Appendix A: Metadata Worksheets

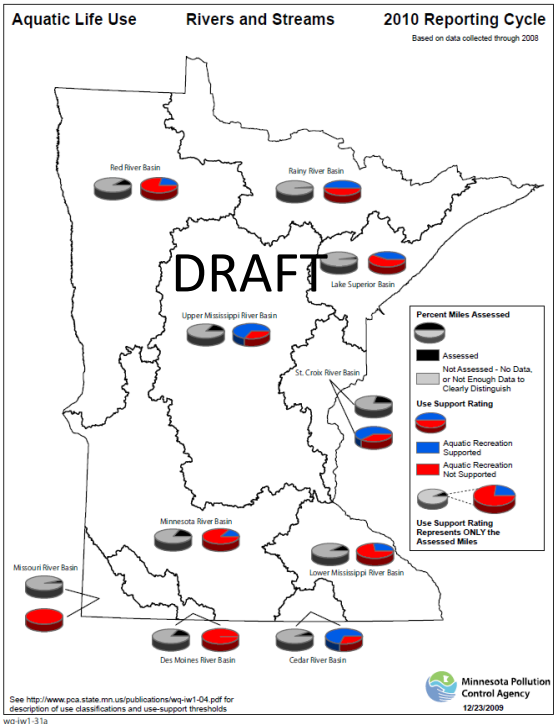
Environmental and Drinking Water Outcome Measures (EDWOM)

EDWOM 1: Statewide and watershed impairment/unimpairment rate *(early draft)*

Measure Background

Visual Depiction

We have a series of map graphics that currently provide this information by basin (see example below) … as we further transition to the watershed approach we're re-thinking how to refine the visuals by watershed and statewide.



New visuals are needed – percent impaired by watershed as intensive watershed monitoring is completed, and bar chart or pie charts showing percent impaired statewide for lakes & streams.

Measure Description

The intent of this measure is to communicate the impairment "rate" of lakes and streams, by designated use, statewide and also by watershed. While we have the ability to report data for each main category of designated use for which we have standards, the focus at least initially will be on aquatic recreation for lakes and aquatic life for rivers and streams. This measure will be presented at statewide and watershed scales.

Associated Terms and Phrases

Assessment: The process of summarizing the biological, chemical and physical data available for a lake or stream site and comparing the data against water quality standards to determine if designated uses are supported.

Designated use: The identified use for which a waterbody is managed (support of aquatic communities, recreation in or on the water, consuming the water or fish taken from the water).

Impairment: One or more designated use is not being met, as determined by a comparison to applicable water quality standards.

Impairment rate: Percentage of lakes or streams impaired for a specific designated use (statewide, or watershed-by-watershed).

Intensive watershed monitoring: A ten-year rotational cycle wherein 6-8 of Minnesota's 81 major (8-digit hydrologic unit code) watersheds are intensively monitored each year. The outlet of each major watershed is monitored monthly on a continual basis for flow and chemical parameters (termed 'load monitoring'). During intensive watershed monitoring, additional focus is placed on monitoring the outlets of subwatersheds (12 -digit hydrologic unit code) for biota (fish and invertebrates) and physical habitat, and to sample for chemical parameters ten times. One-time biological, physical and chemical sampling is also conducted at the outlet of the 14 -digit hydrologic unit code watersheds. During intensive watershed monitoring, all lakes $\geq$500 acres and at least 25% of lakes 100-499 acres are monitored for chemical parameters (there is currently no tool that allows us to assess lakes for biology).

Target

Ultimately, the target is 100% of Minnesota's waters supporting designated uses, or a 0% impairment "rate" for all designated uses.

Baseline

The baseline for both statewide and watershed scales will be 2007. Note that only two watersheds were assessed in 2007, as the intensive watershed monitoring approach was piloted that year. In 2008, we intensively monitored streams in eight watersheds. In 2009, lakes were formally brought into the intensive watershed monitoring design.

Geographical Coverage

Statewide and watershed.

Data and Methodology

Methodology for Measure Calculation

We will calculate the impairment "rate" for each designated use for which we have data by dividing the total number of resources assessed by those resources not meeting standards. For example, the impairment rate for aquatic recreation for lakes will be the total number of lakes that we assessed in a watershed divided by the number of those lakes found to be impaired for aquatic recreational use support. The statewide rate will be calculated by adding the total number of lakes assessed divided by the number of lakes statewide found to be impaired for aquatic recreational use support.

Data Source

The calculation will be made by staff using data from the assessment database (assessment decision results) maintained by the MPCA.

Data Collection Period
Monitoring data are collected annually with each major watershed intensively sampled every 10 years. The vast majority of monitoring occurs in the year we start intensively monitoring; however, there is some additional sampling in the following year. Data are assessed in winter, two years after we begin intensively monitoring a watershed (i.e., 2010 watersheds will be assessed in winter 2012-2013).

Data Collection Methodology and Frequency
Data for both statewide and watershed scales are collected through the MPCA and partners' condition monitoring efforts. Watershed assessments occur annually.

Supporting Data Set
To be included as new visuals are developed.

Caveats and Limitations
We do not randomly select the watersheds or sites/lakes that are intensively monitored, so the impairment/unimpairment rates must be characterized as representative of the body of lakes or streams sampled.

