives for wetland creation, restoration or enhancement. f. Utilize the EQIP Local Work Group Process to improve application eligibility for wetland restoration or creations in priority watersheds or grassland-wetland habitat complexes. g. Explore ways to leverage future Grassland-Reserve Program allotments to support wetland protection. h. Encourage and help local governments to develop purchase development rights (PDR) programs that focus on or include wetland protection. PDR programs qualify local governments to compete for Farm and Ranch Land Protection Program funding. i. Participate in forums to develop the 2007 Farm Bill conservation policy to assure enhanced wetland protection provisions. 							
4. Develop guidelines and fund the installation of barriers to free passage of undesirable fish through drainage networks.	X	X	X	X	X	319, other federal, state and local sources	MDNR, BWSR, MPCA, Acad. Comm.
5. Improve guidelines and criteria, including vegetative coverage, hydrology and diversity to evaluate restoration effectiveness.	X	X	X			319, other federal, state and local sources	BWS, MnDOT, MDNR, COE

Goal 3: Monitoring and Assessment of Wetland Quality at the State and Local Level

Milestones (Action Steps)	08	09	10	11	12	Funding Sources(s)	Lead Agency(ies)
1. Develop and expand the use of level I assessment methods using remote sensing techniques for wetlands based on plant community diversity patterns or shifts to phytoplankton dominated systems.	X	X	X	X	X	319, other federal, state and local sources	Acad. Comm., MPCA, MDNR

Milestones (Action Steps)	08	09	10	11	12	Funding Sources(s)	Lead Agency(ies)
2. Continue development and testing the use an applicability of Level III assessment methods such as the Index of Biotic Integrity (IBI), and Floristic Quality Assessment Index.	X	X	X	X	X	319, other federal, state and local sources	MPCA
3. Expand the Wetland Health Evaluation Program (WHEP) which is a citizen version of the IBI wetland assessment method and develop guidance and training for local governmental units (LGUs) and other users		X	X	X	X	319, other federal, state and local sources	LGU's, MPCA
4. Continue validation and testing the use and applicability of level II assessment methods such as the (MnRAM).			X	X	X	319, other federal, state and local sources	MDNR, MPCA, BWSR, COE

Goal 4: Support Local Government Wetland Management and Protection Efforts

Milestones (Action Steps)	08	09	10	11	12	Funding Sources(s)	Lead Agency(ies)
1. Provide funding to LGUs to develop local wetland management plans that include priority wetland designations for both existing and potentially restorable wetlands.		X	X	X	X	319, other federal, state and local sources	BWSR, USDA
2. Offer competitive grants or other incentives to encourage LGUs to implement strategies which will leverage farm bill protection and restoration programs.	X	X	X	X	X	319, other federal, state and local sources	BWSR, USDA, MDA
3. Produce an effective model of a special area management plan (SAMPs) following federal guidance and which is parallel to comprehensive wetland management plans as outlined by the Wetland Conservation Act.	X	X	X	X	X	319, other federal, state and local sources	BWSR, COE, MDNR
4. Educate LGUs regarding incentives and zoning to discourage land use activity in wetland buffer (fringe) areas that would negatively impact wetlands.	X	X	X	X	X	319, other federal, state and local sources	BWSR, Met Council, MDNR, NRCS
5. Evaluate how agricultural land preservation programs such as Minnesota's "Green Acres" property tax incentive or the Federal Farm and Ranch Land Protection Program affect wetland functions and values.	X	X	X	X	X	319, other federal, state and local sources	MDA, BWSR, USDA

Milestones (Action Steps)	08	09	10	11	12	Funding Sources(s)	Lead Agency(ies)
6. Promote nutrient control measures and related BMP implementation to benefit wetlands		X	X	X	X	319, other federal, state and local sources	MDA, BWSR, MPCA, MDNR

Goal 5: Promote Understanding of Wetland Responses to Pollutants

Milestones (Action Steps)	08	09	10	11	12	Funding Sources(s)	Lead Agency(ies)
1. Promote development and implementation control measures to contain the spread of and/or adverse impacts of exotic/invasive species in wetlands.		X	X	X	X	319, other federal, state and local sources	MDNR, MPCA, BWSR, MDA, Acad. Comm., MnDot
2. Research the process of mercury methylation processes in different wetland types and hydrologic regimes.	X	X	X	X	X	319, other federal, state and local sources	MPCA, USGS, Sci. Museum, Acad. Comm.
3. Research techniques for enhancement and restoration of wetlands infested by invasive and/or exotic species including undesirable fish.	X	X	X	X	X	319, other federal, state and local sources	BWSR, COE, MDNR
3. Develop or implement a process for responding to non pollutant based “pollution” impaired wetland waters			X	X	X	319, other federal, state and local sources	MPCA, LGUs
4. Research human induced “bounce” and pollutant related loading on wetland plant, invertebrate and wildlife populations.	X	X	X	X	X	319, other federal, state and local sources	MPCA, Acad. Comm., MnDOT
5. Assess how shifts from agricultural land-use, to residential or commercial development affects the quality of adjacent wetlands.	X	X	X	X	X	319, other federal, state and local sources	MPCA, Acad. Comm.

Goal 6: Wetland Research Needs

Milestones (Action Steps)	08	09	10	11	12	Funding Sources(s)	Lead Agency(ies)
1. Research targeted plant or invertebrate taxa, or taxa groups response signatures to various pollutants or stressors.		X	X	X	X	319, other federal, state and local sources	MPCA, MDNR, Acad. Comm.

Milestones (Action Steps)	08	09	10	11	12	Funding Sources(s)	Lead Agency(ies)
2. Research Methods for restoring wetlands on mine tailing sites, abandoned gravel pits and peat mining sites.	X	X	X	X	X	319, other federal, state and local sources	BWSR, MDNR, Acad. Comm. MnDOT
3. Research techniques for enhancement and restoration of wetlands infested by invasive and/or exotic species including undesirable fish.		X	X	X	X	319, other federal, state and local sources	MDNR, MPCA, MnDOT, LGUs, BWSR, Acad. Comm.
4. Research the social and economic benefits along with the cost of maintaining or restoring wetlands	X	X	X	X	X	319, other federal, state and local sources	MPCA, USGS, Acad. Comm., MDA
5. Evaluate how the property tax system influences local government and landowner decisions about natural resources management, with particular focus on wetlands.	X	X	X	X	X	319, other federal, state and local sources	Acad. Comm.
6. Research the short and long term effects of adjacent agricultural practices on temporary and seasonal wetlands.	X	X	X	X	X	319, other federal, state and local sources	MDNR, MDA, Acad. Comm.
7. Evaluate the needs and impacts of biomass harvesting, including shrub lands harvesting on wetland quality and integrity.		X	X	X	X	319, other federal, state and local sources	MDNR, Acad. Comm., MPCA
8. Investigate the importance of carbon sequestration in wetlands and possible improvement of wetlands for carbon sequestration.			X	X	X	319, other federal, state and local sources	Acad. Comm.

Chapter 5: Monitoring Needs, Priorities and Milestones, Action Plan

The action plan provided below summarizes the goals and milestones identified in the preceding sections. Many of the milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement.

Goal 1: Develop Baseline Data Necessary to Allow Establishment of Good Status and Trend Information Relative to Surface Water and Ground Water at the State/Regional Level.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. For lakes: Continue to increase network of citizen lake monitoring volunteers and lake level volunteers by actively promoting programs, especially where volunteers are lacking in southern Minnesota. Also promote use of lake monitoring volunteers in all special projects (i.e. CWP, Clean Lakes (CL)), as well as on reference lakes.	X	X	X	X	X	State General Fund, <i>Continuing effort</i> Clean Water Legacy Act (CWLA)	MPCA, MCES, MDNR.
2. Lakes: Establish a set of trend and intensive study lakes. Report on status and trends, including intensive study lakes.	X	X	X	X	X	State Funds, <i>Continuing effort</i>	MPCA, MDNR, MCES.
3. Lakes: Collaborate with Environmental Protection Agency (EPA) on national status and trends lakes studies.	X	X				EPA 106 Funds	MPCA, MDNR.
4. Lakes: Use sediment cores and diatom reconstruction techniques, as needed, to complement conventional trend studies.	X	X	X	X	X	319, State Funds.	MPCA, Science Museum of Minnesota
5. Ground Water: Expand the State Well Records Database to include all well records and obtain accurate locations for these wells.	X	X	X	X	X	State Funds, Federal SDWA, <i>Continuing effort</i>	MDH
6. Ground water: Develop a network of wells to be sampled regularly to determine the degree of NPS contamination of the state's vulnerable aquifers.	X	X	X	X	X	State General Fund, <i>Continuing effort</i>	MDA, MPCA.



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
7. Ground water: Continue to conduct baseline assessments of the residence times of Minnesota's ground waters to use in identifying aquifers that may be susceptible to contamination.	X	X	X	X	X	State General Fund, <i>Continuing effort</i>	MDNR, MGS, MDH.
8. Ground water: Continue to incorporate determination of gradient (direction of ground water movement) in ground water monitoring programs.	X	X	X	X	X	State Funds, Federal SDWA, <i>Continuing effort</i>	MDH
9. Ground water: Determine statewide trends in concentrations of non-agricultural chemicals in ground water, focusing on trends associated with land use changes.	X	X	X	X	X	Continuing effort	MPCA
10. Rivers: Continue to design the statistically-based network of river sites for those basins for which it has not yet been done. When complete, this will allow for making statistically valid evaluations about statewide water quality and trends.	X	X	X	X	X	State General Fund, Technical assistance from EPA, EMAP for site selection, <i>Continuing effort</i>	MPCA
11. Rivers: Maintain a set of established long-term monitoring sites to allow for determination of long-term trends at a set of specific sites. Conduct further analyses and presentation of trends.	X	X	X	X	X	State General Fund, MCES Funds <i>Continuing effort</i>	MPCA, MCES.
12. Rivers: Partner with other local, state and federal agencies (MCES, BWSR, MPCA, U.S. Army Corps of Engineers (USACE), USGS) in Minnesota to determine the priority of long-term gage sites and guarantee funding by way of legislative appropriation.	X	X	X	X	X	Possible State General Fund, Possible fees on dischargers, <i>New effort, but build on existing network</i>	MDNR



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
13. Rivers: Continue annual biota, hydrology and geomorphology surveys at long-term study sites to monitor and assess stream ecology parameters.	X	X	X	X	X	Game and Fish Fund	MDNR
14. Rivers: Continue to increase network of CSMP volunteers. Continue analyses of CSMP data and other measures to determine use of CSMP for use-support assessments and other purposes. Continue to provide support for volunteer monitoring coordination efforts, such as Metro Monitoring Partners. Provide technical assistance to other volunteer monitoring programs, as resources permit.	X	X	X	X	X	State General Fund, CWLA <i>Continuing effort</i>	MPCA, MCES, MDNR.
15. Expand and refine remote sensing monitoring capabilities to greatly increase the number and type of waterbodies monitored and improve the tracking of land use changes, including impervious cover, and near shore impacts to lakes, wetlands and rivers.	X	X	X	X	X	319, MCES Funds <i>Continuing effort</i>	MPCA, MCES.

