Pollution Prevention Survey:
A Status Report on Integration of Preventive Approaches into MPCA Programs

Technical Report

November 2002 (final draft)

1. BACKGROUND

For the past eight years, the Minnesota Pollution Control Agency (MPCA) has received a Pollution Prevention Incentives for States (PPIS) Grant from the U.S. Environmental Protection Agency (EPA) to assist with integrating prevention approaches into its programs. The MPCA currently invests nearly $200,000 annually in federal and state match funds distributed directly through the PPIS grant to promote preventive practices and approaches as a means of environmental improvement. An additional amount is spent through service delivery programs actively promoting pollution prevention (P2). Because of this investment, MPCA staff have recognized the need to quantify and assess the impact of its pollution prevention efforts and to use such assessment in its future planning.

To do so, in 2002 the MPCA conducted an internal survey to evaluate factors surrounding integration of prevention principles and practices. The survey results were intended to provide a better understanding of perceptions among Agency staff and leadership (supervisors, managers and executives) about pollution prevention (P2) integration, to quantify the experience of staff and leadership with P2 integrations and to attempt to identify the readiness of staff and leadership for implementing additional P2 integration.

In conducting the survey, the MPCA provided staff with the following definition of P2, setting the "bar" for responses: *Strictly speaking, "pollution prevention" means to reduce the quantity or toxicity of wastes or inputs at the source (source reduction). Reusing wastes and recycling are other preventive approaches. Treatment, control and disposal of wastes are not considered preventive practices. In addition to source reduction, the EPA considers eliminating pollution through increased efficiency in the use of raw materials, energy and water, and the protection of natural resources by conservation to be pollution prevention. Pollution prevention is a cornerstone of sustainability. You have integrated preventive approaches into your work if you have promoted, facilitated or implemented practices including those listed below:*

- *Increase the useable life span of a product;*
- *Change procurement and waste-generation habits for greater source reduction;*
- *Utilize by-product lymes in land application;*
- *Reduce volume of solid waste going to a landfill through recycling;*
- *Avoid cross-media transfer;*
- *Select cleanup remedies that use natural systems (e.g., reclaimed/constructed wetlands) or less energy;*
- *Restore, replace or enhance habitat (e.g., Natural Resource Damages at Superfund sites);*
- *Prevent stormwater pollutants from entering lakes, streams or groundwater using infiltration/filtration methods; and*
- *Promote high-performance building design and low-impact transit, lighting or vegetation.*

This report details findings from the survey of staff and leadership perceptions regarding integration of pollution prevention practices and policies in Agency programs or projects. The report is divided into the following sections:

- Discussion of agency-wide results
- Discussion of results by work area
- Conclusions
- Recommendations

Numeric responses to the surveys are compiled in Appendices A and B. Narrative comments provided by the respondents regarding their experience integrating preventive approaches into their projects, the resources available for assisting with regulatory integration of preventive approaches and their general thoughts on P2 are provided in Appendices C through F.

2. DISCUSSION OF AGENCY-WIDE RESULTS

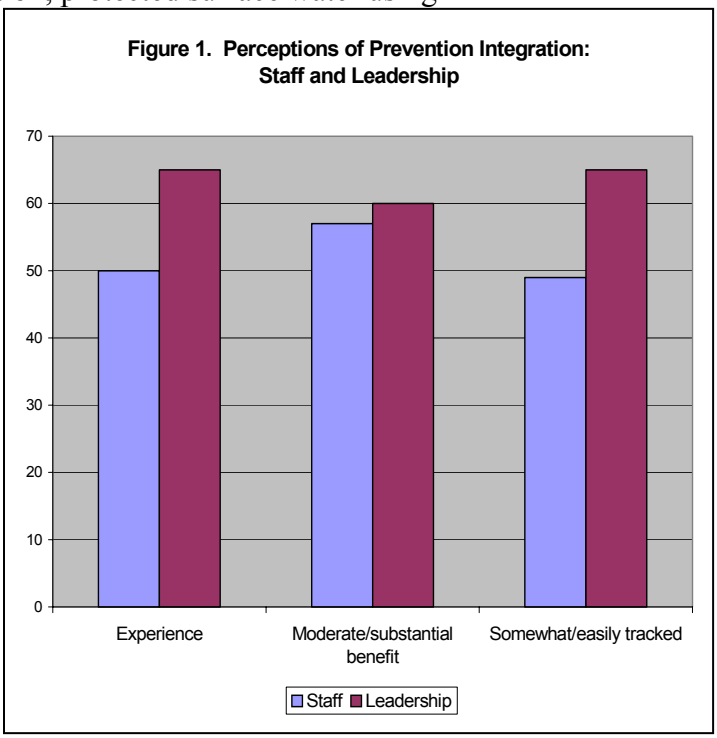
Agency-wide perceptions concerning integration of pollution prevention and other more sustainable approaches to regulatory compliance and environmental outcomes are based on survey responses from 62 members of the MPCA leadership (62 percent of total) and 288 staff (45 percent of total). Although we cannot be certain that the 45 percent of staff respondents represent the 55 percent of staff that did not respond, the results are still informative.

2.1 Experience with Preventive Principles

Based on the survey responses, meaningful prevention integration is occurring at the MPCA to one degree of another, depending on work area. "Meaningful integration," for the purposes of this report, refers to projects or activities that approach wholesale or interdisciplinary integration of prevention or sustainability tools, have perceived environmental benefits resulting from P2 integration or measurable P2-related outcomes and outputs, or prevention activities that were supported by managers in a direct way. Half of the staff respondents and 65% of leadership respondents have experience working on prevention integration projects.

Staff respondents identified a wide variety of projects in which prevention principles were employed. MPCA experience in prevention integration ranges from direct involvement in P2 projects to promoting prevention activities among customers and referring customers to other organizations, resources and training specializing in prevention practices.

Staff and the leadership described projects that document the connections between prevention practices and cleanup, regulated business practices and redevelopment. Staff have incorporated preventive approaches into permit language (i.e., Environmental Management Systems), applied pollution prevention to Supplemental Environmental Projects negotiated as part of an enforcement action, protected surface water using preventive best management practices, and managed remediation sites for greener environmental outcomes through P2. Projects that have used prevention principles as described by staff and leadership are included in Appendix C.



2.2 Perceived Benefit of Prevention Work

The survey clearly indicates that many MPCA employees view preventive practices and approaches as a viable tool for reaching compliance and for achieving enhanced environmental outcomes. A majority of these experienced respondents (57% of staff and 60% of leadership) feel that moderate or substantial environmental improvement could result from an increase in preventive approaches.

2.3 Ability to Track Prevention Activity

Results of the survey showed that 49% of staff respondents and 65% of leadership respondents were either somewhat able to track prevention activity or could easily do so. Half of the respondents with P2 integration experience, however, did not know their projects' ultimate level of success. This is consistent with less-than-successful MPCA attempts in the last several years to inventory Agency-wide P2 integration activity. Factors contributing to lack of documented results from P2 integration may include the absence of a reporting protocol and measurable indicators. At this point, information from MPCA P2 activity and environmental or economic outcomes is relatively unavailable to service delivery staff, legislative staff and information officers, limiting its usefulness.

2.4 Usefulness of Incentives and Resources

Table 1 provides an overview of staff and leadership responses on the usefulness of various incentives and resources. Based on the overall results, no one resource stands above the others as more beneficial to P2 integration activities. The majority of respondents ranked most of the listed resources and incentives as somewhat beneficial, rather than of little or much benefit. It may be more meaningful to consider the perceived benefit from a given resource according to the respondents' work areas, rather than the

group as a whole. In fact, further analysis shows that the relative benefit of a given resource or suite of resources can vary with work area. Therefore, when planning resource maintenance and development, the Policy and Planning Division should ultimately target specific work areas and not necessarily expect a given resource to fulfill P2 integration needs for the entire Agency.

Table 1. Staff and Leadership Perceptions of Prevention Integration Resources

Resources most frequently cited as *most* beneficial	
Staff: Financial Assistance (grants & loans) Case studies describing environmental and economic benefits. P2 training and outreach	*Leadership:* Partnerships with non-regulatory technical assistance, compliance or business assistance programs Financial Assistance (grants and loans). Regulatory flexibility in exchange for P2 project implementation
Resources most frequently cited as *somewhat* beneficial	
Staff: Case studies describing environmental & economic benefits. P2 Internet sites. Staff assigned to help develop or implement P2 projects & policy.	*Leadership:* P2 Training and outreach. Case studies describing environmental & economic benefits. Easy-to-use database for tracking and outcomes measures. P2 Internet sites.

2.5 Perception of Leadership Support

About 43% of staff respondents perceived their supervisors to be supportive of their efforts to integrate prevention into their work. About 23% thought their supervisor was neither supportive nor unsupportive. About 11% did not know how to characterize their supervisor's level of support. Among the staff respondents, there was an apparent decrease in perceived level of support with increasing level of management. And, the number of staff responding "don't know" to the question about management support increased with the level of leadership.

A majority of leadership respondents characterized themselves as supportive of staffs' efforts to integrate P2 into their work. At the same time, a relatively high percentage of leadership respondents believed the question didn't apply to them (18%) or characterized themselves as neither supportive nor unsupportive (18%). The reasons behind these results are not provided in the survey results. Follow-up interviews may be useful, especially if the results involve misperceptions. These results in combination with remarks made in the narrative comments suggest that a clearer message in support of P2 integration is possible from management.

3. DISCUSSION OF RESULTS BY WORK AREA

As part of the survey analysis, we conducted non-parametric tests to determine significant differences between work areas in experience, perceived benefit from P2 integration, the ability to track P2 activities and outcomes, preferred P2 integration resources, the effect of experience on perceived benefit and the effect of perceived level of support for P2 integration among leadership. The work areas used in the analyses were:

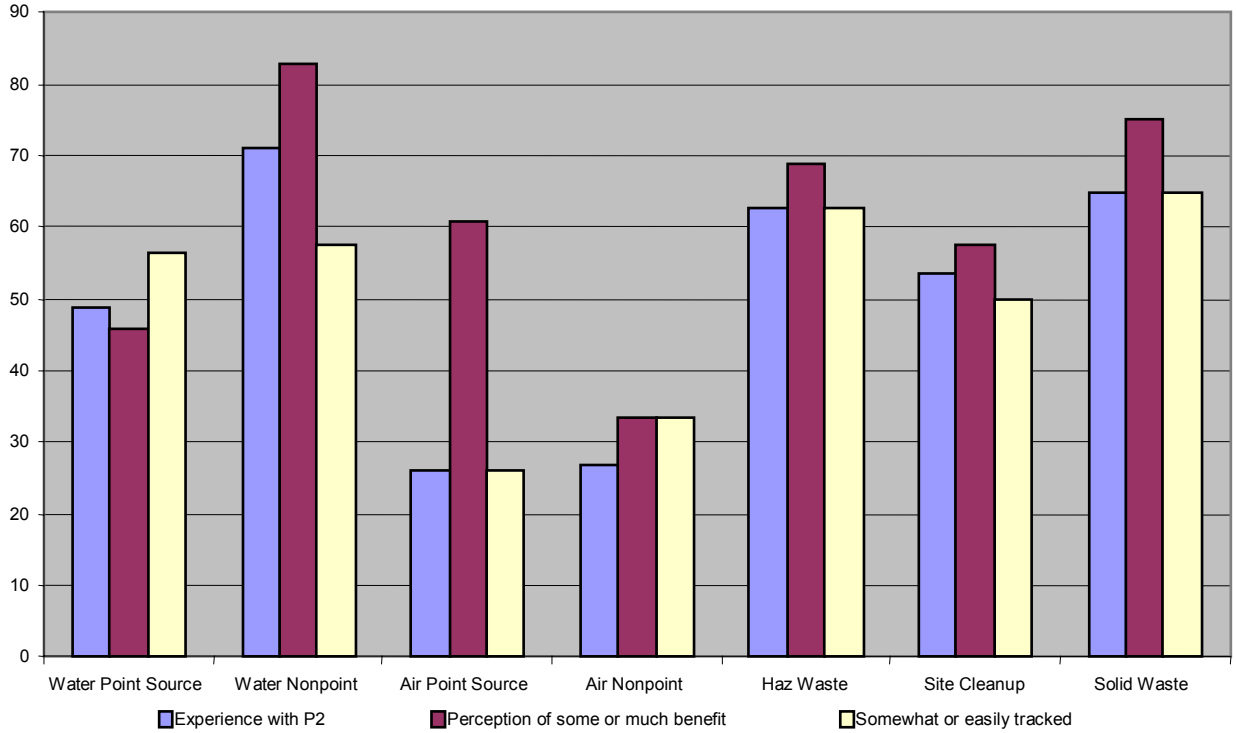
- Water Quality point source
- Water Quality nonpoint source
- Air Quality point source
- Air Quality nonpoint source
- Hazardous waste
- Site Cleanup
- Solid Waste
- Other (may have been used to indicate multiple work areas)