Lastly, at this point, we are not able to report an impairment rate for aquatic life use support for lakes, as we do not have standards yet to evaluate that use (indices of biotic integrity for lakes are under development).

Future Improvements
As new standards are available (for example, indices of biotic integrity for lakes), we will be able to report additional impairment/unimpairment results.

Financial Considerations

Contributing Agencies and Funding Sources
Already being tracked, so no additional cost unless there is a need to automate the reporting. This is an MPCA responsibility under the Clean Water Act (reporting on impairments and unimpairments).

Communication Strategy – to be determined

Target Audience
[who will have the most interest/concern about this measure]

Associated Messages
[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format
[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections

[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information

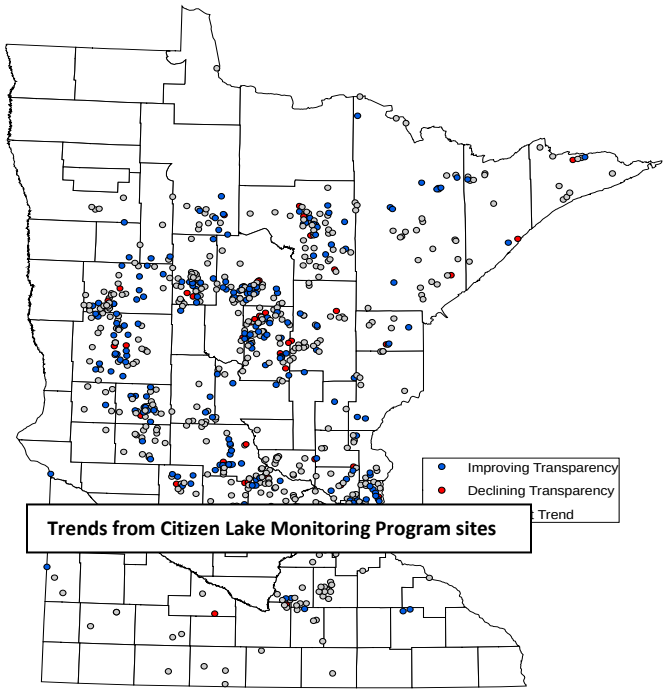
MPCA Water Monitoring Section Manager, water monitoring supervisors and assessment database coordinator

EDWOM 2: Changes over time in key water quality parameters for lakes, streams, and wetlands *(early draft)*

Measure Background

Visual Depiction

TBD



Measure Description

Changes over time in the chemical, biological or physical characteristics of a lake, stream or wetland, either within a particular watershed, statewide or by ecoregion. Provided at three scales: annually, every five years and every ten years.

Associated Terms and Phrases

Index of biological integrity (IBI): A measure of biological health based on a community assemblage such as fish, invertebrates or algae.

Intensive watershed monitoring: Progressive, nested design for intensively monitoring the biological, physical and chemical integrity of streams and the chemistry of lakes within a major (8-digit hydrologic unit code) watershed. The mouth (or outlet) of each major watershed is monitored monthly on a continual basis for flow and chemical parameters (termed 'load monitoring'). Once every ten years, the outlet of the major watershed and the outlets of its subwatersheds (12 -digit hydrologic unit code) are monitored for biological and physical habitat, and chemical parameters. One-time biological, physical and chemical monitoring is conducted at the outlet of the 14 -digit hydrologic unit code watersheds. All lakes $\geq$500 acres and some smaller lakes are monitored for chemical parameters (there is currently no tool that allows us to assess lakes for biology). There are ~80 major watersheds in Minnesota and intensive watershed monitoring follows a ten-year rotational cycle. Thus, ~6-8 new major watersheds are intensively monitored annually.

Load monitoring: Flow and chemistry monitoring conducted at the mouth (or outlet) of each major watershed. Monitoring is conducted at least monthly, and then more frequently during events (i.e., snowmelt or rain events). The objective of load monitoring is to capture the entire hydrograph, and to determine the pollutant load carried by a stream or river.

Probabilistic study: A study where sampling sites are selected randomly, so the resulting data are unbiased.

Trend: Statistically significant improvement, no change or decline in a water quality parameter (chemistry, biology as measured by an index of biotic integrity (IBI), or physical characteristics).

Target

Impaired lakes or streams: Decreasing trend for chemical parameters, increasing IBI and transparency trend.

Unimpaired lakes or streams: Decreasing or stable (no change) trend for chemistry, increasing or stable IBI and transparency.

Wetlands: No net loss of wetland quality (increasing or stable IBI)

Baseline

Baseline varies depending on the parameter and site.

Load monitoring: 2008, the year the network began operation

Citizen Monitoring Lake/Stream Program: Citizen Lake Monitoring Program - began in 1970 at the U of MN, transferred to the MPCA in 1977. Citizen Stream Monitoring Program - began in 1998.

Probabilistic studies: The EPA began funding randomized studies in 2006 for streams. The first national lake study occurred in 2007. The first wetland study will take place in 2011.

Intensive Watershed Monitoring: The baseline year is 2006. The MPCA's condition monitoring activities weren't fully aligned until 2009.

Geographical Coverage

Both statewide and watershed; statewide and ecoregion for wetlands.

Data and Methodology

Methodology for Measure Calculation

<u>Annually</u>

Load monitoring (stream outlets of major watersheds monitored by MPCA and local partners) – Annual tracking of loads.