Goal 2: Establish Reference Conditions, Criteria or Standards for those Waterbody Types or Types of Measurement for which such References do not Currently Exist.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Develop biological criteria for watersheds where such criteria do not currently exist. Complete sampling for IBI development in the Red and rainy basins and develop state-wide IBIs. Longer term: plan to incorporate numerical biological criteria into the state water quality standards rules.	X	X	X	X	X	State General Fund, Federal 106, Federal 319, <i>Continuing effort</i>	MPCA

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
2. Wetland water quality criteria development: Extend IBI development work to other types of wetlands including ephemeral wetlands, bogs, and fens. Develop a state-wide wetland monitoring strategy.	X	X	X	X	X	Federal grants, <i>Continuing effort</i>	MPCA
3. Conduct monitoring to support development of river nutrient criteria.	X	X	X	X	X	State General Fund, Federal 104(b)3, <i>Continuing effort</i>	MPCA, USGS
4. Identify other measurements important for NPS impacts for which standards or references do not currently exist.	X	X	X	X	X	319, State General Fund, <i>New effort</i>	MPCA
5. Define relationships among water quality parameters and the movement of various parameters through the system.	X	X	X	X	X	319, State General Fund, <i>Primarily new effort</i>	MPCA
6. Work toward development of biological criteria for lakes.	X	X	X	X	X	319, State General Fund	MPCA, MDNR

Goal 3: Improve Monitoring Designed to Characterize NPS Contributions to Water Quality Problems.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Increase the amount of nutrient monitoring on lakes to provide data at a level of intensity needed to guide resource managers and allow for 303(d) assessment. Implement prioritization scheme presented in Lakes Chapter as a basis for lake selection.	X	X	X	X	X	Federal 319, State Clean Water Partnerships, State General Fund, MCES Funds <i>Continuing effort</i>	MPCA, MCES

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
2. Expand database of flow information, both by increasing number of monitoring stations where flow can be obtained and by redesigning type of information obtained from existing stations. Identify gaps in continuous record data gathering in major watersheds and support the effort to create new or reinstall old USGS gage sites where warranted.	X	X	X	X	X	State General Fund, State Fees, <i>Continuing effort</i>	MDNR
3. Obtain more quantitative assessment of NPS loadings by: a. Through basin planning, secure cooperation, or new funding where necessary, to collect high flow event sampling, either manual or automated, as appropriate to specific sites. b. Combine planning for long-term flow monitoring (Goal 3-2) with basin plans for pollutant concentrations sampling to identify locations best monitored with automated equipment. c. Develop monitoring and assessment to characterize point and nonpoint source contributions to surface water and ground water over a range of hydrologic and hydrogeologic conditions.	X	X	X	X	X	State General Fund, State Clean Water Partnerships, Federal 319, <i>Primarily new effort</i> State General Fund, State Clean Water Partnerships, Federal 319, MCES Funding <i>Continuing effort</i>	MPCA MPCA, MCES, MGS.
4. Develop capacity to monitor emerging contaminant issues, including pesticide metabolites, pharmaceuticals, and pathogenic microorganisms. (See Chapter 10).	X	X	X	X	X	New effort	MDA



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
5. Continue to incorporate these three components in aquifer or wellhead protection projects: a. contaminant source investigation b. hydrogeologic assessment, and; c. ground water/surface water interaction.	X	X	X	X	X	Federal SDWA, <i>Continuing effort</i>	MDH, MDNR, MGS.
6. Develop a monitoring scheme that characterizes the extent, impacts and sources of erosion, sedimentation, and nutrient loading on lake and stream water quality. Incorporate these monitoring procedures into existing programs and into new projects.	X	X	X	X	X	319, <i>Primarily new effort</i>	MPCA, MDNR.
7. Revise field-monitoring protocols to incorporate information on the contribution of specific land use practices, such as feedlot runoff, tile lines etc. Also see Chapter 9.	X	X	X	X	X	319, <i>Primarily new effort</i>	MPCA, MDNR, MDA.
8. Begin monitoring of non-MS4 community storm water runoff quality and quantity in select areas such as the Minnesota River, northern Minnesota adjacent to trout streams to sensitive cool/cold water lakes.	X	X	X	X	X	319	MPCA, communities, watershed districts



Goal 4: Promote Effective Use of BMPs Through Assessing the Improvement in Water Quality Relative to Specific NPS Reduction Actions.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Target geographic areas where monitoring, such as paired watershed monitoring, is used to compare effectiveness of different NPS control measures.	X	X	X	X	X	319, MCES Funds <i>New effort for MPCA; Continuing effort for MCES</i>	MPCA, MCES.
2. Compile and evaluate monitoring results that show direct relationships between BMP controls and improvement of water quality. Use results to encourage use of BMP recommendations for future watershed and aquifer protection projects.	X	X	X	X	X	Some continuing, <i>Primarily new effort</i>	MDH, MPCA, BWSR, MDA, MCES.
3. Define cause and effect relationship by project level monitoring, establish numeric goals and track performance and stream/lake restoration or degradation trends	X	X	X	X	X	Clean Water Partnerships, TMDL funds, <i>Some continuing, some new</i>	MPCA
4. Review data from Phase I and II CWP projects — relate land use to pollutant reduction efforts.	X	X	X	X	X	Primarily new effort	MPCA
5. Design a model, or adopt existing models, that are able to predict changes in water quality due to changes in land use practices.	X	X	X	X	X	MCES Funds <i>New effort for MPCA, Continuing effort for MCES</i>	MPCA, MCES.
6. Conduct monitoring to evaluate effectiveness and efficiency of programs such as Conservation Reserve Enhancement Program (CREP.)	X	X	X	X	X	Continuing effort	MPCA
7. Begin monitoring in shore land areas to assess performance of BMPs in rural residential and low impervious cover urban settings (non-MS4 areas).	X	X	X	X	X	319, <i>New effort</i>	MPCA



**Goal 5: Design Monitoring Programs to Meet Management Information Needs
Concerning Identified Geographic Areas or Issues of Concern, Then Use Information
Obtained for Resource Management Decision-Making**

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Design and implement effectiveness monitoring in the Minnesota River Basin to demonstrate progress towards load reductions overall, and, where possible, progress resulting from particular management efforts.	X	X	X	X	X	State Funding, MCES Funding <i>Some continuing, some new effort.</i>	MPCA, MSU -Mankato, MCES.
2. Evaluate relative contributions of pollutants (e.g., TSS, TP), under different flow regimes and their impact on water quality. Use results to determine necessity for point/ NPS controls.	X	X	X	X	X	New effort for MPCA; Continuing effort for MCES	MPCA, MCES.
3. Continue research on nutrient impacts in streams with intention of being ready to promulgate nutrient standards by the end of 2010.	X	X	X	X	X	Grants from EPA, State funding, <i>Continuing effort</i>	MPCA, USGS
4. Incorporate the collection or use of ancillary data such as land use, pesticide use, cropping histories, and pesticide application practices to allow meaningful interpretation of monitoring results. Continue to include habitat assessments as part of IBI development.	X	X	X	X	X	State General Fund, Federal Grants, <i>Some continuing, primarily new effort.</i>	MPCA
5. Integrate ground water and surface water monitoring results with health-based contaminant levels to support public health protection. Use health risk limits determined by the Minnesota Department of Health to focus contaminant source control efforts.	X	X	X	X	X	State General Fund, Federal SDWA, <i>New effort</i>	MDH

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
6. Develop guidance document designed to interpret standards and provide uniform procedures for analyzing ground water monitoring data.	X	X	X	X	X	State General Fund, <i>New effort</i>	MDNR, MDH, MPCA, MGS.
7. Continue improving accuracy of watershed delineations with improved GIS technology and data sources to establish Minnesota Hydrologic Units. Watershed data refinements support more accurate nonpoint sources and load determinations.	X	X	X	X	X	State General Fund, <i>Continuing effort.</i>	MDNR.

Goal 6: Improve Communication Linkages both Between State and Local Resource Managers, as well as among the Various Local, State and Federal Agencies within the State for Purposes of Expanding the Water Quality Monitoring Database and Enhancing Accessibility to it.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Continue to update, improve and distribute NPS assessment maps. Redesign NPS survey of local resource managers to improve validity and reliability.	X	X	X	X	X	State General Fund, Federal 106, Federal 319, Continuing effort, new effort.	MPCA
2. Work closely with LMIC to complete statewide mapping efforts and ensure the GIS system will meet the various agencies' future needs.	X	X	X	X	X	Continuing effort	USGS.
3. Continue to enhance exchange of information between state and local government through local water planning. Provide training and assistance, when needed.	X	X	X	X	X	Continuing effort	MDH, BWSR, MPCA.



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Maintain interagency monitoring coordination groups. Coordinate monitoring planning and monitoring implementation activities across agencies.	X	X	X	X	X	Continuing effort	MDNR, MN Planning, MDA, MPCA, MDH, MCES, USGS, BWSR, MGS.
5. Use global positioning tools to provide locational data for all monitoring sites.	X	X	X	X	X	State General Funds, Federal Grants, <i>Continuing effort</i>	MDH, MPCA, others.
6. Review previously developed monitoring guidebooks for both ground water and surface water and refine the information to reflect current knowledge and needs.	X	X	X	X	X	State General Fund, <i>New effort</i>	USGS, MCES.
7. Make information more accessible across state and local agencies and to the public via the Web. Provide links between sites with related information. Share pertinent data between agencies via searchable Internet web sites.	X	X	X	X	X	Continuing effort	MDNR, MDA, MPCA, MDH, MCES, BWSR, MGS.
8. Work with communities to implement ground water monitoring networks to address their needs, assist in making sure networks are properly designed and samples properly taken.	X	X	X	X	X	State General Fund, <i>New effort</i>	MDNR, MDA, MPCA
9. Assist county and local government units to develop county and statewide composite databases for nitrate and other water quality information.	X	X	X	X	X	State General Funds, Federal Grants, <i>New effort</i>	MDH



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
10. Work with local government units and volunteer organizations to set up inventory data on subjects such as stream bank erosion, SSTS compliance critical area mapping, to facilitate the TMDL corrective action processes.	X	X	X	X	X	Federal 106, Federal 319, <i>New effort</i>	BWSR, MPCA, MDNR, MDA, MCES

Chapter 6 Information and Education

Needs, Priorities and Milestones, Action Plan

The action plan provided below summarizes the goals and milestones identified in the preceding sections. Many of the milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement.