It is important to note that these work-area analyses have certain limitations – insufficient number of responses for some groups, extrapolation to the half of the Agency that did not respond, and limitations of the work-area categories used in the survey. Because of this, verification may be necessary through follow-up interviews or surveys. More information about the non-parametric statistical analysis methodology can be found in Appendix I.

3.1 Perceptions of Prevention Integration by Work Area

MPCA staff's experience with prevention activities, their perception of its value and their ability to track prevention activity were evaluated. Figure 2 presents results of the three factors by work area. In general, there was wide variation among staff by work areas in terms of experience with prevention. Perception of moderate or substantial benefit to be realized from prevention activities ranged from 33% to 83% among work areas. And, in most work areas, half or more of staff believed that prevention activities could be somewhat easily tracked or easily tracked.

Figure 2. Pollution Prevention Views by Work Area



3.2 Readiness of Specific Work Areas for Prevention Integration

Non parametric analysis of the three factors depicted in Figure 2 was used to determine which work areas appeared to have the most potential to integrate prevention practices and approaches. Table 2 shows the total ranking for each work area according to the results in Figure 2. Within each column (i.e., for a given factor), the numbers corresponds to the comparative ranking of the seven work areas. The lower a number, the higher the likelihood of success in integrating P2, based on the assumption that these factors affect the potential for successful P2 integration.

Table 2: Work Area Readiness for P2 Integration

(Lower cumulative score for ranking reflects a work area where perceived benefit, ability to track activity or outcomes, and experience with P2 integration were highest.)

Work Area	Benefit	Experience	Tracking	Cumulative Ranking
Water Quality Point Source	3	3	1	7
Water Quality Nonpoint Source	1	1	1	3
Air Quality Point Source	2	4	3	9
Air Quality Nonpoint Source	2	4	2	8
Hazardous Waste	2	2	1	5
Site Cleanup	3	2	1	6
Solid Waste	2	2	1	5

Water Quality nonpoint appears to stand apart from the remaining work areas and appears to be an area where integration is likely to be successful. Hazardous Waste and Solid Waste are areas where success may also be likely. Air Quality and possibly Water Quality point source are areas where success may be less likely. However, additional analysis suggests the need to conduct follow-up interviews to verify these results. Additional analysis seems to support the possibility that P2 integration may have greater potential on a programmatic level in higher ranked work areas, while integration on a project level may be more appropriate for those ranked lower.

We evaluated the effect of experience on perceived benefit of P2 (Table 3) and the discrepancy between the perception among staff of leadership support and the perception among the same leadership of their support. In Table 3, a p-value less than about 0.05 reflects a work area where staff with experience on a P2 integration project and those without experience had a different perception of the benefit of P2 integration. This analysis shows that those with experience saw the benefit of prevention integration; those without the experience did not.

Table 3: Effect of Experience on Perceived Benefit According to Work Area
(A p-value less than about 0.05 reflects a work area where staff with experience on a P2 integration project and those without experience had a different perception of the benefit of P2 integration. The numbers posted in the remainder of the table indicate the number of respondents in each of the categories.)

Work Area	**p-value**	**No Experience**		**Experience**	
		No or limited benefit	High Benefit	No or limited benefit	High Benefit
Water Quality Point Source	<0.001	11	4	2	16
Water Quality Nonpoint Source	0.048	3	8	2	35
Air Quality Point Source	0.112	2	9	1	5
Air Quality Nonpoint Source	0.680	2	3	1	2
Hazardous Waste	0.435	2	2	1	9
Site Cleanup	0.500	8	11	7	19
Solid Waste	0.923	3	4	2	10

Additionally, a separate analysis of the subpopulation "Water Quality point source with experience" showed that while Water Quality Point Source overall ranked low overall in terms of readiness for prevention integration, when separating out the experienced subpopulation, it ranked highest. This seems to indicate that integration might be successful in Water Quality programs mostly in projects where those with P2 experience are involved. Getting experience for others in WQP may increase the likelihood of successful integration program-wide.

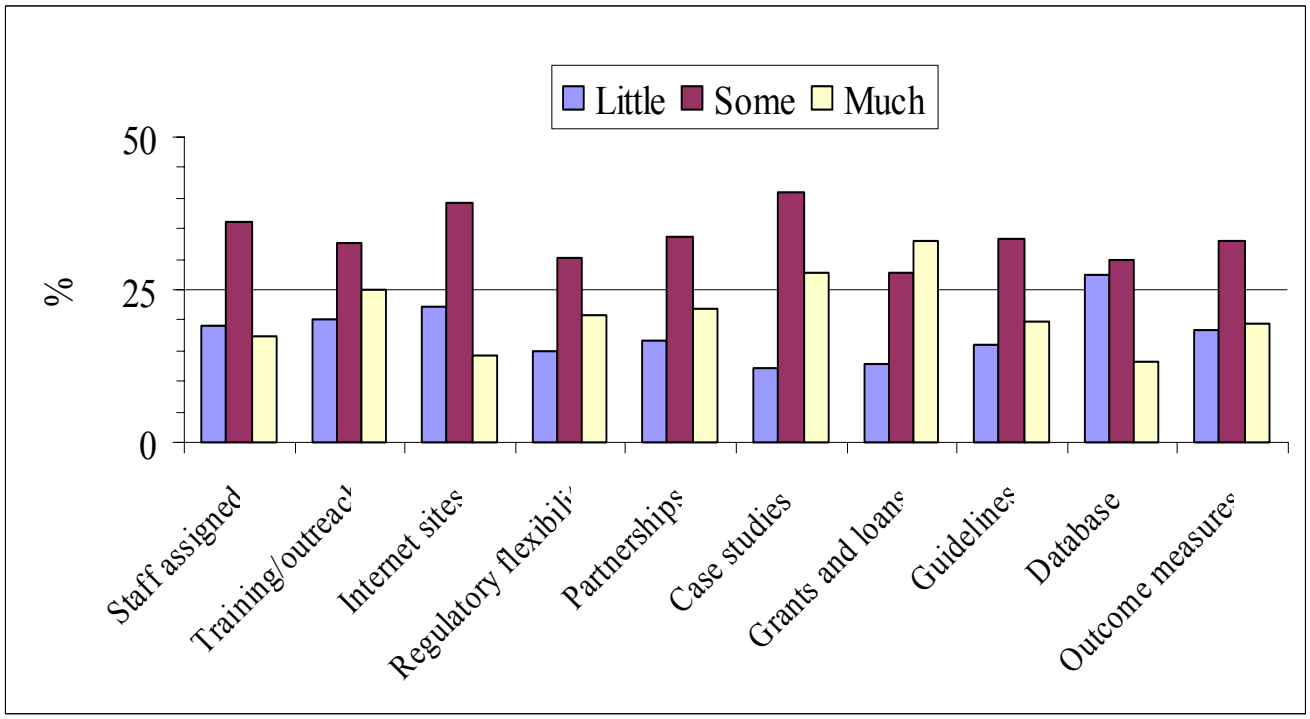
The ranking in Table 2 for Water Quality point source may also be influenced by a poor understanding among staff of the high level of support among leadership. Eighty-three percent of the leadership respondents associated with Water Quality point source programs stated support for P2 integration, yet approximately 30% of staff respondents did not know the level of support from managers or directors. Additional investigation may be helpful to gain a better understanding of these nuances.

3.3 Other analyses

A variety of other analyses were conducted. Table 4 shows that most P2 integration resources listed in the survey are perceived or known to be of at least some benefit to some of the respondents. By evaluating the relative value for specific prevention incentives, resources and assistance by work area we found, in general, that preferences varied by type of work, e.g., regulatory programs preferred tools such as regulatory flexibility while non-regulatory programs preferred tools useful to building relationships. This may point to the need for a menu of resources, including some that are strongly relationship-oriented and others focused on regulatory flexibility as a primary resource for P2 integration.

Additional analyses that were conducted, including the analysis of the perception of leadership support, are available from the P2 grant coordinator, along with more detailed information on the analyses discussed above.

Table 4: Benefit from P2 Integration Resources



4.0 CONCLUSIONS

Based on the analysis of the survey results, MPCA staff has concluded:

- Many MPCA staff and leadership view preventive practices and approaches as viable tools for achieving enhanced environmental outcomes

- Preventive work is done in many parts of the Agency, but its environmental and economic outcomes are not always clear

- The usefulness of particular incentives or resources used to promote or implement prevention practices are variable by work areas

- In survey responses, management and staff commented on specific areas in which prevention tools work well or could be applied more diligently in the future

- Although many respondents indicate that they are easily or somewhat able to track results, documentation of P2 activities is not currently widespread. This may be due, in part, to a lack of protocol or procedures.

- Most leadership characterize themselves as supporters of prevention integration, but staff has not necessarily received a clear message in support of their P2 integration efforts

- Some work areas – Water Quality Non Point Source programs, Water Quality Point Source staff with P2 experience, and to a lesser degree, Hazardous Waste, Solid Waste and Site Cleanup programs, appear to be better poised for meaningful P2 integration at this time.

- A minority of staff and leadership respondents doubt the role of prevention principles in meeting MPCA goals and obligations. This group appears to believe that preventive practices (1) must not be placed above other functions (i.e., not implemented at the expense of obligations to core functions), (2) are implemented only at the expense of already burdened staff resources, (3) do not have a connection with their specific program, or (4) are inconsistent with Agency priorities.

5.0 RECOMMENDATIONS

The Commissioner, Directors and Managers, with assistance from the P2 Grant coordinator in the Office of Strategic Resource Management, Agency-wide Planning and Assistance Unit, can consider the following recommendations for priority implementation.

Leadership should provide a clearer, more visible message to staff about their level of support for P2 integration by:

- Tasking a team to work on the EPA P2 Grant project "Road Map to the Future." This project can clarify MPCA manager's support of prevention integration at the MPCA. Road Map to the Future will build upon the wide support for and experience with prevention integration at the MPCA and develop a system for moving forward with prevention integration in the agency.
- Assigning a manager and staff person as P2 champions in each division and region to help Policy and Planning Division P2 staff develop the most suitable P2 integration resources and help target increased integration that serves specific service delivery need.