> Key parameters: total suspended solids (TSS), total phosphorus (TP), nitrite-nitrate (NO_2+NO_3)
>
> Scale: Statewide and by watershed
>
> Method: TBD. Statewide and watershed flow-weighted mean loads will be calculated annually and plotted for comparison purposes. Annual yields will also be considered for inclusion.

Citizen Lake/Stream Monitoring Program (lakes and streams monitored by citizen volunteers) –

Key parameter: transparency

Scale: Statewide

Method: Transparency trends are calculated for each lake/stream monitored through the MPCA's Citizen Lake/Stream Monitoring Program using a seasonal Kendall test. Only sites for which a significant statistical test result (i.e., those with sufficient data for trend analysis) is obtained will be reported in this measure. Statewide maps are created from this information, and statewide summary statistics (% of sites in this network with increasing, declining or no trend in water clarity) will be manually computed.

Every five years

Flowing Waters survey (federally funded probabilistic stream study conducted by MPCA) –

Key parameters: TSS, TP, NO_2+NO_3, index of biotic integrity (fish, invertebrates), physical habitat (MN Stream Habitat Assessment)

Scale: Statewide/ecoregion

Method: TBD

National Lake Assessment (federally funded probabilistic lake study conducted by MPCA) –

Key parameters: TP, chlorophyll-a, Secchi transparency

Scale: Statewide/ecoregion

Method: TBD

National Wetlands Condition Assessment (federally funded probabilistic wetland study conducted by MPCA) –

Key parameters: plants

Scale: Statewide/ecoregion

Method: TBD.

Every ten years

Load monitoring (stream outlets of major watersheds monitored by MPCA and local partners) – Statistically-based trend analyses will be conducted every ten years, at a minimum.

Key parameters: total suspended solids (TSS), total phosphorus (TP), nitrite-nitrate (NO_2+NO_3)

Scale: Statewide and by watershed

Method: TBD. Statewide and watershed flow-weighted mean loads will be calculated annually and plotted for comparison purposes.

Intensive Watershed Monitoring (compare results of revisits to target sites (lakes ≥500 acres, outlets of subwatersheds (12-digit hydrologic unit code)) within a given watershed from visits that occurred ten years prior) –

Key parameters: TP, chlorophyll-a, Secchi transparency (lakes); TSS, TP, NO_2+NO_3, index of biotic integrity (fish, invertebrates), and physical habitat (MN Stream Habitat Assessment) for streams.

Scale: Statewide and by watershed

Method: TBD. We will monitor and assess all lakes ≥500 acres and stream sites at the outlets of subwatersheds (12-digit hydrologic unit code) within each watershed on a 10-year rotational basis. Once we have worked through the 10-year watershed cycle and are beginning a second round (2018-2027), we will be able to compare assessment results for these lakes and stream sites from the first cycle to the second. While this comparison will not provide a statistical trend, it will reveal changes in assessment status after a 10-year period of time.

Data Source

Load monitoring, citizen monitoring data, chemistry data from probabilistic studies, intensive watershed monitoring chemistry data for lakes and streams: STORET/EQuIS water quality database*

Biological data from probabilistic studies, biological and physical habitat data from intensive watershed monitoring: MPCA program databases

Wetland: MPCA program databases

Data Collection Period

Load monitoring: Load monitoring sites are sampled annually.

Citizen monitoring: Citizen Monitoring Program sites are sampled annually.

Probabilistic monitoring: Data are collected annually, with each survey conducted every five years.

Intensive watershed monitoring: Watershed lake and stream data are collected annually, with each major watershed intensively sampled for a two year period every 10 years.

Data Collection Methodology and Frequency

Load monitoring: Data are collected by MPCA staff and local partners monthly for baseline information, and during events (snowmelt and rain events) for pollutant loading. Each site is sampled between 25–35 times annually.

Citizen monitoring: Transparency data are collected through volunteer efforts. Volunteers are encouraged to collect weekly data from May-September, but actual sampling frequency is variable. Data are submitted to STORET through the MPCA each fall/winter.

Probabilistic monitoring: Survey occurs every five years on a rotating schedule (i.e., Flowing Waters survey in 2006; the National Lakes survey in 2007and again in 2012; the Wetland survey in 2011, etc.). Approximately fifty sites are selected randomly for each survey, and then sampled once during the

survey. A certain number of sites are selected for revisits for quality assurance purposes for each survey. Data are collected by MPCA staff during the May-September timeframe in the summer in which the survey occurs. For wetlands, plants are sampled from June-August.

Intensive watershed monitoring: Data are collected by MPCA staff and local partners. Each of Minnesota's 81 major watersheds will be intensively monitoring from 2008–2017, with 6-8 watersheds monitored each year. Lakes are sampled at least monthly from May-September for two years. Streams are sampled for chemistry at least twice monthly May–September for the first year, and then three times per month June–August the second year. Streams are generally sampled for fish/habitat in the May-July, and invertebrates sampled in the July–September timeframe.

Supporting Data Set

Milestone River Monitoring: We have trends through 2010 on major rivers and their tributaries through the Milestone River Monitoring network. This data will help us understand changes we've seen in rivers prior to the 2008 date that marks the start of the load monitoring network.