Goal 1: Build and Improve Capacity to Deliver NPS-related Information and Education at State and Local Levels.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Encourage and develop more involvement of outreach and educational specialists, staff of state agencies on NPS issues.	X	X	X	X	X	319	MPCA, BWSR, MDNR, MDA
2. Reach newsletters of local water planners and watershed managers to share information about Best Management Practices (BMPs) that have been used successfully in Minnesota.	X	X	X	X	X	BWSR and 319	BWSR and UMES
3. Initiate, develop and implement education programs on NPS officials for municipal officials.	X	X	X	X	X	319 and USDA Extension Water Quality	UMES and MPCA
4. Sponsor and/or support regional and statewide conferences that are about or have tracks on NPS I&E.	X	X	X	X	X	Many	MPCA, WDNR, IDNR, NRCS-USDA, USDA-ARS-MSA, UMES, MDA, MDNR and US EPA Region 5
5. Provide training support to local water planners and NPS educators.	X	X	X	X	X	319, BWSR grants, and UMES grants	BWSR and UMES
6. Provide information and materials support to local water planners and NPS educators.	X	X	X	X	X	319, BWSR grants, and UMES grants	UMES, MPCA and BWSR
7. Provide educational program support on NPS educational issues of regional importance.	X	X	X	X	X	319, BWSR grants, and UMES grants	All

8. Assist local water planners in review, assessment, and improvement of NPS educational plans.	X	X	X	X	X	BWSR County Local Water Planning Grants	BWSR and UMES
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Goal 2: Raise Awareness of the General Public about the Nature of NPS Pollution, how Communities and Individuals Contribute to it, and what Governmental Organizations and Individuals are doing about it.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Develop and coordinate multi-agency media campaigns designed to raise awareness of and change behavior on NPS issues.	X	X	X	X	X	319	MPCA and UMES
2. Develop and share print and multimedia resources for I&E on NPS issues.	X	X	X	X	X	319	MPCA and UMES
3. Improve utilization of involved agencies' public information offices as a mechanism for disseminating NPS news items.	X	X	X	X	X	319	MPCA, BWSR, MDNR, MDA

Goal 3: Foster Coordination and Cooperation between Governmental Agencies and Private, Nonprofit and other Organizations to Carry out Information and Education Efforts.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Identify and publicize lessons learned from 319- and Clean Water Partnership (CWP) - funded demonstration projects through Web sites, newsletters, and print media articles.	X	X	X	X	X	319	UMES and MPCA
2. Ensure that educational efforts within this overall NPS I&E strategy are implemented and reported back to the Project Coordination Team.	X	X	X	X	X	319	MPCA and UMES
3. Foster the sharing of available resource materials by expanding new and existing Web sites and clearinghouses to include materials for broad audiences.	X	X	X	X	X	319	MPCA and UMES

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Support the work of regional water quality teams to implement I&E efforts for NPS issues.	X	X	X	X	X	319 and Metro Council Water Quality Initiative Grants	Watershed Partners, UMES and MPCA
5. Support technical forums where professionals can exchange information and gain information on NPS pollution issues.	X	X	X	X	X	319 and UMES Funding	MPCA and UMES

Goal 4: Include NPS and in Formal and Informal Educational Curricula.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Assess existing classroom (formal) science curricula and state standards related to NPS.	X	X	X	X	X	USDA Extension Water Quality Grants, Extension Director's Grants, 319	Dept. of Education
2. Assess existing non-formal curricula and educational efforts related to NPS (e.g. Project (WET), MinnAqua, etc.).	X	X				USDA Extension Water Quality Grants, Extension Director Grants, 319	MDNR, UMES, MDA
3. Increase and improve/enhance the number of NPS educational messages in adult/continuing professional education programs.	X	X				EPA education grants, 319	UMES
4. Pilot use of new and emerging delivery methods/technologies to reach targeted audiences.	X	X					MPCA (TEA Division)

Goal 5: Effectively Measure Impact of NPS and Activities

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Utilize existing surveys (e.g. state, Met Council) to measure changes in attitudes and behavior as a result of NPS I&E.	X	X	X	X	X	319	MPCA and UMES
2. Develop and institute a standardized format or tool to measure outcomes and impacts of NPS-related I&E efforts.	X	X				319 and CWP	MPCA
3. Increase use of social indicators as measures of effectiveness.	X	X	X	X	X	319 and CWP	MPCA, UM
4. Compile and report on use of social indicators to assess outcomes from 319-funded projects.	X	X	X	X	X	319	MPCA, UM
5. Pull together other data sources reflecting behavioral changes of Minnesotans with respect to NPS pollution.	X	X	X	X	X	319	MPCA and UMES

Chapter 7 Feedlots Needs, Priorities and Milestones, Action Plan

The action plan provided below summarizes the goals and milestones identified in the preceding sections. Many of the 2008 through 2012 milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement.

Goal 1**Reduce Pollutant Transport to Surface and Ground Waters Associated with Land Application of Manure.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Feedlot officer inspections of records*** Increase inspections of land application records and actual practices to assess compliance, and to provide more opportunity to discuss with producers the importance of proper land application practices. Improve existing forms and processes used to inspect land application records, and provide associated training.	X	X	X	X	X	MPCA	MPCA, MACFO
2. Commercial applicator training*** Offer high quality training options for commercial animal waste technicians, who are required to maintain a certain level of continuing education.	X	X	X	X	X	Workshop Fees, MDA, MPCA 319	MDA MPCA Extension
3. Inspections of commercial applicator activities*** Increase inspections of commercial applicator records and of actual practices during manure spreading.	X	X	X	X	X	MPCA, MDA	MPCA, MDA
4. Winter application*** Review and conduct research on winter application effects on water quality. Include a component of inspecting winter application sites during spring runoff periods.	X	X	X			MPCA, USDA-ARS	MPCA, MDA, USDA-ARS, U of MN
5. Education Programs** Hold regularly offered in-depth educational courses in manure application and nutrient management for a wide variety of audiences, including technical service providers, producers, agency and county staff, and others.	X	X	X	X	X	State 319 Workshop fees	Extension MPCA, NRCS, MDA



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
6. Publications** Keep existing publications and materials up-to-date and develop new and/or improved ways of communicating land application requirements and voluntary best management practices. Build from past efforts such as the GEIS documents, where possible.	X	X	X	X	X	State 319	MPCA, MDA, Extension, NRCS
7. Demonstrate equipment and practices** Hold on-farm demonstrations of equipment and practices which are practical and protect water quality. Emphasize equipment and technologies which can achieve low enough rates to meet state rule requirements, and injection equipment which maintains residue cover.		X		X		319 event fees, USDA-NRCS, MDA, MPCA	Extension, NRCS, MPCA, MDA, BWSR
8. Software for manure management planning** Survey users of computer programs. Work toward improving existing software programs used for writing manure management plans. Provide training on these computer tools to producers, technical service providers, and agency staff. Ensure that software activities are coordinated amongst the agencies. Work to simplify manure management planning and make it more useful for producers.		X	X	X	X	NRCS, MPCA, 319 workshop and software fees	U of MN, MPCA, NRCS



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
9. Value of Manure** Increase awareness of the real value of manure as a soil amendment so that it is managed judiciously <ul style="list-style-type: none"> – a) Improve tools and training to provide increased emphasis on the economics of manure management; – b) Develop brochures and information campaigns that describe the many benefits of properly managed manure on soil properties; – c) Conduct educational events on ways to maximize the benefits of manure phosphorus additions in the most economical and environmentally friendly ways; – d) Conduct research on ways to maximize the benefits of manure as a way to improve soil quality and reduce runoff and erosion; – e) Increase producer and public awareness of the potential benefits of manure to reduce sediment losses to waters, and the benefits of dairies and other farming systems which maintain vegetative cover (e.g. grasses, alfalfa, clover) on sloping land. 	X	X	X	X	X	MDA MPCA Extension USDA- CSREES	Extension U of MN NRCS MPCA MDA
10. Assess current rules**: Assess existing feedlot rules for ways in which the rules reduce the real or perceived value of manure. In particular examine alternative approaches to rules dealing with <i>transferred ownership</i> of manure for land application.		X	X			MPCA	MPCA MDA



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
11. Alternative uses** Research, identify and communicate alternative uses for manure and how to market alternative uses (e.g. manure composting). Develop informational publications on ways to use manure as a source of energy, including anaerobic digesters and incineration. Research new ways to convert manure into energy sources.	X	X	X	X	X	MPCA, U of MN, USDA/AURI	MDA Extension AURI
12. Phosphorus management** Evaluate phosphorus management policies and BMPs in light of the most recent research and consider adjustments where needed. Increase the use of the P index as a way to prompt improvements in phosphorus management.			X	X	X	319	U of MN, NRCS, MPCA, MDA
13. Preferential flow of manure** Research nutrient and pathogen losses to tile inlets and other avenues of preferential flow in manured fields and use the results to adjust policies and BMPs where needed. Research alternatives to open tile intakes which increase water quality protection.			X	X	X	319, LCCMR, USDA/CIG/ NRCS	U of MN, MDA, MPCA
14. Cropland availability* Monitor cropland availability relative to acreage needed for manure applications. Animal density information on a minor watershed or slightly larger scale can be used to help prioritize where records inspections and monitoring are most needed, and can be used in local planning efforts.				X	X	MPCA U of MN	MPCA U of MN



Goal 2Assist Producers with Methods to Correct Feedlot Runoff and Discharges to Surface Waters.**

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Technical assistance staff for low cost solutions*** Secure new positions with SWCD Technical Services Areas to work on providing technical assistance for low cost improvements to open lot runoff (i.e. without need for cost share).	X	X	X	X	X	MPCA, 319 BWSR	BWSR, MPCA Jt. Powers Bds
2. Implementation of Open Lot Agreements** Expand guidance on procedures for implementation of phase 1 and phase 2 of Open Lot Agreements under state rules. Evaluate how existing policies and assistance are working to protect water quality associated with open lot runoff.	X		X	X		MPCA	MPCA, NRCS, BWSR, MDA
3. Financial Assistance** Coordinate cost share and regulations on open lot agreements. Seek to supplement 50% EQIP cost share for fixing high priority open lot runoff problems.	X	X				MDA, BWSR	MDA, BWSR
4. Written guidelines on low cost pollution prevention** Develop written guidelines for use by farmers who choose to install BMPs to reduce open lot runoff. Also update dead animal composting publication and evaluate the need for other publications.	X	X				319 State MPCA, MDA, NRCS, BWSR	MPCA, MDA, NRCS, BWSR Jt. Powers Bds.