The MPCA should make information about prevention integration successes more visible to all staff by developing a communication plan for P2 integration activities. The plan will include strategies for:

- Developing case studies to publicize the Agency's P2 efforts and their environmental and economic benefits, along with lessons learned from specific P2 projects.
- Raising awareness among MPCA employees of prevention topics, P2 technical and business assistance referral networks, suitable P2 integration resources and incentives, etc.

The MPCA should assist staff in documenting and tracking prevention activities by:

- Assigning the P2 Grant coordinator to annually develop an easy-to-use method to document Agency pollution prevention activities

The MPCA should focus its prevention integration efforts more effectively by:

- Targeting P2 integration assistance and coordination toward work areas with highest potential for integration – Water Quality nonpoint, Water Quality point source with staff experienced in P2, and to some degree, Hazardous Waste, Solid Waste and Site Cleanup.
- Funding or actively supporting more P2 demonstration pilots to improve the chances of companies adopting prevention practices and technology.

- Pursuing partnerships between the Policy and Planning Grant Coordinator and MPCA service delivery programs, MPCA policy and legislative initiatives, and other organizations to conduct projects that will provide measurable P2 results.
- Incorporating prevention goals into Unit, Section or Division and individual staff work plans

The MPCA should further investigate some issues raised by the survey:

- The P2 Grant coordinator should collaborate with staff in other divisions and those assigned to stakeholder research to gather external stakeholder input regarding P2 integration, documented trends in P2 integration activity, and fill in information gaps from the January 2002 P2 survey.
- Evaluate further the preferred P2 integration resources by work area to patterns in the types of resources necessary for the most common situations.
- Conduct follow-up interviews based on the P2 Survey results to explore concerns regarding P2 integration and to identify areas of misperceptions or inaccurate assumptions.

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APPENDICES:

APPENDIX A: STAFF SURVEY RESULTS, BY QUESTION
APPENDIX B: LEADERSHIP SURVEY RESULTS, BY QUESTION
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APPENDIX A:

STAFF SURVEY RESULTS, BY QUESTION

P2 Staff Survey Results

January 2002

Response rate: 288 of 633 staff (45%) responded to this survey.

Q.1 In which of the following areas has the majority of your work been focused during the past three years? (choose one)

Choice	Count	Percent
Water quality--point source	48	16.8%
Water quality--nonpoint source	52	18.2%
Air quality--point source	23	8.0%
Air quality--nonpoint source	15	5.2%
Hazardous waste	16	5.6%
Site cleanup	54	18.9%
Solid waste	20	7.0%
Other	58	20.3%

Q.2 Check activities that you have worked in during the last three years (choose all that apply)

Choice	Count	Percentage Answered
Permit writing	76	26.6%
Inspections or site visits	152	53.1%
Enforcement	107	37.4%
Business or compliance assistance	90	31.5%
Training and certifications	86	30.1%
Development of performance indicators or reports	57	19.9%
Risk assessment	60	21.0%
Environmental modeling	51	17.8%
Monitoring	121	42.3%
Legislation, rules, policy, guidelines	97	33.9%
Environmental priority setting	62	21.7%
Administrative support	51	17.8%
Procurement	28	9.8%
Other	86	30.1%

Q.3 The explanation of preventive approaches below will help you answer this question and the rest of the survey.
Strictly speaking, "pollution prevention" means to reduce the quantity or toxicity of wastes or inputs at the source (source reduction). Reusing wastes and recycling are other preventive approaches. Treatment, control and disposal of wastes are not considered preventive practices. In addition to source reduction, the US EPA considers eliminating pollution through increased

efficiency in the use of raw materials, energy and water, and the protection of natural resources by conservation to be pollution prevention.

You have integrated preventive approaches into your work if you have promoted, facilitated or implemented practices including those listed below:

--increase the useable life span of a product
--change procurement and waste-generation habits for greater source reduction
--utilize by-product limes in land application
--reduce volume of solid waste going to a landfill through recycling
--avoid cross-media transfer
--select cleanup remedies that use natural systems (e.g., reclaimed/constructed wetlands) or less energy
--restore, replace or enhance habitat (e.g., Natural Resource Damages at Superfund sites)
--prevent stormwater pollutants from entering lakes, streams or groundwater using infiltration/filtration methods
--promote high-performance building design and low-impact transit, lighting or vegetation.

Have you ever worked on projects that integrated preventive principles? (choose one)

Choice	Count	Percent
No, not really	143	50.4%
Yes, but it never really got going, as far as I know	6	2.1%
Yes, but level of success is/was not clear	68	23.9%
Yes, and the preventive component was relatively successful	67	23.6%

Q.4 If you answered yes to #3, please provide a brief explanation of the preventive work.

• These comments have been sorted into theme categories in separate documents.

Q.5 What level of environmental benefit do you think could result from an increase in preventive approaches in your work areas or activities? (choose one)

Choice	Count	Percent
No real environmental improvement	14	4.9%
Fairly minor environmental improvement	48	16.8%
Moderate level of environmental improvement	82	28.7%
Substantial level of environmental improvement	80	28.0%
Don't know	38	13.3%
Not applicable (NA)	24	8.4%

Q.6 How able or unable are you to periodically provide documentation of preventive activities in your projects? (choose one)

Choice	Count	Percent
Unable to do this	49	17.1%
Somewhat able to do this	108	37.6%
Easily able to do this	33	11.5%
Don't know	58	20.2%
Not applicable (NA)	39	13.6%

Q.7 How much benefit would each of the following resources provide in helping you integrate preventive approaches into your project(s)? (Note, below, P2 refers to all preventive approaches.)

	Little	Some	Much	DK	NA
Staff assigned to help develop or implement P2 projects	19.2	36.2	17.4	15.2	12.0
P2 training and outreach	20.3	32.6	25.0	10.1	12.0
P2 Internet sites	22.3	39.4	14.2	12.0	12.0
Regulatory flexibility in return for P2 project implementation	14.9	30.1	21.0	18.1	15.9
Partnerships with non-regulatory technical, compliance or business assistance programs	16.8	33.7	22.0	13.2	14.3
Case studies highlighting environmental or economic benefits	12.3	40.9	27.9	8.0	10.9
Grants and loans or other financial assistance	13.0	27.8	32.9	14.1	12.3
Guidelines for utilization of byproducts or environmental media	15.8	33.3	19.8	16.5	14.7
Easy-to-use database for tracking P2 projects	27.6	29.8	13.1	14.5	14.9
P2 environmental outcome measures	18.5	33.1	19.3	16.7	12.4

Q.8 Please list resources not included above that may help:

• These comments have been sorted into theme categories in separate documents.

Q.9 What would you say about the level of support your supervisor, manager and director have shown for your efforts at integrating preventive approaches during the last three years? (Please respond for the supervisor, manager and director you have had the longest during that time.)

	Supportive	Neither supportive or unsupportive	Unsupportive	Don't know	NA
Supervisor	43.4%	23.3%	2.9%	10.8%	19.7%
Manager	24.1%	29.5%	6.5%	21.2%	18.7%
Director	17.6%	28.8%	6.5%	28.4%	18.7%

Q.10 Please make any additional comments you have about integrating preventive approaches into MPCA programs:

• These comments have been sorted into theme categories in separate documents.

Q.11 Additional information may be helpful once the survey results are evaluated. Please provide your name if you would be willing to participate in a follow-up interview or survey:

48 individuals volunteered

APPENDIX B:

LEADERSHIP SURVEY RESULTS, BY QUESTION

Pollution Prevention Survey of MPCA Leadership
January 2002

62 responses/100 leadership staff = 62 percent response rate

1. In which of the following areas has the majority of your work been focused during the last three years? (choose one)

	Count	Percent	
Water quality point source	7	11.3%	
Water quality--nonpoint source	12	19.4%	
Air quality—point source	1	1.6%	
Air quality--nonpoint source	1	1.6%	
Hazardous waste	3	4.8%	
Site cleanup	10	16.1%	
Solid waste	4	6.5%	
Other	21	33.9%	
Not Answered	3	4.8%	
	62		100.0%

2. Check activities that you have worked in during the last three years (choose all that apply)

	Count	Percent
Permit writing	14	22.6%
Inspections or site visits	21	33.9%
Enforcement	21	33.9%
Business or compliance assistance	17	27.4%
Training and certifications	13	21.0%
Development of performance indicators or reports	29	46.8%
Risk assessment	14	22.6%
Environmental modeling	7	11.3%
Monitoring	20	32.3%
Legislation, rules, policy, guidelines	30	48.4%
Environmental priority setting	31	50.0%
Administrative support	21	33.9%
Procurement	13	21.0%
Other	19	30.6%

3. Have you or your staff ever worked on projects that integrated preventive principles? (choose one)

	Count	Percent
No, not really	21	33.9%
Yes, but it never really got going, as far as I know	2	3.2%
Yes, but level of success is/was not clear	20	32.3%
Yes, and the preventive component was relatively successful	18	29.0%
Not Answered	1	1.6%
	62	100.0%

4. If you answered yes to #3, please provide a brief explanation of the preventive work:

- These comments have been sorted into theme categories in separate documents.

5. What level of environmental benefit do you think could result from an increase in preventive approaches in the work areas or activities you're responsible for? (choose one)

	Count	Percent
No real environmental improvement	2	3.2%
Fairly minor environmental improvement	9	14.5%
Moderate level of environmental improvement	22	35.5%
Substantial level of environmental improvement	15	24.2%
Don't know	8	12.9%
Not applicable (NA)	6	9.7%
	62	100.0%

6. How able or unable are your staff to periodically provide brief documentation of preventive activities in their projects? (choose one)

	Count	Percent
Unable to do this	4	6.5%
Somewhat able to do this	30	48.4%
Easily able to do this	10	16.1%
Don't know	7	11.3%
Not applicable (NA)	10	16.1%
Don't know	7	11.3%
	62	100.0%

7. How much benefit would each of the following resources provide in helping you or your staff integrate preventive approaches into project(s)? (Note, below, P2 refers to all preventive approaches):

	Percent				
	Little	Some	Much	Don't Know	Not applicable
Staff assigned to help develop or implement P2 projects	20.3	39.0	20.3	10.2	10.2
P2 training and outreach	21.7	53.3	11.7	5.0	8.3
P2 Internet sites	30.5	40.7	5.1	15.3	8.5
Regulatory flexibility in return for P2 project implementation	23.7	22.0	27.1	13.6	13.6
Partnerships with non-regulatory technical, compliance or business assistance programs	15.3	30.5	33.9	10.2	10.2
Case studies highlighting environmental or economic benefits	11.9	54.2	16.9	6.8	10.2
Grants or loans or other financial assistance	23.7	20.3	27.1	18.6	10.2
Guidelines for utilization of byproducts or environmental media	21.4	37.5	14.3	12.2.2	14.3
Easy-to-use database for tracking P2 projects	20.7	41.4	12.1	15.5	10.3
P2 environmental outcome measures	20.3	40.7	13.6	13.6	11.9

8. Please list resources not included above that may help:

These comments have been sorted into theme categories in separate documents.