Remotely-sensed transparency: The MPCA and researchers from the University of Minnesota's (UMN) Remote Sensing Laboratory have partnered on a project that paired citizen-collected Secchi transparency data with Landsat satellite images (primarily Thematic Mapper and Enhanced Thematic Mapper Plus) to estimate the water clarity of Minnesota lakes. Through this project, a comprehensive water clarity database has been assembled on Minnesota lakes larger than 8 hectare (ha) in surface area at five-year intervals over the period 1970–2005 (Olmanson et al. 2008). This information provides us with inferred transparency trends that can be considered with field-measured transparency trends from CLMP and MPCA lake monitoring.

Wetland: The plant and invertebrate IBI used to assess wetland quality was developed from data collected from 300 wetlands from 1996 to 2007.

Caveats and Limitations

It may be important to distinguish between trend information that we provide that is unbiased and has been determined through statistical trend analysis vs. information that provides a comparison from year to year or from site visit to site visit, but isn't a trend in the statistical sense.

Most of the monitoring networks mentioned in this measure (load, intensive watershed, probabilistic studies) result in the collection data above and beyond the key parameters chosen to represent this measure. As programs develop, the key parameters for this measure may change to incorporate other parameters.

Future Improvements

The intensive watershed monitoring and load monitoring networks are all new and very much still in the development phase. As those monitoring activities solidify, aspects of the measure may change accordingly. At a minimum, this measure will be modified to clarify the Methodology for Measure Calculation once those methods have been developed.

Financial Considerations

Contributing Agencies and Funding Sources

Communication Strategy – to be determined

Target Audience
[who will have the most interest/concern about this measure]

Associated Messages
[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format
[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections
[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information
Load monitoring, citizen monitoring, probabilistic studies, intensive watershed monitoring: MPCA Water Monitoring Section Manager and supervisors

EDWOM 8: Number of previous impairments now meeting water-quality standards due to management actions

Measure Background

Visual Depiction

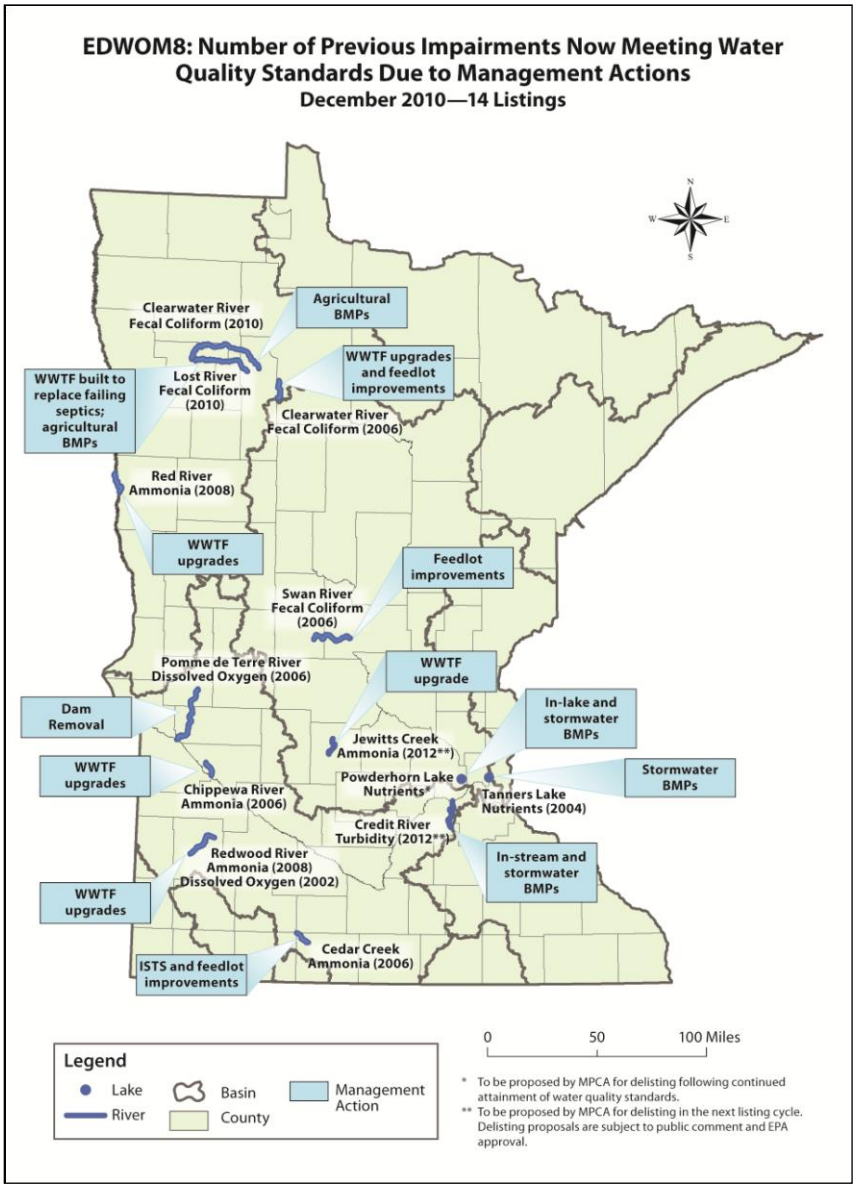
Map being developed that will show restorations and link them with management actions taken.