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
5. Filter strip standards and guidelines** MPCA, NRCS and BWSR work together to align guidelines/standards, as the agencies work to finalize interim documents on the use of filter strips. Continue evaluating and clarifying use of filter strips at non-CAFO sites. Conduct workshops/training on the pros and cons of filter strips and proper design options of vegetated treatment areas.		X	X			MPCA, NRCS, BWSR	MPCA, NRCS, BWSR Extension
6. Research new ways to treat feedlot runoff** Conduct on-farm research of woodchip biofilters to treat feedlot runoff. If promising, install several demonstration biofilters at feedlots.	X	X	X			319, LCCMR	U of MN
7. Continue research and installation of milkhouse wastewater treatment systems** Continue to research improved methods for milkhouse waste treatment and increase adoption of proven technologies for treating milkhouse wastewater at more dairy facilities.	X	X				319	U of MN, MPCA Extension
8. Training on new FLEval model** Hold training sessions for technical service providers and agency/county employees on the use of the upgraded FLEval model.	X	X				319 MPCA	U of MN, MPCA, NRCS, BWSR
9. Roof guidelines and training* Develop brochures and training on the pros and cons of roofs vs. runoff containment structures or other ways of managing feedlots.		X	X			NRCS, BWSR, MDA	NRCS, BWSR

Goal 3**Ensure that Ground Water Quality is Protected at Manure Storage Areas

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Further Evaluate Large Liquid Storage Liners** Conduct ground water monitoring (e.g. geoprobe and monitoring well investigations) at large liquid manure storage areas used for 5-10+ years to evaluate long term effectiveness of liners. Conduct monitoring in different areas of the state and focus on the highest risk situations.	X	X				MPCA	U of MN, MPCA
2. Alternatives to liquid storage** Conduct research and education on alternatives to liquid storage such as dairy composting barns, roofs with stockpile storage, and managed grazing.	X	X	X	X	X	MPCA 319	MDA, MPCA
3. Training on manure storage design, construction and inspection* Provide periodic training for public and private technical service providers, regulatory staff and others on design, construction and inspection of manure storage areas.	X	X				Workshop fees MPCA NRCS 319	U of MN NRCS MPCA Extension NRCS
4. Review standards* Review manure storage standards to ensure that standards and policies provide protection that is up-to-date with the collective body of research and monitoring.				X	X	MPCA	MPCA NRCS BWSR Extension MDA

Goal 4**Increase the Level of Adoption of Air Emission Control Methodologies

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Review regulations* and policies associated with odor control and make adjustments as necessary.				X	X	MPCA	MPCA
2. Education on odor control technologies* conduct education on the use of biofilters and other odor control technologies.	X		X		X	USDA MPCA	U of MN Extension MPCA
3. Pump-out odor* Develop alternatives for agitation pump-out odor problems.		X	X			MPCA	U of MN Extension

Goal 5 Collect, Assess and Quantify Current Feedlot and Manure Management Practice Information and Establish Risk-based Priorities, Programs and Policies from this Information and Associated Feedlot Research**

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Farmer surveys compiled*** Survey and interview farmers, commercial applicators and nutrient management planners about nutrient and manure management practices (e.g. through the FANMAP program). Include information on phosphorus management. If possible, establish a system to return to the same producers periodically over a long period of time. Examine feasibility of conducting ongoing statewide statistical assessments of nutrient management practices (see also 5.3 - targeting TMDLs)	X	X	X	X	X	319	MDA, MPCA
2. Evaluate relative risks*** Evaluate which types of feedlot runoff scenarios present the greatest relative risk to water quality and evaluate which scenarios should be the highest priority based on such factors as cost/benefit analysis and mass loading reductions to achieve TMDLs.	X	X				MPCA 319	MPCA, U of MN, MDA
3. TMDL manure management assessments*** Conduct manure management surveys/inventories to establish existing land application practices and open lot management in watersheds with TMDLs related to feedlot pollutants. Identify the potential to reduce pollutant loading with improved management practices in these watersheds. Prioritize feedlot mitigation activities to move toward compliance with TMDLs.	X	X	X	X	X	319	MPCA, U of MN, MDA, BWSR

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Evaluate feedlot sources for TMDLs*** Quantify the extent of feedlot pollution problems in watersheds with TMDLs. Identify which of the feedlot facility activities impact waters the most and how these impacts compare to other pollution sources in the watershed. Develop standardized approaches and tools for greater efficiency when evaluating relative risks of feedlot and manure spreading activities for TMDL development.	X	X	X	X	X	MPCA	U of MN, MDA, MPCA
5. Database improvement** Improve the Minnesota feedlot information database and include more information about which sites have pollution problems that are a high environmental priority. Consolidate existing databases if necessary to simplify data extraction and analysis. Allow better tracking of nitrogen and pathogen control.		X	X			MPCA, EPA, 319	MPCA, BWSR
6. Evaluate bacteria contributions from feedlots** Research the relative contributions of feedlots, land application of manure, and pastures to bacteria in waters impaired with elevated bacteria. Publish BMPs to reduce bacteria transport to waters. Conduct research and monitoring to identify how various manure management practices affect bacteria losses to surface waters.		X	X	X	X	MPCA, 319, USDA	U of MN, MPCA, MDA, MDH
7. Assess existing rules** Evaluate existing feedlot rules to ensure that they focus on the highest environmental priorities. Evaluate pros and cons of changing from a concentration based standard to a loading based standard or practice standards.		X	X	X		MPCA	MPCA, MDA, BWSR, NRCS, U of MN



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
8. Paired Watersheds** Conduct paired watershed studies that evaluate management and water quality linkages on a variety of soils, crops, landscapes, and hydrology.		X	X	X	X	319, MPCA, MDA, USDA	U of MN Ext., MPCA, MDA
9. Risk based work plans** Develop guidelines for state feedlot staff and county feedlot officers to develop risk based work plans which aid in prioritizing inspections and follow-up work. Develop inspection prioritization scheme of highest risk feedlots/locations at both NPDES - and non-NPDES permitted sites.				X	X	MPCA	MPCA, MACFO
10. Antibiotics and emerging issues** Evaluate the relative risks posed by other substances such as antibiotics which are often found in manure. Coordinate this effort with other states and nations evaluating this issue.	X	X	X	X	X	EPA	U of MN, MDH, Bd. of Animal Health
11. Cost Share Priorities** Assess cost share rate policies to ensure alignment with highest environmental priorities. Ensure agencies work together to enhance alignment of priorities for financing feedlot water quality improvements. Coordinate with other agencies how open lot runoff situations are prioritized for inspection, technical assistance and cost share.		X	X	X			NRCS, BWSR, MDA, MPCA
12. Fish kill tracking* Improve tracking mechanisms to allow a better understanding of the circumstances which lead to fish kills associated with feedlots/ manure.						DNR, MPCA	MDNR, MPCA

Goal 6Improve Communication and Coordination Avenues Associated with feedlot Regulations, Research, Education, and Assistance.**

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Hold meetings to improve coordination and communication*** Convene meetings as needed with representatives from the organizations previously involved in FMMAC to build working relationships amongst the groups and discuss such things as: <ul style="list-style-type: none"> • What is and is not working with current regulations • Inconsistent messages with producer groups and agencies • Identify research and education priorities • Results of recent research findings • Legislative issues • Convene special task forces when needed. 	X	X	X	X	X	MDA, MPCA	MDA, MPCA
2. Improve electronic communications** Maintain and improve feedlot communications through electronic newsletters, e-mail prompts and updates; web sites, and other technologies	X	X	X	X	X	MPCA, MDA, U of MN, NRCS	MPCA, MDA U of MN, NRCS
3. Feedlot education forum and Website** Regularly convene a multi-agency feedlot and manure management education forum to discuss education priorities and strategies. Maintain a statewide manure and feedlot training opportunities Website.	X	X	X	X	X	Extension	UM Extension
4. Update Feedlot Policy Guides, reference guides, and web-links: Update the feedlot resource guide listing various agencies, consultants, county contacts, etc., involved in feedlot and manure management. Develop and improve feedlot reference guides with web links to all key documents.	X	X	X	X	X	MPCA, MDA	MPCA, MDA

Goal 7Evaluate and Expand ways to make it Easier for Livestock Producers to work on Pollution Prevention through Evaluating and Improving Existing Feedlots, and Finding the Best Sites for New Feedlots.**

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Help identify best sites for new feedlots*** Develop guidelines for counties working on local zoning regulations or policies affecting feedlots. Provide assistance to producer groups on the issue of finding new feedlot sites and technologies which provide the needed environmental protection. Seek further development of Geographic Information System (GIS) data layers that assist good environmental siting of new feedlots.	X	X				State, MDA	MDA, MPCA
2. Environmental Management Systems** Continue evaluation, improvement and expansion of Producer Group led Environmental Management Systems for livestock production.	X	X	X	X	X	319, MPCA	MPCA, MDA, MDH, MDNR, BWSR, NRCS
3. Expand financial assistance** Expand availability of loans and consider tax credit program to provide greater level of incentives for implementing required fixes. Continue zero interest loans for digesters and other financial assistance for new facilities which exceed 7020 rules for environmental protection. Continue the dairy business planning grants program.		X	X	X	X	State	MDA
4. Assess regulations** Evaluate how the rules are working to provide an efficient, environmentally sound, community/producer friendly regulatory process. Also assess how important regulation is in driving feedlot improvements (i.e. compared to education and assistance).		X	X	X	X	MPCA	MPCA, MDA

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
5. One stop shopping* Promote, evaluate and further develop one stop shopping to make it easier for producers to meet financial, technical and regulatory needs when modifying or expanding a feedlot facility.	X	X				MPCA	MPCA, MDA, NRCS, BWSR, SWCDs

Chapter 8 Agricultural Erosion

Needs, Priorities and Milestones, Action Plan

The action plan provided below summarizes the goals and milestones identified in the preceding sections. Many of the 2008 through 2012 milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement.

Goal 1: Improve Interagency Coordination in the Development and Implementation of Statewide Policies and Programs Concerning Agricultural Erosion and Sediment Control.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Continue to pursue the development and implementation of a comprehensive strategy for integrating federal farm policy and programs into state and local policy and programs to increase the use of ag erosion and sediment control practices.	X	X	X	X	X	State general fund	Board of Water and Soil Resources (BWSR), Minnesota Department of Agriculture (MDA), and the USDA State Technical Committee (STC)
2. Meet and confer on technical and policy issues, share relevant information, coordinate regulatory and other activities and collaborate on strategic and locally directed planning associated with agricultural erosion and sediment control.	X	X	X	X	X	State general fund	BWSR, MDA, University of Minnesota (U of M) and the STC

Goal 2: Improve Technical Assistance and Education Associated with the Application and Adoption of Best Management Practices (BMPs) for Agricultural Erosion and Sediment Control.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Identify needs and develop training programs for individuals planning and applying BMPs.	X	X	X	X	X	State general fund and fee supported	BWSR, U of M, MDA and the NRCS
2. Provide the on-going support of current training programs developed in recent years via Section 319 funds.	X	X	X	X	X	State general fund and fee supported	BWSR, U of M, MDA, MPCA and the (NRCS)

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
3. Increase the number of certified conservation planners on the USDA technical service provider registry.	X	X	X			319, State general fund	BWSR, NRCS, MDA, U of M, MN Project
4. Education focused on comparative economics, emphasizing management packages for whole tillage systems.	X	X	X	X	X	State general fund, 319, LCCMR	U of M, MDA, BWSR, NRCS
5. Develop and distribute informational materials and conduct associated workshops.	X	X	X	X	X	State general fund and fee supported	U of M
6. Develop and implement a process to evaluate the effectiveness of information and education programs.	X	X	X	X	X	State general fund, 319	U of M