9. Within the last three years, how supportive or unsupportive have you been of your staff's efforts at integrating preventive approaches into appropriate projects. (choose one)

	Count	Percent
Supportive	37	59.7%
Neither supportive or unsupportive	11	17.7%
Unsupportive	1	1.6%
NA	11	17.7%
Not Answered	2	3.2%
	62	100.0%

10. Please make any additional comments you have about integrating preventive approaches into MPCA programs:

These comments have been sorted into theme categories in separate documents.

11. Additional information may be helpful once the survey results are evaluated. Please provide your name if you would be willing to participate in a follow-up interview or survey:

19 volunteers responded

APPENDIX C:

P2 PROJECTS REPORTED, BY WORK AREA

Summary of P2 Projects by Work Area --- January 2002

P2 survey respondents listed the types of work in which they had integrated P2 tools. Other known, but unreported, projects are not included in this discussion.

- ***Air quality nonpoint source:*** Staff respondents have promoted, in some cases promulgated, cleaner fuel or more efficient fleet vehicles; nonabrasive blasting methods for lead paint; alternative fuels and transit; the P2 hierarchy as a framework for addressing Minnesota air quality; and implemented beneficial reuse programs involving fly ash.
- ***Air quality point source:*** Staff respondents have been involved with green procurement; CFF product substitution; inclusion of P2 into enforcement actions; assisting companies with product substitutions that result in lower toxicity wastes; beneficial reuse of waste lime by-product (avoiding cross-media transfer); permitting facilities to burn waste effectively reducing fossil fuel emissions; MnTAP referrals; training and outreach; resource recovery (burning waste for energy); and developing policy for legislative report that is based on the P2 hierarchy.
- ***Hazardous Waste:*** Staff and leadership respondents have pursued Natural Resource Damages; brownfields-to-green space and wildlife restoration; best management practices (that are presumably preventive); inclusion of P2 information into workshops, newsletters, and other outreach materials; rule writing on blasting methods to prevent release of lead to the environment; reduction of pollutant loading in wastewater; pollutant minimization plans in permits; P2 and EMS in SEPs; reclassifying waste to accommodate reuse practices; redirecting household hazardous waste and used oil filters from solid waste to recycling facilities; applied natural attenuation to cleanups; Mercury Free Zone; source reduction; recycling; reuse; P2 training for permit staff; and provided referrals to MnTAP for P2 evaluations and other technical assistance.
- ***Site Cleanup:*** Staff and leadership respondents have been involved in many different P2 projects including: Natural Resource Damages; recovering product for beneficial reuse; flood damage reduction work; beneficial reuse and recycling; reducing greenhouse gas emissions through conversion of methane to carbon dioxide; mercury reclamation; stormwater infiltration; reclaimed or constructed wetlands; stabilizing lead contaminated soil using incinerator kiln dust; avoiding cross-media transfer through in-situ treatment techniques (reagent, stabilization, natural attenuation); beneficial reuse of contaminated soil as utility and asphalt plant feedstock; groundwater treatment using restored wetland; conserving resources through more efficient ground water pumping systems and smart office management, including office recycling and composting practices; report design that reduced volume of paper used; and green procurement. feedlot remediation and compliance using freshwater diversions and vegetative buffers; shoreland vegetation; P2 evaluations; composting; natural attenuation; brownfields to green space; and wildlife habitat restoration.
- ***Solid Waste:*** Staff and leadership respondents reported projects in the solid waste work area: product stewardship initiatives; constructed wetlands to mitigate contamination from closed landfills; beneficial reuse of materials for fertilizer and energy uses; Mercury Free Zone Program; Listed Metals Program reduced amount of lead, cadmium, mercury and hexavalent chromium in products; landfill gas extraction and destruction or utilization to produce electricity; establish resource recovery center at closed landfill; beneficial reuse of food and beverage industry waste effluent; composting; recycling; SEPs; innovative stormwater management.

- ***Water quality nonpoint source:*** Staff and leadership respondents have worked on the following P2 projects: Phosphorus Strategy; guidelines for beneficial reuse of industrial solid waste and biosolids; integrating wetland systems with WWTP; using telemetry to reduce unnecessary field trips; monitoring strategies designed for prevention-oriented projects; lakescaping workshops for lake associations with DNR and Extension Service and other outreach and education projects; constructed wetlands; P-free fertilizers; stormwater P2 plans; on-site stormwater management; research on the fate of mercury as a component in soil amendments; funding or implementing water quality projects that use and measure impact of preventive BMPs; stormwater and riparian zone BMPs; nutrient management practices in urban areas; promote use of anaerobic digesters; designation of special protection areas to protect surface waters from degradation; tracking pollutant discharge reductions through LARS database, development of preventive stormwater management BMPs. This list does not distinguish between projects implemented for remedial purposes from those implemented from the outset as preventive solutions.
- ***Water quality point source:*** Staff and leadership respondents have been involved with the following P2 projects: P2-based phosphorus management plans in permits; pollution minimization plans in permits and evaluating cross-media transfer; product stewardship; recycling/reusing process wastewaters, primarily ash, at various power plants; separation and reuse of clean waters at refinery; stormwater plans as part of enforcement and technical assistance efforts; preventive BMPs; beneficial reuse of facility wastewater on cropland; extended life of individual sewage treatment systems through reduced solids moving to drainfield; Metro Model used by planners for wellhead protection and other water quality protection; regulatory burden reduction; permits that incorporate constructed wetlands; land application of biosolids and industrial by-products (reuse/recovery); and P2 and Environmental Management Systems in SEPs.
- ***Other:*** Staff or leadership respondents have worked on Environmental Management Systems (which presumably include P2) negotiated into enforcement actions and multimedia permits; green procurement and life cycle purchasing; composting; Earth Week planning; green team for Waste Conference; cleanup remedies incorporating restored/constructed wetlands; infiltration/filtration methods in stormwater management at cleanup site; natural attenuation; promoting P2 in MPCA's Environment 2000; Best Management Practices (BMPs) that reduced sediment from runoff in the Minnesota River watershed by 25%; research grants to investigate prevention methods; enforcement actions that integrate waste reduction, product substitution, energy reduction; reducing POTW phosphorus loading; natural attenuation to avoid cross-media transfer and conserve energy; groundwater cleanup through a restored wetland; native habitat restoration on landfills; recycling or reuse of pollutants screened at demolition sites; promoting beneficial reuse as an incentive to reduce waste toxicity; implementing beneficial reuse, including anaerobic digestion of manure for energy generation at feedlots; utilization of industrial byproducts; product substitution; in-situ remedies that avoid cross-media transfer; expanding audit program and ISO 14000 focus; P2 and waste reduction at salvage yards; restoration of natural habitat at cleanup sites; wetland restoration as part of an enforcement Supplemental Environmental Project; promoting BMPs to reduce nutrients and sediments entering lakes; permits with constructed wetlands and stormwater permits and pretreatment oriented P2; product substitution; increasing the usable life span of a product; Great Printers Project; recycled paper and ink in MPCA projects; tax policy changes to reward P2 investments; regulatory flexibility/streamlining incentives in MPCA programs for facilities to undertake P2 projects; replacing primarily coal-fired boilers with natural gas-fired boilers, reducing

sulfur dioxide, nitrogen oxide and mercury emissions; inclusion of P2 activity in biennial budget document; smart growth project along I-94 corridor with potential to protect water and conserve habitat by preventing development; Alliance for the Recycling and Reduction of Waste (ARROW) team at MPCA; Web-based decision tool for incorporating greener practices in site cleanup, business operations and site development; Information Technology that avoids sequential printed drafts of documents; product stewardship; Environmentally Preferable Purchasing; Life Cycle Purchasing; reusing office products; and using alternative forms of transportation; mitigating environmental impacts of Growth & Development; green meetings/conferences; guidance development for beneficial reuse.

Discussion Regarding Proper Categorization of Preventive Approaches

Some of the respondents' comments about their work activities suggest some confusion regarding the categorization as pollution prevention activities. The definition of preventive practices used for this survey and included at the beginning of the Technical Report is based on the definition used in recent federal announcements for the US EPA P2 Grant application and the Minnesota Toxic Pollution Prevention Act of 1990 and subsequent Executive Orders.

Strictly speaking, pollution prevention refers to source reduction, although the EPA also includes resource conservation. Other preventive approaches include reuse, recovery, and recycling. This definition has traditionally excluded pollution management or control methods, such as stormwater detention and spills response and preparedness, etc., from preventive approaches. Some of the prevention examples provided by the survey respondents are not strictly source reduction, but involve less rigorous preventive practices such as beneficial reuse or utilization practices, recycling and conservation using more sustainable Best Management Practices.

Some people may question whether various land use practices or Best Management Practices (BMPs) and utilization are genuinely preventive because they fall outside the strict definition of pollution prevention as source reduction. To the degree the practices reuse or recover materials that would otherwise pollute the environment, they are considered preventive practices for the purpose of this survey. Stormwater infiltration and filtration might be considered the only real preventive stormwater management BMPs because they help assimilate or recover pollutants and sediment. Artificial vegetative buffers and filter strips are control BMPs to the degree they are not intended to restore or protect native or wildlife habitat. Recovery, reuse, and utilization are preventive to the degree the process involves waste or by-products with intrinsic value, conserving virgin resources, and that do not add to the toxic load.

APPENDIX D:

GENERAL COMMENTS

Theme	Work Area	Comment
LEADERSHIP		
P2 may not apply to me or may not be an Agency priority	Other	PP is a nice lofty goal or issue in the environmental arena but right now the Agency should forget about a focus on lofty goals and instead focus on what needs to happen so that upper leadership at a minimum stops being a barrier to efficient and effective Agency core operations.
	Site Cleanup	Hard to make a connection between P2 and remediation. Cindy Hilmoe probably did as much as can be done with her work in this area.
	Site Cleanup	Let's define pollution prevention as doing stuff that prevents pollution
	Water Quality Nonpoint Source	I don't see how pollution prevention principles are relevant to either Lake and stream monitoring or effluent limit setting.
	Water Quality Nonpoint Source	Not to state the obvious but we have been involved in program triage for the past year and unfortunately some things P2 being one of them are not a core function priority.
Prevention has a place among core work when balanced with other regulatory functions and tools	Other	I was supportive of pollution prevention approaches to the extent that I was able to balance that with other demands. Those I have reported to in the past have not showed much interest or direct support for pollution prevention although they didn't select it as a program to eliminate when resource decisions were made over the last year. The level of support for pollution prevention in the agency feels passive to me. Pollution prevention outcome measures might help some--and should be used--but highlighting Agency successes with pollution prevention and building enthusiasm by keeping those successes visible would probably do more.
	Site Cleanup	This survey apparently is looking for support to continue or improve Agency P2 activities. I think P2 should be considered part of our core work BUT not valued above other core work activities (compliance permitting etc) which may be in jeopardy given recent budget projections.
Proposed activities or ways for P2 to work at the Agency	Air Quality Nonpoint Source	Air Monitoring Unit staff indirectly measure the benefits of P2 efforts in ambient air but are not directly involved.
	Other	Pollution prevention outcome measures might help some--and should be used--but highlighting Agency successes with pollution prevention and building enthusiasm by keeping those successes visible would probably do more.