Measure Description

The measure will identify waters restored due to a management action (bmp installation, wastewater upgrade, etc.) taken to fix a pollution problem, rather than a delisting that's due to better monitoring data or other reasons unrelated to actual restoration activities.

Associated Terms and Phrases

- Water quality standards identify allowable concentrations (per Minnesota regulations) of specific pollutants in water, established to protect its beneficial uses such as recreation, aquatic life, drinking water, fish consumption and others.
- A lake or stream is considered impaired if monitoring data reveals that it is not meeting a water quality standard. Each state updates a list of these impaired waters is updated every two years. As of the 2010 draft list, 3,049 impairments have been identified and approximately 20% of Minnesota's waters have been assessed.



Target
Ultimately, the goal is for all impaired waters in Minnesota (just over 3,000 impairments identified thus far) to be restored. However, achieving this goal is unlikely due to lack of adequate economic resources, extremely degraded water quality in some cases, and other constraints.

Baseline
The baseline year for this measure is 2002, which is the year that the first water body was removed from the impaired waters list ("delisted") due to a management action that resulted in it again meeting water quality standards. [Another possible baseline year could be 1998, which was the date of the first impaired waters list.]

Geographical Coverage
This measure is statewide.

Data and Methodology

Methodology for Measure Calculation
The MPCA recommends "Delistings" (i.e., removal from the impaired waters list) to the U.S. EPA through the impaired waters list approval process. Delistings are determined according to the MPCA's assessment and delisting methodology.

Data Source
The data for the measure is maintained (see below) by the MPCA's Environmental Outcomes Division's Delisting Committee through its delisting review process.

Data Collection Period
1998 to present.

Data Collection Methodology and Frequency
Water qualitymonitoring data is assessed by the MPCA every two years and then documented in two places:

1. Data and decisions reached is documented in a spreadsheet maintained by the MPCA's Delisting Committee
2. Summary data listed below is also located in a spreadsheet maintained by the MPCA's regional division.

Supporting Data Set
As of 12-02-10:

Credit R. turbidity (Upper Mississippi, Twin Cities)	1	2012**	In-stream and stormwater BMPs
Jewitts Creek, ammonia (Upper Mississippi)	1	2012**	WWTF upgrade
	1	2010	WWTF built to replace failing septics; agricultural BMPs

Lost R. (Anderson L. to Hill R.) E.coli (Red)			
Clearwater R. (Ruffy Bk to Lost R) E. coli (Red River Basin)	1	2010	Erosion buffer and drainage BMPs
Powderhorn L. eutrophication (Upper Mississippi, Twin Cities) (Category 4b)	1	2010*	In-lake and stormwater BMPs
Red R. (at Moorhead) ammonia (Red River Basin)	1	2008	WWTF upgrades
Redwood R. ammonia (MN River Basin)	1	2008	WWTF upgrades
Swan R. fecal coliform (Upper Miss.)	1	2006	Feedlot improvements
Clearwater R. (trout stream portion) fecal coliform (Red River Basin)	1	2006	WWTF upgrades and feedlot improvements
Pomme de Terre R. dissolved oxygen (MN River Basin)	1	2006	Dam removal
Chippewa R. ammonia (MN River Basin)	1	2006	WWTF upgrades
Cedar Cr. Ammonia (MN River Basin)	1	2006	ISTS and feedlot improvements
Tanners Lake eutrophication (Upper Miss. Basin)	1	2004	Stormwater BMPs
Redwood R. dissolved oxygen (MN River Basin)	1	2002	WWTF upgrades
TOTAL	**14**		

* To be proposed by MPCA for delisting following continued attainment of water quality standards

** To be proposed by MPCA for delisting in the next listing cycle.

Delisting proposals are subject to public comment and EPA approval.

Caveats and Limitations

Implementation actions may be funded from a variety of state, local or federal sources so it is difficult to attribute a restoration to a single funding source such as the Clean Water Fund.

Future Improvements

No future improvements are anticipated at this time.

Financial Considerations

Contributing Agencies and Funding Sources

There are no additional financial burdens beyond existing activities related to the tracking of this measure.

Communication Strategy

Target Audience

All audiences

Associated Messages

This measure is important to convey because it is the achievement of one of our most important environmental goals – the restoration of impaired waters due to implementation activities often led by local government and supported by local, state and federal funding.

Outreach Format

This measure will be included on the MPCA web page and linked to other state sites.

Other Measure Connections

Depending on the cause of the impairment and the activities required for restoration, other measure connections will vary widely. In general, measures related to monitoring, funding and point/nonpoint source implementation activities will be most relevant.