Goal 3: Continue to Improve the Reliability and Accuracy of Decision-Making Tools Associated with Agricultural Erosion and Sediment Control.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Increase the level of associated technical evaluation and research.	X	X	X	X	X	State general fund	U of M, Science Museum of Minnesota
2. Continue to develop, promote and integrate the Local Annual Reporting System (eLINK) with other agencies.	X	X	X	X	X	State general fund, 319	BWSR, MPCA, MDNR, MDA
3. Evaluate the environmental and economic effectiveness and adoption rates of agricultural erosion and sediment control BMPs.	X	X	X	X	X	State general fund, 319	BWSR, U of M and MPCA
4. Investigate different techniques of gathering and displaying soils information.	X	X	X	X	X	State general fund	BWSR, NRCS and U of M

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
5. Evaluate and develop hydrologic modification BMPs addressing the impacts of: a. drainage (subsurface and surface); b. effects on wetland habitats and flow; and c. effects on streambank and lakeshore stability.	X	X	X	X	X	State general fund, LCCMR, 319	U of M, MDA, BWSR, MPCA
6. Develop and implement a field-scale BMP audit component for eLINK.	X	X	X	X	X	State general fund	BWSR

Goal 4: Increase the Adoption and Effectiveness of Agricultural Erosion and Sediment Control BMPs.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Develop and implement demonstration projects to illustrate how agricultural erosion and sediment control BMPs can be integrated into different farm-scale production systems.	X	X	X	X	X	State general fund, 319	BWSR and U of M
2. Promote the use of crop residue management	X	X	X	X	X	State general fund and EQIP	BWSR, NRCS and U of M
3. Monitor, model and evaluate the effectiveness of BMPs at various watershed scales.	X	X	X	X	X	State general fund, 319	MPCA, U of M, USGS, BWSR
4. Conduct research for improved field and watershed scale estimation of sediment loading from stream bank erosion.	X	X	X	X	X	State general fund	U of M, Science Museum of Minnesota
5. Develop a better understanding of the effect of sediment in water.	X	X	X	X	X	State general fund	U of M and MPCA

Goal 5: Focus Agricultural Erosion and Sediment Control Activities in Watersheds Contributing the Most Sediment.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Encourage local governments to use watershed assessments and prediction models in the development of their comprehensive water management plans.	X	X	X	X	X	State general fund	BWSR
2. Develop and distribute guidance for targeting agricultural erosion and sediment control BMPs at the sub-watershed or smaller scale.	X	X	X	X	X	State general fund	U of M, MDA, BWSR
3. Emphasize the use of targeting efforts in the completion of TMDLs and following implementation plans	X	X	X	X	X	State general fund, 319	MPCA

Chapter 9 Agricultural Nutrients

Needs, Priorities and Milestones

The action plan provided below summarizes the goals and milestones identified in the preceding sections. Many of the milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement.

Goal 1: Accelerate and Enhance Education and Outreach of BMPs Related to the Management of Fertilizers, Manure, and Organic Sources of Agricultural Nutrients. Promote Programs Related to BMP Implementation. Focus BMP Education and Implementation Efforts on Vulnerable Areas Identified using Monitoring Data and Risk Assessment Tools.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Develop a mechanism for delivering current research to stakeholders and promote/develop synergistic relationships among stakeholders (i.e. resurrection of “blue books”, better use of existing conferences that bring together researchers, producers, agricultural retailers, and agricultural advisors).	X	X	X	X	X	Rapid Response Fund (U of M), EQIP, 319, State, Commodity Orgs	U of M, MDA, USDA-ARS, SWCD, NRCS, MPCA
2. Education and outreach topics							
a. Promote the principles of nutrient management, alternative cropping systems, and drainage technology and the associated environmental and economic aspects of these areas.	X	X	X	X	X	CIG ¹ -NRCS, 319, State, MLICA ²	U of M, MDA, USDA-ARS, SWCD, NRCS, BWSR, ISU
b. Promote the principles of manure management including such topics as nutrient availability associated with manure storage and application methods, proper crediting, spreader calibration and uniformity. Promote livestock industry’s environmental quality assessment programs. Provide tools and technical assistance to the agricultural community to accelerate the development of nutrient management plans.	X	X	X	X	X	319, Livestock Commodity Orgs, EQIP	U of M, MDA, USDA-ARS, SWCD, NRCS, MPCA



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
c. Provide technical training to agricultural service providers through “traditional” programs such as the Certified Crop Advisors and the Commercial Manure Applicators as well as distance-based methods including the internet, software, and other “state-of-the-art” technology.	X	X	X	X	X	Various Public and Private Funds, 319	Various Boards, U of M, MDA Certification Programs, Multi-Agencies, Private Organizations, EPA
d. Maintain appropriate consistency in recommendations from manure and soil testing labs through approved laboratory methods, reporting units and subsequent fertilizer recommendations using such certification programs as Certified Manure Testing Labs and Certified Soil Testing Labs. Accelerate efforts in consolidating manure-testing programs on a national level to reduce conflicting individual state programs.	X	X	X	X	X	Livestock industry, EPA, State	MDA, U of M, Soil Science Society of America
e. Promotion of water scheduling and nutrient management in SWPA and other areas with threatened drinking water supplies.	X	X	X	X	X	Local water plans, 319	U of M, SWCD, NRCS, MDA, MDNR
3. Establish demonstration projects of research-proven effective BMPs related to nutrient management to validate BMPs in physiographic settings that differ from the conditions in which the BMPs were researched and developed (i.e. on-farm research and demonstration projects).	X	X	X	X	X	319, CWP ³ , State, EQIP, Commodity Orgs	U of M, Center for Ag Partnerships, MN Corn Growers, MDA, USDA-ARS, SMBSC, NWROC, Local Watershed Groups
4. Develop and promote innovative programs designed for BMP implementation with a particular focus on environmentally sensitive areas.	X	X	X	X	X	CIG, 319, LCCMR	MDA, NRCS, BWSR, SWCD, Local Watershed Groups, U of M

Goal 2: Continual Research, Development and Refinement of BMPs that Minimize Nutrient Losses from Agricultural Systems. Evaluate BMP Effectiveness and Long-Term Sustainability. Continual Research of Nutrient Sources and Transport Mechanisms in Agricultural Systems for the Development of Tools for Resource Planners/Managers to Prioritize BMP Implementation and Selection. Provide Guidance to the Agricultural Community for Proper Selection of BMPs and Expected Performance/Outcomes.

Milestones (Action Steps)	08	09	10	11	12	Funding Source	Lead Agency(ies)
1. Research BMP effectiveness for water quality improvement. Research should address BMPs related to nutrient management, manure management, drainage (i.e. “conservation drainage,” controlled drainage, etc.), water treatment systems (i.e. wetlands, riparian treatment, linear wetlands, control structures, etc), and alternative cropping systems. Techniques should include the use of validated computer simulation models, long-term demonstrations (via paired watersheds, drainage lysimeters, “model farm concepts”) and other proven methods. Research should be evaluated on a field-scale basis when possible and developed for different regions/sensitive areas of the state with unique climatic, topographic, and soil characteristics.	X	X	X	X	X	Commodity Groups, Proposed AFREC ⁴ , USDA, EPA, LCCMR, MLICA	U of M, USDA-ARS, MDA, MPCA, NRCS, Multi-Agencies
2. Research and quantify nutrient sources, losses, and mechanisms of transport at different scales (plot, field, and watershed). Develop and validate different tools to assist resource managers/planners to identify priority areas for BMP implementation. Examples would include a statewide N leaching index that accounts for the cropping systems and agricultural management practices observed throughout the state.	X	X	X	X	X	319, CWP, LCCMR, Commodity Groups, Proposed AFREC	U of M, USDA-ARS, MDA, MPCA, NRCS, Multi-Agencies
3. Identification of barriers that impede economic, social, and technology transfer of existing BMPs and technologies.	X	X	X	X	X	State, 319	U of M, MDA

Goal 3: Provide Accurate Assessments of BMP Adoption Rates and Performance Through Surface and Ground Water Monitoring As Well As “Performance Indicators” Such As Survey Instruments.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Assessment of BMP adoption in geographic areas where BMP education, promotion, and programs have been focused using survey methods.	X	X	X	X	X	319, CWP, State, CREES	MDA, UM, NASS ⁵ , State Agencies, USDA-NRCS
2. Establish monitoring networks to evaluate BMP effectiveness at landscape scales and identify environmentally sensitive areas. Promote monitoring activities among multiple agencies.	X	X	X	X	X	State, 319, CWP, CREES	MPCA, MDA, MDH, MDNR, NRCS, SWCD
3. Develop additional performance indicators of water quality impacts to supplement traditional survey and monitoring techniques.	X	X	X	X	X	State, 319	MDA, BWSR, UM, USDA-NRCS
4. Evaluate the costs of BMP related activities on a per unit basis and associate with water quality improvements to determine the per unit costs of water quality improvements. Consider coordinating economic evaluations with other performance indicators (i.e. survey instruments) to obtain the information needed for economic analysis.	X	X	X	X	X	State, LCCMR, 319	U of M, MDA
5. Develop a standardized record keeping tool for farmers that includes information required for enrollment in various conservation programs (i.e. CSP, CRP, EQIP) and could be used for risk assessment tools (i.e. PI, RUSLE2, Manure management planner, etc).	X	X	X	X	X	CIG, NRCS	USDA-NRCS, MDA

Goal 4: Develop Effective Statewide Policies for Decreasing the Transport of Agricultural Nutrients to the State's Water Resources and Improve the Coordination Framework Necessary to Accomplish these Policies.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Final development of the Nitrogen Fertilizer Management Plan including protocols for declaring a "Special BMP Promotion Area." Establish a reasonable timeline and actions steps needed when implementing water resource requirements. Develop an institutional framework that clearly identifies the interrelating roles of various organizations and programs as they relate to the Nitrogen Fertilizer Management Plan.	X	X	X	X	X	State	MDA, Local SWCDs, MPCA
2. Seek legislative approval for the MDA and U of M to formally develop BMPs for a phosphorus management plan using a similar process as nitrogen.	X	X	X	X	X	State	U of M, MDA
3. Establish a multi-agency advisory group to determine criteria for classifying the severity of existing surface and ground water nitrate problems and develop a prioritization plan.	X	X	X	X	X	State	Multi-Agency, LMIC, NRCS, MDA, MPCA, U of M
4. Establish a multi-agency advisory group to determine criteria for classifying the severity of existing surface water phosphorus problems and develop a prioritization plan.	X	X	X	X	X	State	Multi-Agency, LMIC, NRCS, MDA, MPCA, U of M

1 Conservation Innovation Grants (Natural Resource Conservation Service)

2 Minnesota Land Improvement Contractors of America

3 Clean Water Partnerships

4 Ag Fertilizer Research and Education Council" Pending legislative approval in the spring of 2006.

5 National Agricultural Statistics Service

Chapter 10 Agricultural Pesticides

Needs, Priorities and Milestones, Action Plan

The action plan provided below summarizes the goals and milestones identified in the preceding sections. Many of the milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement.