	Other	Great concept. Carpe Deum!
	Solid Waste	I could go on and on about this but basically we need to look methods that help promote environmental compliance and methods that may encourage the regulated community go beyond compliance. Of course management philosophy and organizational culture of individual organizations vary. However MPCA is capable of identifying opportunities where the a person or organization is ready to go beyond state and Federal standards in order to protect the environment. We may be able to work with such organizations to make more than incremental gains in the quality of our environment.
	Water Quality Nonpoint Source	P2 pros are needed to do idea cross pollenization. They need to be a small in comparison to the program staff. Sort of comparable of yeast to dough.
	Water Quality Nonpoint Source	The NPS programs are P2. We have been successful....there may be additional things. There has been very little interest among P2 staff in working in this arena.
	Water Quality Nonpoint Source	I think that keeping "pollution prevention" a separate entity is not an effective approach - all program areas should have certain "P2" aspects incorporated into strategies for program success and the desired environmental outcome or behavior change outcome. So far Non-point had traditionally been more voluntary in nature rather than regulatory.
	Water Quality Nonpoint Source	Let's talk to some of our external customers as well. Some groups no doubt have some very efficient and creative ways to prevent pollution but we don't ask.
	Water Quality Point Source	I think that the Agency has spent a lot of time looking for "P2 beans" count. There are times when p2 activities really makes sense. However we have spent a lot of time talking about p2 when the time could have been better spent on permitting enforcement or other activities. Question number one should have had an option for multimedia responsibilities.
	Water Quality Point Source	Regulators need to be TAUGHT new skills to convince (without regulation) pollution prevention work in the private sector.
STAFF	**STAFF**	
Comments on survey	Air Quality Nonpoint Source	I think you need to specify the employee's responsibilities in this survey to understand the responses to the questions and to tabulate them.
Need management support if P2 is going to work	Air Quality Nonpoint Source	All P2 efforts would be limited by politics/industrial costs and lack of leadership at the Agency.
	Site Cleanup	I'm not sure what any manager has done the last three years except have all day meetings and retreats. I think they are too far removed from the day to day work that we do.

	Site Cleanup	Needs to also be a function of management
	Site Cleanup	We could do a lot more pollution prevention on our projects if we had the support and encouragement of ALL levels of management. Our manager discouraged pollution prevention as taking too much staff time but he never really looked into how much actual
	Solid Waste	This should be a MUCH higher priority by the MPCA. It could be a good win-win program.
	Water Quality Nonpoint Source	As the Agency adjusts itself to be more top down and program driven vs outcome driven the ability to be proactive in P2 has diminished. My supervisor has made it clear that we don't have time to do this type of work. He wants high profile projects a
	Water Quality Nonpoint Source	There has been a lot of "talk" about the importance of the nonpoint/basin management program but limited "real priority" given to the program/approach.
	Water Quality Point Source	Need assistance and support from upper Management team!
P2 may not apply to me or may not be an Agency priority	Site Cleanup	I think P2 has more of a role during waste generation; not site cleanup.
	Site Cleanup	P2 refers to both prevention and preparedness. Most(all?) of our effort is in preparedness. Your definition doesn't include it.
	Solid Waste	My position does not deal directly with pollution but with compliance support.
	Water Quality Point Source	My work has changed significantly so the question above doesn't really apply. See previous comments.
	Water Quality Point Source	I'm just a Fiscal Coordinator with no real 'up close and personal' touch to the programs.
Personal experience/example	Air Quality Nonpoint Source	The prevention work I do is outreach oriented- trying to reduce mobile source pollution through changes in behavior technologies policies and choices available.
	Water Quality Nonpoint Source	I find that as I learn more about these measures I find that I can put them to use in my own life. My work focus feedlots is one where composting and recycling is a fringe topic. But it is a very exciting fringe!
	Water Quality Point Source	the program I work in is preventative we have companies conduct investigations in order to determine if they have any ground water problems. We also have each one conduct a risk assessment for future reference in case there is a release or event that
Proposed activities or ways for P2 to work at the Agency	Air Quality Nonpoint Source	I don't view P2 as an ends in itself. To me it is something that is inherently part of what I do in trying to reach an environmental goal to when I work on projects. Bigger systems changes are needed to be truly successful. For example an economic sy

	Air Quality Nonpoint Source	The preventive approaches applicable to our programs are inherently political and require major changes in laws and philosophies. These are not likely to be occurring in the near future.
	Air Quality Point Source	Individual residences could be required to pay an escalating tax on the size of the garbage can supplied by the waste hauler. The income could be used for waste reduction purposes.
	Air Quality Point Source	Companies laugh at us when we bring it up. "Switch solvents? What world do you live in?" More case studies to prove they can save money is about the only thing that will make a company consider P2.
	Air Quality Point Source	It is not that anyone is actually against taking preventative approaches but there simply isn't time or resources to devote to those projects. It is quicker to take the traditional approach. With the current budget situation it simply comes down to
	Hazardous Waste	There should be a fraction of time set aside in work plans dedicated to prevention projects. Items such as clearing out and archiving old files actual assistance in recycling efforts and waste minimization in all permits.
	Hazardous Waste	I see no mention of the education factor in all this information. Workshops and technical assistance are valuable and productive tools where typically we get the most bang for the buck. Trouble is you can't easily measure the positive results gen
	Other	All staff members should work to integrate these concepts directly into their individual work projects. However there will still be benefit to having a team of P2 specialist that can help advocate and explain the concepts.
	Other	Turn rhetoric about integrating prevention with real program outputs make managers/supervisors responsible for their staff's specific P2 outputs and make specific resource investments in P2.
	Other	As a communications employee I more frequently see programs I promote describe or assist that could really use some P2 thinking.
	Other	I think a strong relationship with non-regulatory technical compliance or business assistance programs would
	Site Cleanup	In my experience MPCA supervisors and managers are supportive of the NA approach in general less supportive of scientific efforts to understand it and generally unsupportive of efforts to measure NA effectiveness.
	Site Cleanup	Outreach education to begin at the elementary level and for adults not once but continuous touching every single business school and home will get P2 rolling faster. There is always that unwilling 10% out there that won't do it and tho
	Site Cleanup	It's a good idea that needs follow through.
	Site Cleanup	Given that my work deals with cleanup indicates P2 is less applicable--we are dealing with the results of the lack of P2. I do see the benefit in environmentally friendly and energy conserving remedial approaches.

	Solid Waste	It requires taking risks to implement new ideas and vary from existing rules which may be in place but out of date. The people implementing such ideas must be able to understand the risks and handle the responsibility. This requires the lead people to k
	Solid Waste	We have to open our organization to the possibilities and the potential. We have to be willing to take some risk and try different approaches. We have to put aside old policy and procedure and stop doing things just because "They have always been done
	Water Quality Nonpoint Source	We need good economic summaries of specific approaches - the brain to wallet approach can be pretty effective (case-in-point the City of Bemidji's approach to wastewater and storm water treatment related to numeric in-lake goals for Lake Bemidji.)
	Water Quality Nonpoint Source	In order to do so we have to be able and willing to pass through dollars to the local level in order to better enlist their cooperation and participation. Mandates without that level of assistance have never proven to be effective and yet that remains the
	Water Quality Nonpoint Source	Ag is voluntary as we move into TMDLs in the future they are concerned about going to regulatory if we could show them win-win measures that are trackable they would not be as fearful going through the TMDL process.
	Water Quality Nonpoint Source	Let's get busy and get tough on nonpoint polluters. We recognize the "sources" we know the remedies needed. All we do is spend our time trying to get the bad actors to comply. It has not and is not working. We are spending a lot of money on staff i
	Water Quality Nonpoint Source	A fundamental thing that is needed is a change of focus from a reactive approach (i.e. do as little as possible yet still receive funding) to a proactive approach. Most programs are woefully understaffed making true environmental protection que
	Water Quality Nonpoint Source	The Basin approach to tackling point source and non-point source issues jointly is essential for developing a preventive methodology for pollution control and for providing a framework from which rational decisions can be made regarding the assignment of
	Water Quality Point Source	Funding for training of staff and facility operators is needed to promote regulate and permit land application programs. Recycling of these waste products for beneficial re-use is both efficient cost saving and can be done in an environmen
	Water Quality Point Source	Be sure any studies you do are as objective as possible not self-promotion of P2.
There are philosophical or other nonresource barriers to implementing P2	Air Quality Nonpoint Source	I think P2 is the right thing to do. I think it open to debate and has not been resolve within the PCA as to whether PCA is the right agency to do P2 or to what degree.
	Air Quality Nonpoint Source	The preventive approaches applicable to our programs are inherently political and require major changes in laws and philosophies. These are not likely to be occurring in the near future.

	Air Quality Point Source	Current AQ permitting/regulatory structure does not promote P2 (the only incentive at the smaller facility level is somewhat reduced record keeping) Once a facility is subject to a NESHAP they are not allowed to get out of it even if P2 efforts resul
	Air Quality Point Source	While I think it is very important to consider preventive approaches during policy and program development I don't think that some of our implemented regulatory programs lend themselves to encouraging preventive approaches. Attempting to do so is li
	Hazardous Waste	These is no time relegated to sep development. And there are disincentives for creating seps due to long term care and no acknowledgement of this in the Agency work plans.
	Other	We are having P2 right now but it looks like it is not a program or whatever.
	Other	We have been giving P2 lip service ever since 1989. That's all we've ever done and that's all we ever will do. Nobody gives a shit.
	Other	We need to decide what the MPCA's role in this is and should be. How much assistance should we be giving on P2? Is this not the role of other agencies and consultants?
	Site Cleanup	The agency does not seem to be designed to look at remediation of sites in terms of indirect impacts on the environment. It is like you are speaking a different language when you propose to do something other than merely dig up and rebury waste.
	Site Cleanup	My work is in site cleanup prevention efforts are conducted by other staff in a sister program. The only task that could be at all related to prevention is our policy of leaving most contamination in place and remediating it there if necessary.
	Solid Waste	Risk base approaches to environmental protection are in most cases in direct conflict with each other.
	Water Quality Nonpoint Source	I opted for the "neither supportive or unsupportive" answer because it always comes down to the cost - not necessarily the cost effectiveness
	Water Quality Nonpoint Source	MPCA seems to be resistant to imposing such measures on farmers if they add costs even if the environmental benefit may be substantial.
	Water Quality Point Source	Preventing pollution takes a lot more resources up front to make happen than we devote to it now. A shift from a reactionary regulatory agency to a preventive one will take a change in thinking and probably funding. Education of legislature is needed fo
	Water Quality Point Source	As long as pollution prevention is a separately identified program we are really not promoting pollution prevention properly.
	Water Quality Point Source	P2 is not really a stand alone type of thing. There are gradual shades of P2 not cut and dried and that tends to make it difficult and maybe unwise to designate clear-cut P2 activities. A major sign of P2 success is when we realize w

	Water Quality Point Source	a major source of water degradation is nonpoint and ag runoff. How is this controllable. Few rules or regulations to control nonpoint source runoff.
Time/Resources are barriers to implementing P2	Air Quality Point Source	It is not that anyone is actually against taking preventative approaches but there simply isn't time or resources to devote to those projects. It is quicker to take the traditional approach. With the current budget situation it simply comes down to
	Air Quality Point Source	The way the air program is set up where we have very specific guidelines and deadlines set by EPA we have very little opportunity to "dicker" with permittees about their business practices. We are encourage to "just issue the permit and move on
	Hazardous Waste	As long as the "traditional" programs insist on viewing P2 as something which takes resources away from their ability to protect the environment we will not be able to effectively integrate P2 into Agency programs. Maybe we just need to have a separa
	Other	The PCA is barely able to perform its basic program commitments. Special EPA initiatives (P2 is one of many) compete for scarce resources. EPA needs to recognize that its dwindling financial support may mean less support for its many special initiatives
	Site Cleanup	There are many opportunities to incorporate P2 but there is little support to do so in the Agency. P2 can be time consuming and require followup but I don't have the time to commit to it. I was hoping that facility inspectors would take a bigger role in
	Water Quality Nonpoint Source	we can't afford to make more work to do P2 (like adding work to fill in data bases) when we can't even devote time to tech review and decision making.
	Water Quality Nonpoint Source	Not enough staff to even respond to all complaints and follow through to a satisfactory conclusion (enforcement or compliance). Would be very difficult to increase preventative approaches
	Water Quality Point Source	In times of reducing staff resources I would hate to see resources lost chasing after something which would not be beneficial in my area.