Measure Points of Contact

Agency Information

Jeff Risberg, Minnesota Pollution Control Agency
(651) 757-2670
Jeff.risberg@state.mn.us

EDWOM 9: Number of best management practices (BMPs) implemented with Clean Water funding and estimated pollutant load reductions

Measure Background

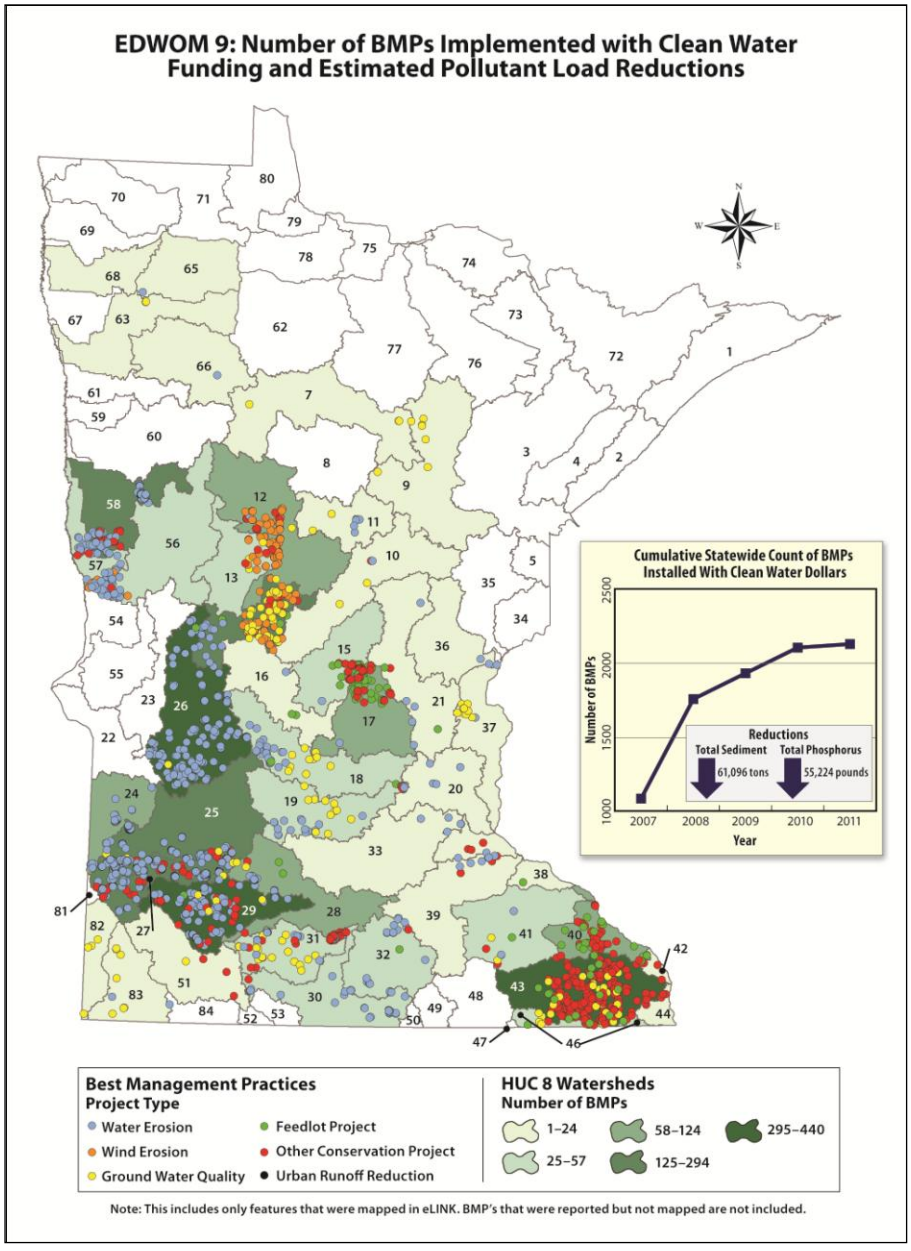
Visual Depiction

Graphics should depict number of BMPs statewide annually and then cumulative for all years

Measure Description

This measure communicates the number of BMPs implemented with Clean Water funds and the estimated associated reduction in sediment and phosphorus reaching surface waters. It does not reflect BMPs implemented with State general fund dollars or federal farm bill dollars.

It is an indirect or surrogate measure of environmental response. It does not provide information on watershed health, but does provide information on efforts to reduce pollutant loads over time that are likely to improve watershed health.



Associated Terms and Phrases

To better understand this measure, it is necessary to understand the following terms and phrases: know what projects are tracked under each category. Definitions used in this measure are as follows:

BMPs: Conservation practices that improve or protect water quality in agricultural, forested, and urban areas. See separate list of practices included in the BMP counts in this dataset.

Clean Water Funding: For this measure, the term Clean Water Funding refers specifically to Clean Water Grants distributed to local governments for BMP implementation through special Clean Water Fund appropriations to various State grant and loan programs, including one-time (FY 2007–2009) Clean Water Legacy Act appropriations and ongoing Clean Water Fund appropriations starting in FY10. A list of CWF grant and loans programs can be found at http://www.cdf.leg.mn/.

Phosphorus: Total Phosphorus. In this measure, we report the estimated reduction in the amount of phosphorus reaching surface waters as a result of runoff or soil erosion (sheet, rill, gully erosion, or steam channel).

Sediment Loss: The estimated amount of sediment reaching the nearest surface water body as a result of soil erosion from water (sheet, rill, gully erosion, or stream channel).

Target
There is no specific numeric target for this measure to date.

Baseline
FY 2007 serves as the baseline for this measure.

Geographical Coverage
Statewide and by watershed

Data and Methodology

Methodology for Measure Calculation
The Clean Water Fund Grants comprise funding from multiple state grant and loan programs. To calculate this measure, state agencies first collect data on the number of BMPs implemented with Clean Water Funds by each program and then sum these figures to provide a single count for each watershed and for the state.