Goal 1: Promote Prevention of Occurrences of Pesticides or Pesticide Breakdown Products in Ground Waters and Surface Waters of the State. It is Intended that this Prevention be Accomplished While Promoting Practices that Consider Economic Factors, Availability, Technical Feasibility, Implementability, Effectiveness, and Environmental Effects, and in Consideration of the Beneficial Uses of Pesticides and Applicable Water Quality Standards.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Utilize analysis tools to focus agency operating staff resources in scientifically defensible ways and in high risk areas; Utilize available databases, maps and analytical procedures to evaluate potential pesticide loss and water resource impacts based on hydrogeology, soil and pesticide properties.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, MPCA, MDNR, U of M Extension, Private Organizations Local Units of Government,
2. Establish an EPT to assist the MDA in coordinating prevention activities.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, MPCA, MDNR, BWSR, NRCS, SWCDs, U of M Extension, Local Units of Government
3. Develop, adopt, and implement effective strategies for prevention education and promotion.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, MPCA, DNR, BWSR, NRCS, SWCDs, U of M Extension, Private Organizations, Local Units of Government

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Incorporate into pesticide applicator certification and training the various prevention activities and strategies developed and recommended by the EPT, and all BMPs developed as part of MDA's general prevention activities or in response to common detection pesticides in ground water or to surface water pesticides of concern.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, MPCA, DNR, BWSR, NRCS, SWCDs, U of M Extension, Private Organizations, Local Units of Government
a. Conduct periodic literature reviews of available pesticide ground water and surface water research data, and to facilitate the development of scientifically-based prevention activities and programs, including BMPs. Such reviews can also be used to determine opportunities for research, demonstration projects and education.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, U of M Extension
b. Develop and adopt Pesticide BMPs to address general pesticide distribution, storage, handling, use and disposal. Develop and adopt additional generic BMPs to serve as core practices to address potential water resource impacts or concerns for specific classes of pesticides (e.g., insecticides, herbicides, fungicides). Develop and adopt chemical-specific BMPs for pesticides (or their breakdown products) determined to be common detection in ground water or to be surface water pesticides of concern.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, NRCS, SWCDs, U of M Extension, Local Units of Government, Stakeholders



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
c. Develop, coordinate and extend BMP educational programs to include training for dealers, crop consultants, agronomists, SWCD and NRCS staff and pesticide users. Assistance with these educational programs would be sought from the UMES, registrants and dealers, and others.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, U of M Extension, Registrants, Stakeholders
d. Incorporate results of BMP research into ongoing MDA-UMES applicator training and certification/licensure programs.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA
e. Develop demonstration projects to show the potential effects of BMPs and alternative pest management systems (Integrated Pest and Weed Management, crop diversification, etc.) on changes in water quality over time.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, MPCA, DNR, BWSR, NRCS, SWCDs, U of M Extension, Private Organizations, Local Units of Government
f. Promote and coordinate Integrated Pest and Weed Management activities related to water quality protection with the University of Minnesota and Registrants/Dealers.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, U of M Extension, Private Organizations, Local Units of Government
g. Encourage state agencies (e.g., Minnesota Department of Natural Resources [DNR], MDA, University of Minnesota, and the Minnesota Department of Transportation) to use Integrated Pest and Weed Management to protect water resources.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, DNR, U of M, MNDOT, Local Units of Government

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
h. Identify alternative pest management systems and determine efficacy by working with the University of Minnesota, registrants, and other interested parties.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, U of M Extension, Registrants, Private Organizations
i. Educate on and promote the adoption of effective BMPs by pesticide users considering all management tools available including pesticide distribution, storage, handling, use, disposal, and crop-specific strategies.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, MPCA, BWSR, SWCDs, U of M Extension, Stakeholders
j. Utilize the available data collection activities of the MDA – Minnesota Agricultural Statistics Service, UMES, and other interested organizations and encourage coordination of state task forces, working groups, and agencies in gathering and issuing data.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, MASS, U of M Extension, Stakeholders

Goal 2: Evaluate Detections of Pesticides and Pesticide Breakdown Products In Water Resource Monitoring Data, and Evaluate the Adoption, Validity and Effectiveness of Prevention and Management Strategies, including Pesticide BMPs.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Utilize a PMPC to review the collection and analysis of information on detections of pesticides and pesticide breakdown products for potential common detection determinations in ground water and surface water pesticide of concern determinations in surface water.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, MPCA, DNR, MDH, U of M Extension, Farm Organizations, Farmers, Environmental Organizations, Industry, additional academic expertise

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
2. Develop potential pesticide management and monitoring areas based on land form units, agro-ecoregions, watersheds and other factors.							
a. Conduct water monitoring in each monitoring region.	X	X	X	X	X	• Federal • State • Local	MDA, U of M Extension, additional academic expertise
b. Delineate BMP promotion areas based on land form units or watersheds.	X	X	X	X	X	• Federal • State • Local	MDA, MPCA, DNR, BWSR, NRCS, SWCDs, U of M Extension, Stakeholders
c. Develop a strategy to evaluate the effectiveness of pesticide or crop-specific pesticide management strategies for best management practices promotion areas.	X	X	X	X	X	• Federal • State • Local	
3. Assess, evaluate, and validate:							MDA, MPCA, DNR, MDH, U of M Extension, Farm Organizations, Farmers, Environmental Organizations, Industry, additional academic expertise, SWCDs, NRCS, Local Units of Government
a. changes in management practices;	X	X	X	X	X	• Federal • State • Local	
b. resource impacts and trends;	X	X	X	X	X	• Federal • State • Local	
c. delivery systems to local interests and stakeholders; and	X	X	X	X	X	• Federal • State • Local	
d. economic impact of implementing prevention steps.	X	X	X	X	X	• Federal • State • Local	

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Use evaluation findings to refine practices and management strategies.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	

Goal 3: Reduce or eliminate continued movement of pesticides or pesticide breakdown products to ground water and surface water.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Intensify and target education and outreach (preventative) efforts; refine or develop BMPs, incentives or regulatory options; and consider the cost versus benefit and technical feasibility of mitigation measures.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, MPCA, DNR, MDH, U of M Extension, Farm Organizations, Farmers, Environmental Organizations, Industry, additional academic expertise, SWCDs, NRCS, Local Units of Government
2. If necessary, exercise regulatory authority through mandatory use changes by adoption of water resource protection requirements or the restriction or cancellation of product registration.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, MPCA

Goal 4: Promote the Development and Implementation of Integrated Pest and Weed Management as they Pertain to Water Quality Protection.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Provide funds for demonstration grants that affect water quality.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA
2. Utilize low-interest loan program to support farmer transition to more environmentally sound, profitable practices that reduce pesticide impacts to water resources.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
3. Assist with whole farm planning decision-making and on-farm research in practical farming alternatives that minimize pesticide impacts to water resources.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA
4. Promote and supplement the technical and financial assistance offered by several Farm Bill Conservation Title programs to help landowners implement and maintain IPM practices. a. Promote and/or supplement Environmental Quality Incentives Program (EQIP) incentive payments and technical assistance for implementing integrated pest and weed management on cropland (MN NRCS Conservation Standard 595 Pest Management) or pasture (Standard 528a Organic Prescribed Grazing) on eligible acreage;	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA, USDA, FSA, NRCS, USFWS, BWSR, DNR, SWCDs, U of M Extension, Private Organizations, Local Units of Government

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
b. Promote and/or supplement Conservation Security Program (CSP) enhancement payments for one or more pest management activities to protect water quality, whether already regularly practiced by the landowner or to be started. Includes pest scouting to minimize and target pesticide applications; band, split, spot or variable rate application; one or more non-chemical controls as the primary method of weed control; crop rotations including small grains and/or hay; or use of pest management products that meet USDA organic farming requirements.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	
5. Promote Integrated Pest Management programs, develop and implement state-wide strategies for the increased use of IPM on private and state managed lands.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA and Private Organizations
6. Provide organic farming technical assistance on conversion to organic methods, certification and marketing of crops and livestock.	X	X	X	X	X	<ul style="list-style-type: none"> • Federal • State • Local 	MDA



Chapter 11 Urban Runoff

Needs, Priorities, and Milestones, Action Plan

The action plan provided below summarizes the goals and milestones identified in the preceding sections. Many of the milestones listed below, as well as the implementation schedules of specific projects, are contingent upon adequate funding, data, preceding projects, and local involvement.

Goal 1: Jurisdictions Responsible for Unregulated Small Municipal Separate Storm Sewer System (MS4) Develop Comprehensive Runoff Management Programs (see EPA's *National Management Measure to Control Source Pollution from Urban Areas*).

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Evaluate or develop and implement a runoff management program framework in local jurisdictions: <ul style="list-style-type: none"> establish legal authority through local codes or ordinances establish program funding establish program staffing 	X			X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH
2. Identify areas needing protection or restoration: <ul style="list-style-type: none"> state recognized outstanding resource value water and other special waters locally recognized special waters and ground water used for recreation, drinking water supplies, etc. state listed impaired waters locally recognized waters that are threatened with urban runoff. 	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH
3. Develop and implement a program to address runoff from new development: <ul style="list-style-type: none"> maintain predevelopment site hydrology protect erodable or areas benefiting water quality limit impervious areas limit land disturbances preserve natural areas and vegetation 	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Develop and implement a program to address runoff during construction: <ul style="list-style-type: none"> • sediment • erosion and • chemical control 	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, UM
5. Reduce pollutant runoff through pollution prevention measures for: <ul style="list-style-type: none"> • household chemicals • lawn, garden, and landscaping • commercial activities • parking lots and roads • trash • pet/animal waste • municipal operations/good housekeeping 	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDA, UM
6. Evaluate, identify, or develop ordinances and/or stormwater fee incentives to require/encourage BMP installation, especially during redevelopment. <ul style="list-style-type: none"> • limit impervious areas • increase natural areas • increase opportunities for on-site infiltration 	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH
7. Perform maintenance, clean-out, and repair of structural BMPs owned by the community and insure maintenance of private BMPs flowing into the communities system. <ul style="list-style-type: none"> • assess maintenance needs and costs within a LGU jurisdiction • evaluate, identify or develop long term funding mechanisms to address clean-out of ponds or other structural BMPs • evaluate, monitor, or compare maintenance techniques for cost effectiveness and for minimizing release of contaminants from structural BMPs 	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH

Goal 2: Additional Best Management Practices (BMPs) and Better Site Design (BSD) Techniques are Advanced in Minnesota (see the Stormwater Steering Committee's Minnesota Stormwater Manual).