APPENDIX E:

RESOURCE COMMENTS

Theme	Work Area	Comment
LEADERSHIP		
How can leadership help?	Other	Resources is not the problem; the problem is upper leadership that doesn't have the ability or understanding of what leadership means and what it means to set priorities and then stick to them.
P2 resource development inconsistent with Agency priorities	Other	Resources is not the problem; the problem is upper leadership that doesn't have the ability or understanding of what leadership means and what it means to set priorities and then stick to them.
Specific Resources or Needs	Water Quality Nonpoint Source	Again in non-point arena from my perspective it is the lack of resources to do the important planning education and assistance pieces. Field staff need to have more time to work with stakeholder groups (regulated nonregulated entities and partners) that can most make the desired behavior changes to make a difference.
	Water Quality Point Source	The resources [listed in survey] are only beneficial if there are adequate resources to run the core programs.
What approaches can the Agency use?	Other	Increased participation by staff especially using the compost bins instead of using the trash cans. Reuse of materials instead of buying new.
	Solid Waste	In order to be effective P2 needs to be integrated into our method of doing business. P2 people in the MPCA and OEA need to be helping staff think of P2 as they do their jobs. P2 is a method to get us beyond mere compliance.
	Water Quality Nonpoint Source	Gov't purchasing policies may also help.
	Water Quality Point Source	Statutory support
STAFF		
How can leadership help	Other	Management FTE in each Division to champion P2/Sustainability regulatory integration. Clearer Management vision with concrete results specified. (Qualifier: without some additional information like that from this survey
	Solid Waste	Managerial support legal assistance
	Water Quality Nonpoint Source	Management visible support of P2 policies
	Water Quality Point Source	Leadership needs to determine clearly what PCA's role is in P2. Also agency needs to make better use of data currently collected what is the problem (e.g. what pollution needs to be prevented most?) Then target the solution. Also th
Specific Resources or Needs	Air Quality Nonpoint Source	$ for development of outreach materials

	Hazardous Waste	Staff trained and assigned to conduct technical assistance site visits work with businesses to install innovative P2 technologies and provide documentation of the environmental and economic benefits of P2. In short we need a formal P2 Team/
	Site Cleanup	1. Guidelines that are based on scientific risk assessment and less on an enthusiastic desire to recycle or reuse. 2. I know management doesn't like to hear this but: Sufficient staff to catch non-compliance early and educate non-complier
	Site Cleanup	Information on the amount of energy consumed and emissions generated by remediation equipment such as well pumps aeration equipment transportation (trucking waste).
	Water Quality Nonpoint Source	Good marketing approaches needed!
	Water Quality Nonpoint Source	On web information inventory of P2 activities with description successes and failures
	Water Quality Nonpoint Source	staff to do the technical review and decision making for waste utilization.
	Water Quality Nonpoint Source	The assistance from Information Officers
	Water Quality Point Source	Direct funding earmarked for the permitting and regulation of land application of Industrial by-products that includes training of facility operators.
	Water Quality Point Source	Identify who are lead people in P2 that make sure that it is implemented into programs.
What approaches can the Agency use?	Air Quality Point Source	In combination a)promoting awareness b)conducting an on-site demonstration and c)pilot trial vastly improves the chance that P2 will be adopted by the company (see Timothy C. Lindsey "Key Factors for Promoting P2 Technology Adoption"
	Air Quality Point Source	Political support for waste reduction providing incentives.
	Hazardous Waste	On site coordination of collection systems for identifying and sorting recycled goods @ place of generation.
	Hazardous Waste	Staff trained and assigned to conduct technical assistance site visits work with businesses to install innovative P2 technologies and provide documentation of the environmental and economic benefits of P2. In short we need a formal P2 Team/
	Other	An overall interest within the Agency for groundwater issues.
	Other	E-mail distribution lists daily screen messages as staff log-on the system...
	Other	Public Education and Training Tribal Empowerment Environmental Justice Community Pilot Training
	Site Cleanup	"P2 environmental outcome measures" for remediation = effectiveness monitoring at NA cleanup sites.

	Site Cleanup	Having regulatory authority to actually get things done instead of begging people to do what they do not want to do. In the end many people are motivated by what effects their bottom line rather than what the effect is on the environment.
	Site Cleanup	We would like our program to be located in a more natural function of the Agency to remove it from ad hoc status.
	Site Cleanup	1. Guidelines that are based on scientific risk assessment and less on an enthusiastic desire to recycle or reuse. 2. I know management doesn't like to hear this but: Sufficient staff to catch non-compliance early and educate non-complier
	Solid Waste	I think the keys are consumer education and tough bargaining with manufacturers and distributors to be more accountable for the environmental damage brought by their products.
	Solid Waste	Managers Supervisors Engineers and other PCS staff that have an environmental ethic instead of an economic cost benefit ethic
	Water Quality Nonpoint Source	More staff and resources available at the source of the problems rather than in St. Paul and also the relinquishing of authority to local project managers that are in actual contact with the permit and/or are most familiar and involved with the issues of
	Water Quality Nonpoint Source	Most things we do are not Easy to Use!
	Water Quality Nonpoint Source	Nonpoint source enforcement to use on landowners who pollute the waters of the state. A train the staff person should be put in place. A quick form of ticket system should then be utilized by trained staff. And management should stand behind staff. Do
	Water Quality Nonpoint Source	What do we need to do to encourage composting as well as recycling in this state? Much can be done using composted materials as tools for erosion control. A double bonus: waste stream reduction and erosion control and carbon source addition to soils.
	Water Quality Point Source	a major source of water degradation is nonpoint and ag runoff. How is this controllable. Few rules or regulations to control nonpoint source runoff.
	Water Quality Point Source	Leadership needs to determine clearly what PCA's role is in P2. Also agency needs to make better use of data currently collected what is the problem (e.g. what pollution needs to be prevented most?) Then target the solution. Also th
	Water Quality Point Source	The main thing that we as a regulatory agency have to do to further pollution prevention is to provide regulatory incentives and direction to the regulated community and get rid of our barriers to pollution prevention. We have done lit
	Water Quality Point Source	The preventative measure I work with is encouraging cities to up grade their storm water controls rules.

	Other	Tax policy changes to reward P2 investments relative to control. Regulatory flexibility or streamlining incentives in MPCA programs for facilities to undertake P2 projects. Clear MPCA objectives and outputs. Performance reviewed (and rewarded or recognized

APPENDIX F:

EXPERIENCE COMMENTS

Experience Category	Experience Subcategory	Work Area	Comment
Agency publications, reporting, tracking	measurable results	Water Quality Point source	The 2 refineries have used P2 from enforcement actions to get pollutants out of the process and their effluent has demonstrated it's working to some degree
Constructed wetland treatment	non-point source mitigation	Water Quality Nonpoint Source	I have been involved with contructed wetlands to prevent nutrients from entering a lake. I have also been involved with monitoring release of mercury from fly ash applied to soils.
	non-point source mitigation	Water Quality Nonpoint Source	minimize impacts by fill drainage excavation and inundation to wetlands. Use constructed wetlands for stormwater treatment. Restore and construct wetlands for mitigation.
	permits	Water Quality Point source	Permits with constructed wetlands and stormwater permits.
	point-source mitigation	Site Cleanup	Biotreatment constructed wetland
	point-source mitigation	Site Cleanup	During a remediation a sedimentation/wetland was created to control surface water run-off from a closed landfill as well as treat leachate entering the pond.
	point-source mitigation	Solid Waste	Installed constructed wetland to prevent treated groundwater from being pumped into the Mississippi River and allowing treated groundwater to infiltrate back into aquifer on-site.
	point-source mitigation	Solid Waste	Landfill closures which reduced ground water contamination. Pump and treat system that utilized constructed wetlands for cleanup.
Deconstruction		Air Quality Point Source	Demolition program consists of making sure mercury lead PCBs CFFs get recycled/reused appropriately.
Environmentally friendly building and site design	high-performance buildings	Water Quality Point source	On the design team to integrate "green" into our new offices.
	transportation	Site Cleanup	Lafayette Park Transportation Committee Our program of promoting transportation alternatives reduces energy consumption and extends the life of existing motor vehicles.
	DfE	Other	Created an internally linked electronic report to reduce the need for sequential printed drafts. Recycled and composted extensively in my personal work space.
	DfE	Other	Design computer programs and data systems that are scalable and readily modified.

	environmentally friendly purchasing	Air Quality Nonpoint Source	Encouraged reductions in vehicle pollution by using cleaner fuels and using less fuel
	environmentally friendly purchasing	Other	A company has installed a sludge dryer for their wastewater treatment sludge that allow them to send a majority of this waste to the industrial boiler to be burned as fuel and steam from the dryer is also reused for facility heat. The dryer reduces dramatically the amount of waste that is now being sent off-site for land disposal. Also the sludge dryer significantly reduces odor problems associated with wastewater treatment sludge and produces a much more stable waste.
	environmentally friendly purchasing	Other	A company has installed a sludge dryer for their wastewater treatment sludge that allow them to send a majority of this waste to the industrial boiler to be burned as fuel and steam from the dryer is also reused for facility heat. The dryer reduces dramatically the amount of waste that is now being sent off-site for land disposal. Also the sludge dryer significantly reduces odor problems associated with wastewater treatment sludge and produces a much more stable waste.
	environmentally friendly purchasing	Other	As editor of "Minnesota Environment " we specified the highest post-consumer content possible soy ink and participation of the printer in the Great Printer program. The magazine also incorporated information previously provided in several other newsletters consolidating (and eliminating) publications and the waste involved. The magazine also promotes P2 and sustainability.
	environmentally friendly purchasing	Other	working with Great Printers using recycled papers and recycled ink in all state printed projects.
	environmentally friendly purchasing	Site Cleanup	- assured contracts contain preventive and recycling requirements. - choose superfund remedies that address the source avoid media transfer and protect natural resources from further damage. - maintenance of landfill covers prevents costly energy consuming repairs this is less successful when "priorities" take the stage because of insufficient staffing.
	environmentally friendly purchasing	Water Quality Point source	#2 Change procurement
	environmentally friendly purchasing	Water Quality Point source	1.Worked on contracts for state purchasing which reduced toxicity of cleaners purchased and used in state buildings. 2.Worked on clarifying labels of pesticides to improve proper disposal on a national level. Labels were changed. 3. General public education on hazardous waste reduction.
	labels	Water Quality Point source	1.Worked on contracts for state purchasing which reduced toxicity of cleaners purchased and used in state buildings. 2.Worked on clarifying labels of pesticides to improve proper disposal on a national level. Labels were changed. 3. General public education on hazardous waste reduction.
	Recycling/reduction program	Water Quality Nonpoint Source	Reusing file folders 3 ring binders and many other file related products. Also recycling all paper and envelopes.
	Recycling/reduction program	Water Quality Nonpoint Source	The Agency's ARROW team (Alliance for the Recycling and Reduction of Waste) works to assist staff in waste reduction and recycling in the office