Pollutant estimates are entered into eLINK by grant recipients when entering BMP data. The State of Minnesota does not require a specific methodology for developing pollutant load estimates. Pollutant load reductions using existing models developed for estimating pollutant load are acceptable. The Minnesota Board of Water and Soil Resources (BWSR) provides pollutant estimators for eLINK based on soil erosion (sheet, rill, gully and stream channel). Sediment reduction estimates in eLINK are based on the distance to the nearest surface waters and soil loss calculations using USDA's Revised Universal Soil Loss Equation (RUSLE2). Phosphorus reduction estimates are derived from sediment reduction estimates. Detailed information on the calculations used in eLINK for estimating pollutant load reductions is available at ftp://ftp.bwsr.state.mn.us/elink/Manual2006/19PolRedCalc.pdf.

The table below shows the source of the BMP data for each of the Competitive Clean Water Grants component programs.

Data Source

Clean Water Fund Grant programs	Responsible Agency	Funding availability by fiscal year*	Database
Conservation Cost-Share	BWSR	07, 08, 09	eLINK
Lake and River Management Grants	BWSR	07, 08	eLINK
Competitive CWF Grants	BWSR	10,11	eLINK
Ag BMP Loans	MDA	07, 08, 09	AgBMP Loan Program database
Forest Stewardship Grants	DNR	07	[ask DNR]
other			

* for the Data Collection Period stated below
Source: www.bwsr.state.mn.us/CWL/CWL-Background.pdf

For programs administered by BWSR, local grant recipients are required to enter BMP data in eLINK, BWSR's web-based reporting and tracking tool. More information on eLINK is available at www.bwsr.state.mn.us/outreach/eLINK/manual/index.html.

Data Collection Period

FY2007 through FY2011. As explained below in Caveats and Limitations, there is a lag time between grants being awarded and BMPs being fully implemented and recorded. The dataset will be complete once all of the BMPs funded with FY2007–2011 are fully implemented and recorded. Until then, the dataset for this measure only provides a snapshot in time.

Data Collection Methodology and Frequency

Data on the number of and type of BMPs implemented with Clean Water Funds are extracted from various databases established by state agencies to track Clean Water Grants programs (see Data Source above). The data collection methods and frequency vary by program. The programs and respective databases existed well before Clean Water Funds became available and therefore were not designed specifically with Clean Water Fund tracking in mind.

For data that is entered in eLINK, BWSR staff extracts the data simply by querying eLINK for BMPs implemented with Clean Water Fund dollars. Local grant recipients enter BMP information into eLINK every six months, recording only those BMPs that are fully implemented at that time. BMP data is analyzed by the fiscal year the grant was awarded rather than the calendar year the BMP was installed.

Supporting Data Set

Below are data sets from each of the state agencies participating in data collection for this measure (see Data Source above).

Clean Water funded BMPs recorded in BWSR's eLINK

Watershed	Number of BMPs						Estimated Pollutant Load Reductions	
	FY 07	FY08	FY09	FY10	FY11	Total	Sediment (T/yr)	Phosphorus (lbs/yr)
Statewide	1083	671	174	173	24	2125	61,096	55,224
Buffalo	47	70				117	8473	10012
Cannon	11					11	287	406
Snake	4		4			4	721	614
Sauk	1		3			4	2	229

Clean Water funded loans recorded in MDA's AgBMP Loan Program database

Watershed	Number of loans				Estimated Pollutant Load Reductions	
	FY07	FY08	FY09	Total	Sediment(T/yr)	Phosphorus (lbs/yr)
Statewide	24	77	52	153		
Buffalo	0	0	0	0		
Cannon	0	3	0	3		
Snake	0	0	0	0		
Sauk	1	5	0	6		

Caveats and Limitations

- This measure only tracks BMPs implemented with funding from Clean Water Fund Grants.
- Clean Water Fund Grants are for two years, resulting in a lag time between when funds are awarded and when BMPs are fully implemented and recorded in eLINK. This measure reports only BMPs that are fully implemented; it does not report on those that are planned or in progress.
- Pollution reductions entered into eLINK are calculated at the field scale, not the watershed scale.
- BMPs vs. Projects: The AgBMP Loan Program database does not record BMPs implemented per se, but rather loan projects completed. Most loan projects involve a single BMP or cluster of related BMPs. For example, a loan might finance an entire feedlot runoff control system or just one component. (The same is true for most other conservation financial assistance programs.) A BMP crosswalk is being developed to facilitate multi-program tracking.
- Potential Double-Counting of BMPs: An individual BMP may be co-funded by several Clean Water Fund implementation programs. For example, a gully/grade stabilization structure might be funded 75% through a BWSR grant and 25% by an AgBMP loan – with both programs counting the same structure in their respective databases. In another example, a BWSR grant might provide financial incentives for a farmer to switch to no-till, while an AgBMP loan finances the farmers' purchase of a no-till drill – again, both programs might record the same structure. Until a method is developed to identify such projects and coordinate the way they are recorded, it is necessary to report eLINK-entered data and AgBMP Loan data as separate figures or, if totaled, it should be noted that data might overlap and result in double-counted BMPs.
- Incomplete Data on Pollutant Load Reductions: Currently, pollutant load reductions can be calculated only for BMPs recorded in eLINK. As noted under Data Source above, not all Clean Water funded BMPs are recorded in eLINK at this time; some are recorded only in other program-specific databases.