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Overcome barriers to Better Site Design <ul style="list-style-type: none"> research local codes and ordinances identify stakeholders conduct roundtable discussions to reach consensus implement code and ordinance changes 			X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT
2. Evaluate and implement BSD through education/behavior change, incentive programs, or ordinances.				X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
3. Evaluate and implement new and innovative BMPs such as rain gardens, porous pavement, green roofs, etc. that are located closer to the source of runoff.	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
4. Evaluate and implement infiltration to also include ground water recharge.	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
5. Evaluate and incorporate into codes or ordinances unified sizing criteria (see Minnesota Stormwater Manual).				X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH
6. Model and evaluate potential impacts of proposed BMPs for site specific watersheds, neighborhoods, and water bodies.					X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, UM
7. Evaluate proper utilization and combinations of urban BMPs as appropriate with varying sets of circumstances within watersheds, such as: <ul style="list-style-type: none"> pond design outlet flow controls wetland pretreatment and use wetland construction housekeeping erosion controls 	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
8. Develop a program of stormwater credits which may include: <ul style="list-style-type: none"> natural area conservation site reforestation/prairie restoration drainage to buffers (stream, wetland or shoreline) surface impervious cover disconnection fooftop disconnection use of grass channels 			X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH,

Goal 3: Address Load Allocation Reductions for Total Maximum Daily Loads Established due to Stormwater Runoff Impacting Impaired Water or Maintain Water Quality of a Water Body Threatened by Urban Runoff.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Coordinate LGUs and stakeholders to assess and address threats to a water body within a watershed		X	X	X	X	State, Local, 319	MPCA, Met Council
2. Implement structural or non-structural BMPs					X	State, Local, 319	MPCA, Met Council
3. Monitor or evaluate effectiveness of BMPs					X	State, Local, 319	MPCA, Met Council, UM
4. Track BMP use within a watershed					X	State, Local, 319	MPCA, Met Council
5. Develop guidance options to allocate urban runoff inputs to water quality for Total Maximum Daily Loads (TMDLs).	X	X	X	X	X	State, Local, 319	MPCA, Met Council

Goal 4: Establish an Effective Technical Assistance and Education Delivery System.

(To Achieve Maximum Effectiveness, Technical Assistance, Education and Information Delivery will prioritize and focus on needs for a particular watershed or runoff concern, target appropriate audiences, address barriers and benefits to implementation, and foster and measure behavior change. The following milestones are best done as a group.)

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Delivery systems are focused with clear goals			X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
2. Benefits and barriers to achieving the desired goal are identified prior to implementation <ul style="list-style-type: none"> benefits are reinforced, created, or recommended to be enacted, barriers to meeting the goals of the education or technical assistance are addressed 			X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT
3. Educational materials take into account age, cultural, ethnic, language and other audience differences as needed.				X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
4. Outcomes of the education or technical assistance delivery system are measured to determine effectiveness of meeting the desired goals.			X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM

Goal 5: Promote the Improvement of Urban Water Quality through Education and Technical Assistance Programs on the Application of Urban Runoff Best Management Practices Consistent with Goal 4 and Chapter 6 of this Plan.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Education of children through such methods as school curriculum or water festivals.	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, EdMN, UM
2. Expand and develop certification/training programs to address contractors, administrators and installers/inspectors. (319 funds would not be used for actual inspections, but for training).	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
3. Pool resources within a watershed or region for more effective outreach efforts.	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Expand and develop both informational materials and educational workshops related to pollution prevention plans for education about compliance with the NPDES storm water program. Workshops would be targeted toward providing technical assistance to NPDES industrial, construction and MS4 permittees.	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH
5. Improve public education efforts related to urban impacts through such delivery channels as neighborhood networks, demonstrations, media coverage, advertisement, public service announcements, publications, and videotapes. Initial areas of emphasis would include: <ul style="list-style-type: none"> • storm sewers (where they discharge to) • lawn and garden chemical use, composting and debris disposal • construction (BMPs and erosion control • material handling (tanks, spills, hazardous materials solid waste, etc.) • animal waste • public participation • litter (source controls, collection and prevention) • imperviousness and the; need to mitigate runoff by running water over pervious surfaces or other measures • water collection and treatment system especially swales, sewers, and ponds • evaluating educational tools 	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM, MDA

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
6. Provide education to elected officials, their staff and consultants on impacts of land use on water resources and Better Site Design Principles	X	X	X	X	X	Local, State, 319	MPCA, MDNR, Met Council, BWSR, UM

Goal 6: Minnesota Stormwater Runoff Stakeholders Work Together to Address and Prioritize Runoff Needs for the State.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Stakeholders address and prioritize runoff needs including: <ul style="list-style-type: none"> education research coordination 	X	X	X	X	X	State, 319.	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, MDA, UM
2. Continue to revise state manuals to reflect the findings of studies and experience gained locally and throughout the nation and publicize and document the work of the group.	X	X	X	X	X	State, 319.	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, MDA, UM
3. Encourage the involvement of associations and non-governmental units in utilizing grant opportunities	X	X	X	X	X	State, 319.	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, MDA

Goal 7: Research the Effectiveness of Urban Runoff Best Management Practices (see Appendix K of the Minnesota Stormwater Manual).

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Evaluate BMP life cycles <ul style="list-style-type: none"> long-term effectiveness costs including maintenance acceptance of urban BMPs 				X	X	319, State, Federal.	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
2. Research the performance of emerging and nontraditional BMPs including but not limited to: <ul style="list-style-type: none"> • bioretention • pervious pavement • green roofs • infiltration • proprietary sediment removal devices • long term performance data 		X	X	X	X	319, State, Federal	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
3. Assess the impacts of freezing, snow and snowmelt on the operation and effectiveness of existing and potential BMPs (BMP assessment).		X	X	X	X	319, State, Federal	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
4. Develop cold climate simulation tools		X	X	X	X	319, State, Federal	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
5. Research BMP effectiveness in contaminate removal for pathogens, toxins, and other emerging issue contaminants.		X	X	X	X	319, State, Federal	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
6. Research infiltration techniques including: <ul style="list-style-type: none"> • soil amendments and deep ripping to increase infiltration • effectiveness in cold conditions • monitor, evaluate, identify or develop BMPs that protect ground water where it may be detrimentally impacted 		X	X	X	X	319, State, Federal	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
7. Develop stormwater runoff demonstration sites for research, monitoring and educational purposes. Publicizing of the sites can be done through being open to the public, published in sources such as the Minnesota Stormwater Manual, and/or cited in training materials.	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
8. Research low impact development and better site design techniques			X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, UM

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
9. Research on salt contamination: <ul style="list-style-type: none"> • salt management including storage and application • BMPs • alternative methods and products 	X	X	X	X	X	State, Local, 319	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM
10. Research into updating TP-40 (Technical Publication 40, Hershfield, 1961) for precipitation analysis in Minnesota.		X	X	X	X	319, State, Federal	NOAA, MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, MDA, UM
11. Evaluate, identify or develop BMPs on ways to mitigate artificially extended “bankfull” flow in developed areas.	X	X				319, State, Federal	MPCA, MDNR, Met. Council, BWSR, MDH, MnDOT, UM

Chapter 12 Forestry

Needs, Priorities and Milestones, Action Plan

The Action Plan Provided Below Summarizes the Goals and Milestones Identified in the Preceding Sections. Many of the Milestones Listed Below, The Implementation of Specific Projects, are Contingent Upon Adequate Funding and Local Involvement.

(P) Private (S) State (F) Federal

Goal 1: Education: Improve Adoption and Use of BMPs Through Effective Educational Programs.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Woodland owner education: Curriculum development and delivery with local partners (i.e. county woodland committees, woodland advisors).	X	X	X	X	X	General Fund (S), Stewardship Education Fund (S), Extension (S).	MDNR Forestry, MFA, U of M Extension.
2. Develop early education curriculum in cooperation with professional associations (i.e. Project Wet, Project Wild, Project Learning Tree, Natural Resources in the Classroom)	X	X	X	X	X	General Fund (S), Association Funds (P).	MDNR Forestry, MDNR Waters, Wildlife Society, Society of American Foresters, U of M Extension.
3. Document benefits of the guideline education programs based on workshop evaluations and landowner surveys		X			X		MDNR Forestry, MFA, U of M Extension.
4. Document benefits of the guideline education programs based on evaluation of implementation field monitoring results.	X	X	X	X	X	General Fund (S).	MDNR Forestry.
5. Develop demonstrations of practices and equipment to reduce impacts and improve the efficiency and cost effectiveness of forest operations.	X	X	X	X	X	General Fund (S), S&PF (F), Grants (P), MLEP (P).	MDNR Forestry, U of M Extension.



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
6. Continue training programs for loggers and foresters and expand to include other natural resource professionals.	X	X	X	X	X	General Fund, (S), MLEP (P).	MFRC
7. Agroforestry education to promote crop diversification and use of woody perennials for phytoremediation and wellhead protection.	X	X	X	X	X	UMN CNR and Extension (S), NRCS (F), RC&Ds (F)	U of M CNR and Extension, NRCS
8. Support statewide initiative to promote third-party certification of Minnesota's private woodlands	X	X	X	X	X	Blandin Fdn. (P), LCMR (S), Extension (F, S), MDNR (S)	U of M CNR and Extension, MFA, Blandin Fdn.

Goal 2: Monitoring: Evaluate and Quantify Implementation of BMPs

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency (ies)
1. Continue guideline implementation monitoring.	X	X	X	X	X	General Fund (S)	MDNR Forestry
2. Improve implementation monitoring process design.	X	X	X	X	X	General Fund (S)	MFRC
3. Adequate sampling of critical activities.	X	X	X	X	X	General Fund (S)	MFRC
4. Identify meaningful sampling criteria.	X	X	X	X	X	General Fund (S)	MFRC
5. Streamline on-site evaluation.	X	X	X	X	X	General Fund (S)	MFRC
6. Expand implementation monitoring beyond timber harvest to include permanent forest management infrastructure such as roads, water crossings, and trails.			X	X	X	General Fund (S)	MFRC MDNR



Goal 3: BMP Development and Implementation: Continue BMP Development and Implementation Efforts to Improve the Effectiveness and Use of BMPs and Expand the Protection of Resources.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Revise guidelines to reflect the results of monitoring and research.	X	X	X	X	X	General Fund (S)	MFRC
2. Prioritize assistance, education, and corrective actions to address those practices identified through implementation monitoring as poorly applied, inadequately utilized, or newly developed or revised.	X	X	X	X	X	General Fund (S), Stewardship Education Fund (S), Cost Share Programs (S) (F), MLEP (P), U of M Extension (F)	MFRC
3. Increase technical assistance to NIPF landowners.	X	X	X	X	X	General Fund (S), Stewardship Funds (S).	MDNR Forestry U of M Extension
4. Evaluate the need for tax credits as incentives for guideline implementation.	X	X	X	X	X	General Fund (S)	MFRC
5. Establish guideline implementation recognition programs for loggers, natural resource managers, landowners, and management agencies.	X	X	X	X	X	General Fund (S), Association Funds (P).	MFRC, SAF, MLEP, MFA.
6. Support statewide logger certification initiative to increase sustainable forestry implementation and the amount of certified fiber from Minnesota's private woodlands.	X	X	X	X	X	Association Funds (P).	MLEP

Goal 4: Research: Target Research Efforts to Evaluate Costs and Benefits Effectiveness of BMPs in Reducing Negative Impacts of Forest Management Practices.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency (ies)
1. Evaluate the costs, benefits, and effectiveness of implementing specific forest management guidelines	X	X	X	X	X	General Fund (S), S&PF (F), Grants (P)	MFRC, MDNR Forestry, U of M CNR, U of M NRRI, USFS NCFES & S&PF.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency (ies)
2. Carry out long term research to evaluate the effectiveness of a variety Riparian Management Zone (RMZ) configurations for; <ul style="list-style-type: none"> – thermal impacts – trapping sediments – capturing or trapping nutrients – providing critical habitats. 	X	X	X	X	X	General Fund (S), S&PF (F), Grants (P) (F), LCMR (S).	MFRC, MDNR Forestry, U of M CNR, U of M NRRI, USFS NCFES.
3. Evaluate soil disturbance impacts and recovery rates; <ul style="list-style-type: none"> – erosion and channelization – infiltration – hydrologic regimes – site productivity. 	X	X	X	X	X	General Fund (S), S&P (F), Grants (P) (F).	MFRC, MDNR Forestry, U of M CNR, U of M NRRI, USFS NCFES.
4. Evaluate alternative technologies to accomplish timber harvest and other forest management activities.	X	X	X	X	X	General Fund (S), S&PF (F), Grants (P) (F)	MFRC, MDNR Forestry, U of M CNR, U of M NRRI, USFS NCFES.