	technical application	Water Quality Nonpoint Source	storm water detention pond. riparian buffers. partnering with local units of government. using telemetry to reduce unnecessary field trips. designing monitoring strategies for projects which are prevention oriented. developing in house ability to conduct specialized non-point source monitoring. Basin approach to surface water quality projects.
Innovative and more efficient strategies		Site Cleanup	- assured contracts contain preventive and recycling requirements. - choose superfund remedies that address the source avoid media transfer and protect natural resources from further damage. - maintenance of landfill covers prevents costly energy consuming repairs this is less successful when "priorities" take the stage because of insufficient staffing.
		Site Cleanup	Fewer and better thought out ground water remediation systems.
		Site Cleanup	Greenhouse gas emission reduction through conversion of methane to carbon dioxide.
		Site Cleanup	Incinerator kiln dust was used (rather than hydrated lime) as a lime reagent to stabilize lead contaminated soil. Also wetland mitigation was part of the remedy. Avoiding cross media transfer is inherent in Best Management Practices we apply during routine soil handling remedies.
		Site Cleanup	Prevention on wastes being landfilled by recycling and reuse preservation of natural resources by reusing contaminated soil rather than trucking in clean soil for construction fill and reducing amount of clean ground water pumped at remediation site
		Site Cleanup	Restored/constructed wetland implemented at Tonka Main Plant Superfund site to attenuate plume discharge into Lake Minnetonka.
		Solid Waste	Landfill gas extraction and destruction or utilization to product electricity.
		Solid Waste	Storm Water run off control; constructed wetlands; constructed native prairie vegetation on landfills; attempted to minimize cross media transfers
		Water Quality Nonpoint Source	Extend life of Individual Sewage Treatment Systems through reduce solids moving to drainfield.
		Water Quality Point source	1. Recycle/reuse of process wastewaters at various power plants primarily ash wastewaters lowered or eliminated discharge requirements. 2. Separation and reuse of "clean" waters at refinery - Koch 3. Promote anaerobic digestion
		Water Quality Point source	-Rerouting clean water to prevent contamination -Alternative uses of waste material for fertilizer or energy generation
		Site Cleanup	Assessing contaminated sites for evidence of natural attenuation/destructive processes and evaluating it as a remediation instead of "active" remedies.
		Other	Remediation and P2/Sustainable Activities:Facilitate External Stakeholder Advisory Group; Research/Construct/Market interactive website Manage MPCA P2/S website; create P2 case studies Administer PPIS grant; collaborate/plan with OEA and MnTAP staff; Etc. Etc.

		Other	Verbal and hard copy dissemination of P2 information both general and process-specific. Develop P2 strategies and policies within MPCA programs. Develop sector and program targets for P2 activities at MPCA. Promote or use energy use reduction and material recycling option internal to MPCA.
		Other	Waste reduction smart growth land conservation road and trail design Non-point water pollution product stewardship stormwater wastewater...
In-situ treatment		Site Cleanup	Feedlot Program - use of freshwater diversions and vegetative buffers. In remediation use of natural attenuation and composting.
		Site Cleanup	Natural Attenuation at petroleum tank release sites.
		Site Cleanup	Recommend selection of Natural Attenuation over standard pump and treat technology as a remediation action.
		Site Cleanup	Site cleanup via natural attenuation; restoration of natural habitat at cleanup sites; minimization of cross-media transfer at cleanup sites.
		Site Cleanup	Used enhanced natural attenuation to clean up ground water contamination instead of pump out systems. Diverted contaminated soil and waste to power plants to be used as fuel instead of burial in a landfill or incineration.
		Site Cleanup	Verify natural attenuation of a ground water chlorinated contamination plume.
		Site Cleanup	We are planning on installing a permeable reactive barrier wall as a response to VOC contamination from the landfill. We are in design as we speak.
Natural habitat replacement, restoration, and enhancement: green space development and land use practices	general point-source mitigation	Site Cleanup	brownfields to green space/wildlife restoration
	general point-source mitigation	Site Cleanup	Recycling - personal Natural Resource Damage work
	general point-source mitigation	Site Cleanup	Site cleanup via natural attenuation; restoration of natural habitat at cleanup sites; minimization of cross-media transfer at cleanup sites.
	general point-source mitigation	Solid Waste	Storm Water run off control; constructed wetlands; constructed native prairie vegetation on landfills; attempted to minimize cross media transfers
	general point-source mitigation	Solid Waste	Wetland restorations--SEP/Enforcement.
	general point-source mitigation	Water Quality Nonpoint Source	BMP implementation in watershed projects

	general point-source mitigation	Water Quality Nonpoint Source	I work on a program that funds non-point source pollution remediation and prevention. We use a variety of BMP's and public education activities to do this. We have measurable results for most of our projects
	green space development and land use practices: agricultural point-source mitigation	Site Cleanup	Feedlot Program - use of freshwater diversions and vegetative buffers. In remediation use of natural attenuation and composting.
	green space development and land use practices: agricultural point-source mitigation	Water Quality Nonpoint Source	Many of the Ag Best Management Practices use the cost savings from less passes in the field to be a income gain on the farmer's books. A win win operation. residue use wetland construction riparian restoration education materials nutrient management credit manure prior to buying commercial fertilizer...
	green space development and land use practices: agricultural point-source mitigation	Water Quality Point source	integrated preventive principles are used all the time with feedlots to bring them into compliance.
	green space development and land use practices: nonpoint source mitigation	Water Quality Nonpoint Source	Lakescaping project to restore riparian habitats. Storm water stenciling to deter pollutions from entering lakes and streams.
	green space development and land use practices: nonpoint source mitigation	Water Quality Nonpoint Source	My position centers around BMP implementation on watershed projects.
	green space development and land use practices: nonpoint source mitigation	Water Quality Nonpoint Source	Non point construct wetlands shoreland vegetation stormwater infiltration

	green space development and land use practices: nonpoint source mitigation	Water Quality Nonpoint Source	Promote nonpoint source best management practice utilization in project areas.
	green space development and land use practices: nonpoint source mitigation	Water Quality Nonpoint Source	storm water detention pond. riparian buffers. partnering with local units of government. using telemetry to reduce unnecessary field trips. designing monitoring strategies for projects which are prevention oriented. developing in house ability to conduct specialized non-point source monitoring. Basin approach to surface water quality projects.
	green space development and land use practices: nonpoint source mitigation	Water Quality Nonpoint Source	stormwater and riparian zone BMPs
	green space development and land use practices: nonpoint source mitigation	Water Quality Nonpoint Source	Stormwater prevention through use of appropriate BMP's. Participation in assuring that Watershed Management Districts incorporate Natural Resource components into all projects
	green space development and land use practices: nonpoint source mitigation	Water Quality Nonpoint Source	Worked on water quality projects whose goal is to prevent polluted runoff from entering water bodies.
	non-point source mitigation	Water Quality Nonpoint Source	Assisted within implementation of water quality BMPs and with the designation of special protection areas in order to protect surface waters from degradation. Also work on stormwater plans via enforcement and technical assistance to insure that surface waters were not unduly impacted from development.
		Water Quality Nonpoint Source	Adoption of agricultural BMP's (ie nutrient management)
Pollution prevention evaluation	compliance/assistance	Air Quality Point Source	Prompted companies to consider alternative products that contained less/no VOCs or HAPs.
	compliance/assistance	Hazardous Waste	Increase the usable life span of a product. Change waste generation habits for greater source reduction. Reduce the volume of solid waste going to a landfill through recycling.

	compliance/assistance	Hazardous Waste	P2 and waste reduction at salvage yards
	compliance/assistance	Hazardous Waste	Working with Hazardous Waste Generators to use less toxic chemicals showing other options and encouraging complete use of materials before discarding.
	compliance/assistance	Other	I do business assistance work. I try to integrate P2 assistance at all appropriate times. I work hand in hand with MnTAP. Recently a small manufacturer switched 6 paints to far less toxic formulations.
	compliance/assistance	Other	I have done some work on applying recycling reuse and reduction in a lot of areas of my environmental work. It probably was successful in some areas but I never get to know if it was an effective process.
	compliance/assistance	Water Quality Point source	Pollution prevention is routinely integrated into pretreatment work. Emphasis is placed on preventing treatment plant problems and barriers to pollution prevention are removed as much as possible. Regulated industries are then free to use pollution prevention to comply. Other resource people (e.g. MnTAP) assist industry in using this approach. As regulators our role is to provide incentive and remove barriers.
	enforcement	Hazardous Waste	enforcement actions that had seps that reduced wastes replaced chemicals reduced energy. Also enforcement actions that removed wastes from entering the stormwater soils air of the State
	enforcement	Hazardous Waste	Would always talk with hazardous waste generators about looking at their waste streams to see if there were areas that they could reduce (i.e. refer them to MNTAP)
	enforcement	Site Cleanup	When working on spills I always try to address how the incident could have been prevented either by making facility changes or educating the employees.
	enforcement	Solid Waste	SEPS to address additional pollution control measures that were not included in the violation corrective actions
	permits	Air Quality Point Source	Permit to replace primarily coal-fired boilers with natural gas-fired boilers; reduced sulfur dioxide nitrogen oxides and mercury emissions
	permits	Water Quality Point source	During the reissuance process for the St. Cloud MN WWTF NPDES permit a phosphorus management plan requirement was proposed by the permit writer (using the phosphorus decision tree) I was working with on the permit process (I am the review engineer with a very minor role in assisting with reissuance process). The city of St. Cloud have already implemented parts of the phosphorus management plan before the permit has been finalized and the resulting education process they have implemented with some of their industrial users has reduced the influent concentrations of phosphorus to the treatment facility and subsequently reduced the effluent concentrations and phosphorus mass discharged to the Mississippi River.
	personal	Site Cleanup	Recycling - personal Natural Resource Damage work
Program development and support	data investment/goals	Other	Metro Model Look at what it provides on the PCA website. It's being used by MDH for Wellhead protection by Met Council for water planning and by countless consultants working for clients interested in wise use of a precious resource.
	data investment/goals	Water Quality Nonpoint Source	I have been involved with contructed wetlands to prevent nutrients from entering a lake. I have also been involved with monitoring release of mercury from fly ash applied to soils.

	data investment/goals	Water Quality Nonpoint Source	monitoring as environmental education providing experience and information about water resources for citizen stewardship and advocacy
	data investment/goals	Water Quality Nonpoint Source	Nutrient management practices in urban areas. Soil testing as a basis for fertilizer application.
	fiscal/tax policy for P2	Other	Tax policy changes to reward P2 investments relative to control. Regulatory flexibility or streamlining incentives in MPCA programs for facilities to undertake P2 projects. Clear MPCA objectives and outputs. Performance reviewed (and rewarded or recognized
	incentives	Other	Tax policy changes to reward P2 investments relative to control. Regulatory flexibility or streamlining incentives in MPCA programs for facilities to undertake P2 projects. Clear MPCA objectives and outputs. Performance reviewed (and rewarded or recognized
	P2 in BMPs	Water Quality Point source	Developed BMP's for permitting and guidelines for land application. Also provided training that has lead to better compliance/knowledge in the area to help prevent pollution from occurring.
	P2 in environmental media recovery	Solid Waste	I have been involved on the internal workgroup developing guidance for the beneficial reuse of industrial solid waste.
	P2 in environmental media recovery	Water Quality Nonpoint Source	Developed policy and procedures for utilization of a wide range of non-hazardous industrial solid wastes promotes reuse less disposal as well as provides and incentive to reduce the toxicity of wastes (buy changing inputs to the process) to make them more attractive for reuse.
	P2 in legislation	Hazardous Waste	have entertained some federal language but decided not to use it since it had no teeth
	P2 in legislation	Other	As part of a legislatively mandated taskforce on DYI disposal of used oil filters -- a small but naggingly persistent issue of MPCA and OEA -- developed approaches looking at the possibility of promoting (in conjunction with ECOS USEPA the Association of Automobile Manufacturers etc.)manufacture and aftermarket alternate reusable filter systems (some are already in use by major manufactures)as systemic industrial ecology response to problem of DYI (Do it yourselfer) disposal of conventional cannister used oil filters into wastestream. Also explored the possibility of developing educational/informational strategies that would focus on DYIers as a specific customer group and in cooperation with Dept. of Health Env. health & OSHA determine the range of actual and potential environmental health and safety issues connected with DYI as an activity and strategies based on how and where DYIers acquire and process information on such issues. Shared interest in my doing a case study approach on this issue as an issue of limited environmental impact but a good case to explore partnering and industrial ecology alternatives to regulation. Case study idea died of benign neglect.
	P2 in legislation	Other	Worked on reducing use of mercury in products and the use of such products.