Goal 5: Retain and Restore Forest Vegetation on Sensitive Areas to Improve Water Quality, Absorb Nutrients, Restore Habitat, Provide Alternative Crop, Improve Aesthetics, Slow Flood Discharge, and Trap Sediment.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Restore riparian forest cover to 2,000 to 6,000 acres per year utilizing native species and hybrid varieties of trees, with preference for native species.	X	X	X	X	X	RIM (S), CRP (F), CREP (F), MFA (P), EQIP (F)	MDNR Forestry, MDNR Waters, MPCA.
2. Promote easement programs or tax incentives to promote riparian cropland to forest cover.	X	X	X	X	X	RIM (S), CRP (F), CREP (F), MFA (P),	BWSR, SWCD's.
3. Research the potential value of woody perennial species for wellhead protection and phytoremediation in agroforestry applications	X	X	X	X	X	U of M CNR and Extension (F, S), MDA (S), RC&Ds (F)	U of M CNR and Extension, RC&Ds, SWCDs



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Conduct outreach and education about the value of woody perennial (and other native) species on sensitive lands. Target crop consultants and advisors, landowners, agricultural professionals, and others as needed.	X	X	X	X	X	U of M CNR and Extension (F, S), MDA (S), RC&Ds (F)	U of M CNR and Extension, RC&Ds, SWCDs
5. Promote programs to retain existing riparian forest areas, such as conservation easements, the forest legacy program, zoning, and outright purchase	X	X	X	X	X	General Fund (S) Grants (P) (F)	MDNR Forestry

Chapter 13: Subsurface Sewage Treatment Systems

Needs, Priorities and Milestones, Action Plan

The action plan provided below summarizes the goals and milestones identified in the preceding sections. Many of the milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement.

Goal 1: To have all Counties Adopt Amended Countywide SSTS Ordinance that Meets State Standards of MR 7082, and to Ensure that Cities and Towns that Chose to Regulate SSTS do so Appropriately.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Work with Association of Minnesota counties to develop aids to facilitate county adoption of ordinances that meet state standards.	X					State Environmental Fund	MPCA, AMC
2. Provide assistance to counties individually as they develop ordinances, particularly in the area of flexibility provided in the rule and other approaches counties may take instead of adopting less restrictive standards.	X	X				SSTS Tank Fee, other state sources	MPCA
3. Review ordinances as they are completed and provide comments to the counties.		X				SSTS Tank Fee	MPCA
4. Provide guidance and assistance to counties as they work with cities and towns to develop consistent ordinances.		X	X			SSTS Tank Fee, other state sources	MPCA
5. Use administrative and enforcement tools available to the Agency to ensure compliance by the local units of government.			X	X		SSTS Tank Fee	MPCA

Goal 2: Have all LGUs Effectively Administering their SSTS Ordinance

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Work with local units of government to develop criteria for evaluating program capacity.	X					Environmental Fund	MPCA/others
2. Define roles of counties and MPCA in SSTS regulation and enforcement.	X					Environmental Fund	MPCA/others
3. Ensure that cities and towns have sufficient resources to effectively administer and enforce their ordinances, and that they drop their ordinances if not.			X	X		SSTS Tank Fee	MPCA



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Seek additional funds for county SSTS programs (remains an action item until accomplished).	X	X	X	X	X	Clean Water Legacy Act (if passed by Legislature)	Group of 16 stakeholders
5. Audit local SSTS programs on an as-needed basis to ensure compliance.				X		SSTS Tank Fee	MPCA

Goal 3: To Effectively Enforce the SSTS Licensing Program.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Undertake an initiative to address the issue of lapsed licenses.	X					SSTS Tank Fee	MPCA
2. Continue communication with industry representatives to identify needed areas of license enforcement work.	X	X	X	X	X	SSTS Tank Fee	MPCA
3. Monitor complaints and assess trends to identify needed areas of license enforcement work.	X	X	X	X	X	SSTS Tank Fee	MPCA
4. Continue enhanced license enforcement efforts.	X	X	X	X	X	SSTS Tank Fee	MPCA

Goal 4: To Increase the Knowledge and Skill Levels of SSTS Professionals

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Amend rules to increase required training for design, inspection and maintenance of larger and/or more complex systems; increased requirements for continuing education for SSTS practitioners; more rigorous experience requirements and additional training for local officials.	X					Environmental Fund and SSTS Tank Fee	MPCA
2. Develop Minnesota-specific, user-friendly training manual for use in the U of Ms SSTS training classes.	X					Environmental Fund, registration fees from SSTS training	U of M
3. Develop a Technical Evaluation Panel (TEP)-like approach for dispute resolution in the field that also increases knowledge in the process.	X					State General Fund	U of M



Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
4. Provide soils training in each of the state's major soil types.	X	X	X	X	X	Registration fees from SSTS training	U of M

Goal 5: Provide Technical and Financial Assistance to Areas with Inadequate Sewage Treatment (Small Communities, Rural Subdivisions, Lakeshore Areas, Unincorporated Communities, etc.)

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Request funding for wastewater treatment planning.	X	X	X			319 (for non-NPDES solutions), State MPCA	MPCA
2. Request funding for education of local leaders.	X	X				319 (for non-NPDES solutions), State.	MPCA
3. Request funding for technical assistance, organizational assistance, permitting, rule revision to accommodate moderate sized flows, financing assistance, enforcement of non-compliance.		X				319 (for non-NPDES solutions), State.	U of M and MPCA.
4. Request funding for construction upgrades of failing systems.	X	X	X	X	X	319 (for non-NPDES solutions), State through Ag. BMP loans and SRF.	MPCA
5. Implement expanded program.	X	X	X	X	X	319 (for non-NPDES solutions), State.	MPCA

Goal 6: Provide Education to Local Decision-makers, the Public and Special Groups

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Request funding to increase homeowner education on the importance of proper SSTS maintenance.	X	X	X	X	X	U of M, 319	U of M
2. Develop and implement presentations to local decision makers on the importance of conforming systems.	X	X	X	X		U of M, 319	U of M
3. Provide presentations for special groups.	X	X	X	X		U of M, 319	U of M
4. Update the Homeowners Guide.	X					U of M, 319	U of M

5. Implement training for real estate agents.	X					U of M, 319	U of M
6. Develop programs for small communities on cluster and small community systems.	X	X				U of M, 319	U of M

Goal 7: Increase Regulatory Control of Operation and Maintenance of SSTS

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Develop regulatory methods to ensure proper system maintenance.	X					319, State (SSTS Tank Fee and Environmental Fund)	MPCA
2. Provide funding for administration of local maintenance programs.		X	X	X	X	319, State (could be enhanced through Clean Water Legacy)	MPCA
3. Encourage local units of government to adopt maintenance requirements in local ordinances.		X	X	X	X	319, State, Environmental Fund	MPCA

Goal 8: Register Proprietary Products used in SSTS in Minnesota and provide Information to Local Units of Government on their Appropriate Use.

Milestones (Action Steps)	08	09	10	11	12	Funding Source(s)	Lead Agency(ies)
1. Amend rule to include product registration process.	X					SSTS Tank Fee, Environmental Fund	MPCA
2. Provide information to SSTS industry on process and open the doors to registration of products.		X				SSTS Tank Fee, Environmental Fund	MPCA
3. Register products, and develop guidance on their use in Minnesota SSTS.		X	X	X	X	SSTS Tank Fee, Environmental Fund	MPCA

Chapter 14: Effects of Atmospheric Pollution on Water Quality

Needs, Priorities and Milestones, Action Plan

The Action Plan provided below summarizes the milestones identified in the preceding sections. Many of the milestones listed below, as well as the implementation of specific projects, are contingent upon adequate funding and local involvement.

Goal: To Develop a Quantitative Understanding of the Effect of Air Pollutants on Water Quality and to Develop Appropriate Best Management Practices to Minimize the Impact of Air Pollution on Water Resources.

Milestones (Action Steps)	08	09	10	11	12	Funding Sources	Lead Agency(ies)
1. Quantify deposition of metals (cadmium, lead, iron, etc.) and phosphorus in select watersheds.	X	X	X	X	X	MPCA, TMDL	MPCA
2. Develop monitoring effort for effect of global warming on surface water; ice cover times and water temperature.	X	X	X	X	X	General Fund	MPCA
3. Quantify proportion of phosphorus and mercury deposited from atmosphere that results from wind erosion of soil.		X				TMDL	MPCA
4. Evaluate why lakes vary greatly in mercury contamination of fish, given that atmospheric deposition is relatively homogeneous.	X	X	X	X	X	TMDL, USGS	MPCA, USGS
5. Evaluate effect of nonpoint sulfate loading on mercury methylation.	X	X	X	X	X	USEPA	MPCA, Science Museum
6. Quantify relationship between emissions of pollutants and deposition to surface water and watersheds.	X	X	X	X	X	General Fund	MPCA
7. Evaluate methylation of mercury in wetlands used as BMPs for trapping storm water runoff.	X	X	X	X	X	General Fund; USEPA	MPCA
8. Investigate the impact of atmospheric deposition of “hormonal copycats” on aquatic organisms.	X					General Fund	MPCA
9. Investigate whether aquatic resources near emission sources experience increased impacts.			X			General Fund	MPCA

Milestones (Action Steps)	08	09	10	11	12	Funding Sources	Lead Agency(ies)
10. Develop land based BMPs for watersheds to minimize the impact of pollutants deposited from the atmosphere.		X	X	X		General Fund	MPCA
11. Study the effect of UV radiation on the health of aquatic organisms.	X					General Fund	MPCA
12. Determine if non-mercury air pollutants can increase mercury (Hg) in water by accelerating the atmospheric deposition of Hg.	X	X	X	X	X	General Fund	MPCA