	P2 in legislation	Solid Waste	I administered the Listed Metals program whose purpose was to reduce the amount of lead cadmium mercury and hexavalent chromium in commercial products. If the rule is adopted the program will eliminate approximately 89 000 pounds of the listed metals in Minnesota each year.
	P2 in policy	Air Quality Nonpoint Source	In 2001 AQ Legislative Report we laid out a hierarchy of actions that mirrors the P2 hierarchy. Similarly in Energy Report advocate for actions that reduce all pollutants from power generation - tend to be P2 type actions.
	P2 in policy	Water Quality Nonpoint Source	It is in the developmental stages - Storm water planning
	P2 in policy	Water Quality Nonpoint Source	We have done extensive education re reducing NPS to lakes -- seeking to protect rather than restore. Our audience has typically been lake associations and local units of government. We also incorporated PP into our Phosphorus Strategy. In that work we partnered with MNTAP and this has been fairly successful.
	P2 in procurement programs	Air Quality Nonpoint Source	The group I work with helped bring low benzene gas (RFG level or below) to MN even though it is not required. We've also had some success with promoting fuel efficient vehicles alternative fuels and transit.
	P2 in regulatory outreach/education	Air Quality Nonpoint Source	encouraged non-abrasive blasting methods and use of recyclable abrasive in compliance ass't and in rule provisions for lead paint from steel structures in MN (final 1995)
	P2 in regulatory outreach/education	Air Quality Nonpoint Source	The group I work with helped bring low benzene gas (RFG level or below) to MN even though it is not required. We've also had some success with promoting fuel efficient vehicles alternative fuels and transit.
	P2 in regulatory outreach/education	Air Quality Point Source	Integrated P2 ideas into workshops guides newsletters site visits telephone contacts. Provided referrals to MnTAP if greater P2 expertise is needed.
	P2 in regulatory outreach/education	Hazardous Waste	Provided training in principles of P2 to enforcement and permit-writing staff and provided some technical assistance to staff that have been able to integrate P2 into their work activities.
	P2 in regulatory outreach/education	Other	Educational activities aimed at getting Minnesotan's to think about ways they can change their behavior to reduce the pollution they generate from lawn care practices to transportation choices
	P2 in regulatory outreach/education	Water Quality Nonpoint Source	Lakescaping project to restore riparian habitats. Storm water stenciling to deter pollutions from entering lakes and streams.

	P2 in regulatory outreach/education	Water Quality Nonpoint Source	lakescaping workshops for lake associations with DNR & extension
	P2 in regulatory outreach/education	Water Quality Nonpoint Source	Suggest in all lake reports to add stormwater ponds for runoff collection to reduce nutrients reaching lakes. Always recommend using P-free fertilizers (when fertilizers are needed)
	P2 in regulatory outreach/education	Water Quality Nonpoint Source	Worked in construction and industrial storm water programs. Inspection for compliance with permit requirements and provide technical information and education periodically.
	P2 in regulatory outreach/education	Water Quality Point source	Developed BMP's for permitting and guidelines for land application. Also provided training that has lead to better compliance/knowledge in the area to help prevent pollution from occurring.
	P2 in regulatory outreach/education	Water Quality Point source	wastewater and collection system operator training
	P2 in solid and hazardous waste management	Hazardous Waste	Worked on a product to re-classify a waste material to a useable fuel product
	regulatory redesign	Other	Tax policy changes to reward P2 investments relative to control. Regulatory flexibility or streamlining incentives in MPCA programs for facilities to undertake P2 projects. Clear MPCA objectives and outputs. Performance reviewed (and rewarded or recognized
	tracking outcomes/outputs	Other	Tax policy changes to reward P2 investments relative to control. Regulatory flexibility or streamlining incentives in MPCA programs for facilities to undertake P2 projects. Clear MPCA objectives and outputs. Performance reviewed (and rewarded or recognized
Recyclable/recovered environmental material	ag/fertilizer	Solid Waste	Utilized by-products for fertilizer. Still in practice.
	ag/fertilizer	Solid Waste	Utilizing lime from a large lime holding lagoon created through the production of acetylene gas on agricultural fields.
	ag/fertilizer	Water Quality Point source	-Rerouting clean water to prevent contamination -Alternative uses of waste material for fertilizer or energy generation
	ag/fertilizer	Water Quality Point source	The use of nutrients from wastewater on cropland.

	compost	Site Cleanup	Feedlot Program - use of freshwater diversions and vegetative buffers. In remediation use of natural attenuation and composting.
	energy	Air Quality Point Source	My involvement is merely incidental. I permit air emission facilities that burn waste. Most produce energy as a result lessening the need to burn fossil fuels. Many are required to segregate mercury from the incineration stream. Most are required to have a plan to reduce the toxics in the resulting ash. Some use ash in construction processes reducing the amount going to a landfill. One has a P2 plan to use less-polluting paints. But I have not been involved in a process whose primary purpose was to be a P2 project.
	energy	Site Cleanup	Used enhanced natural attenuation to clean up ground water contamination instead of pump out systems. Diverted contaminated soil and waste to power plants to be used as fuel instead of burial in a landfill or incineration.
	energy	Water Quality Nonpoint Source	Pushed anaerobic digestion of manure for fuel gas/heat/electricity generation at feedlots.
	energy	Water Quality Point source	A number of projects looked at internal wastewater reduction to reduce loadings of oil metals chemical conditioners etc.
	energy	Water Quality Point source	-Rerouting clean water to prevent contamination -Alternative uses of waste material for fertilizer or energy generation
	Hg reclamation	Air Quality Point Source	My involvement is merely incidental. I permit air emission facilities that burn waste. Most produce energy as a result lessening the need to burn fossil fuels. Many are required to segregate mercury from the incineration stream. Most are required to have a plan to reduce the toxics in the resulting ash. Some use ash in construction processes reducing the amount going to a landfill. One has a P2 plan to use less-polluting paints. But I have not been involved in a process whose primary purpose was to be a P2 project.
	Hg reclamation	Hazardous Waste	Mercury Free Zone Program - goal is to eliminate mercury from schools Lake Superior Initiative Site Visits - Help HW generator reduce waste generation and move out of regulatory world.
	Hg reclamation	Other	Have worked on mercury reclamation projects.
	Hg reclamation	Other	The Mercury-Free Zone Program has successfully collected and dealt with ~250 pounds of mercury-containing equipment essentially preventing ~75 pounds from entering the waste stream. And we've only just begun. The program is going statewide now.
	HHW reuse	Solid Waste	Supporting the HHW collection programs which redirects hazardous wastes from solid waste facilities to recycling reuse and other more environmentally safe management facilities.
	land application	Air Quality Point Source	Currently working on project involving the recalcification of waste lime by-product that would otherwise be landfilled.
	land application	Site Cleanup	I work with land application of industrial by-products: lime waste and food by-products.
	land application	Water Quality Point source	Up until very recently I have facilitated recycling of waste effluent (Industrial By-products)from the food and beverage industry in our state through land application. Our funding was recently cut so I'm not supposed to do this work anymore; however, there are numerous companies who want to land apply their food waste effluent and solids.

	solid waste separation/collection	Site Cleanup	Worked to have a Resource Recovery Center established at a landfill that was closing and to have sorting through refuse for recyclables.
	unknown end use	Solid Waste	I've been involved with reviewing approving and permitting the utilization of industrial solid waste materials which has resulted in reducing the amount of waste sent to landfills and the creation of useful products that often replace virgin material
	unknown end use	Water Quality Nonpoint Source	I've worked on many projects that include biosolids reuse very successfully.
	unknown end use	Water Quality Point source	beneficial re-use of dredged material so new disposal sites were not needed.
	water conservation	Water Quality Point source	1. Recycle/reuse of process wastewaters at various power plants primarily ash wastewaters lowered or eliminated discharge requirements. 2. Separation and reuse of "clean" waters at refinery - Koch 3. Promote anaerobic digestion
		Site Cleanup	Cleanup involved sorting metal(which was recycled)demo debris(mostly concrete crushed & reused onsite) GRO contaminated soil went to facility which incorporated it into new asphalt
Reduce regulatory burden	assistance	Hazardous Waste	Mercury Free Zone Program - goal is to eliminate mercury from schools Lake Superior Initiative Site Visits - Help HW generator reduce waste generation and move out of regulatory world.
	assistance	Water Quality Nonpoint Source	Self-Audit for feedlots in a particular sub-watershed. Brought feedlots into compliance without enforcement action.
	assistance	Water Quality Point source	Site Cleanup
Unlabeled		Site Cleanup	not sure
		Site Cleanup	Prevented waste from entering surface water and rehabilitated contaminated resources.
		Site Cleanup	TCAAP - There has been work performed by the Army to ensure pollution was not entering the lake. Additionally the Army Environmental Center did work to ensure local populations of biota were not affected by clean up work.
		Water Quality Nonpoint Source	basin management

		Water Quality Nonpoint Source	I work in the stormwater program and we have worked with a number of projects to ensure that stormwater ponds and infiltration devices are installed on all projects where appropriate.
		Water Quality Nonpoint Source	Work with clients in developing storm water pollution prevention plans that keep sediments from entering surface water. Majority of these projects are large construction projects.
		Water Quality Nonpoint Source	Work with local communities and state agencies such as the MDOT to develop regional storm water treatment systems. These treatment systems while effective still discharge levels of pollutants that can and do generate problems to the downstream waters and sometimes downstream parties.
		Water Quality Nonpoint Source	Working with contractors to implement stormwater treatment facilities within their projects assisting lake home owners with BMPs for reducing impacts to the lake. Review and comment on proposed lakeshore developments to reduce the impact from the proposal.
		Water Quality Point source	Industrial Storm water on-site processing and controls.
		Water Quality Point source	prevention of storm water pollutant; site inspection and development of storm water pollution prevention plans and implementation of same.
		Water Quality Point source	Selected clean-up on hazardous waste sites underground storage tanks solid waste landfills and runoff issues.
		Water Quality Point source	storm water best management practices to prevent pollutants from coming in contact with runoff