In Future Improvements below, we describe efforts to address to these limitations. *[to be added]*

Future Improvements

Improvements to this measure will be made over time. The type of pollutant reductions estimated in eLINK will expand in the short-term; therefore, this measure will track additional estimated pollutant load reductions associated with BMPs implemented with Clean Water funding.

Ideally this measure will be able to compare estimated pollutant load reductions in a particular watershed with pollutant load reduction targets established through TMDLs and other plans. However, accurate comparisons would require tracking all BMPs in a watershed, not just those implemented using Clean Water funding, as well as point source pollutant load reductions.

Eventually the tracking of BMPs in this measure may be replaced by measures of targeted implementation (see Other Measure Connections below).

Financial Considerations

Contributing Agencies and Funding Sources

This measure only tracks BMPs funded with Clean Water funding, although eLINK tracks a larger universe of BMPs funded through a wide array of funding sources.

Communication Strategy

Target Audience

Stakeholders with interest in this measure include the State legislature, the Clean Water Council, and state agency partners.

Associated Messages

This primary message associated with this measure is to demonstrate the amount of implementation occurring as a result of available funds. In addition, this measure provides information on expected pollutant load reductions associated with implementation. Therefore, a secondary message is that pollutant load reductions in the short-term will help to create water quality improvements in the long-term.

Outreach Format

[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections

This measure doesn't explicitly link to other measures, but will help to provide an understanding of trends in key water quality and quantity parameters for lakes, streams, and groundwater under the Environmental Measures category.

[explain relationship of this measure to targeting measures] Percent of Targeted Areas Addressed with Clean Water Funded BMPs, and Percent of Funds Spent (or BMPs Implemented) in Targeted Areas.

Measure Points of Contact

Agency Information

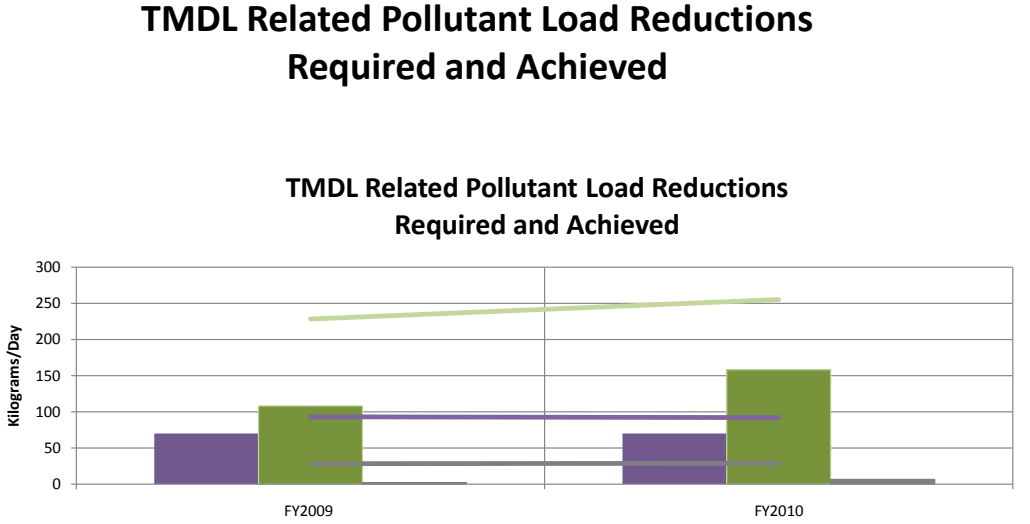
Conor Donnelly, Board of Water and Soil Resources
Dwight Wilcox, Minnesota Department of Agriculture

EDWOM 10: Amount of municipal wastewater pollution reductions achieved to meet Total Maximum Daily Load (TMDL) requirements *(early draft)*

Measure Background

Visual Depiction

This graph compares TMDL derived load reduction requirements (bars) for municipal and industrial wastewater dischargers to pollutant load reductions achieved (lines).



	Reduction Required			Reduction Acieved		
	Ammonia Reduction Required	Phosphorus Reduction Required	Mercury Reduction Required	Ammonia Reduction Acieved	Phosphorus Reduction Acieved	Mercury Reduction Acieved
FY2009	70	108	2.26	93	228	28
FY2010	70	158	6.25	92	255	29

Measure Description

This measure will report on municipal and industrial wastewater pollutant load reduction trends for FY 2009 and FY 2010. Pollutants of concern include ammonia, total phosphorus, and total mercury.

Associated Terms and Phrases

- Pollutant load reduction trends are measured for individual pollutants and watershed specific baselines:

1. Ammonia reductions required and achieved are related to the Chippewa River Unionized Ammonia TMDL (2004) and the Montevideo WWTP. The facility was upgraded and the river is no longer impaired. The reduction displayed in the supporting data set is a constant value because this is the only completed Ammonia TMDL. The required reductions are being achieved.
2. Phosphorus reductions required and achieved are related to implementation of the Lower Minnesota River Dissolved Oxygen (DO) TMDL and the West Fork Des Moines River (Heron Lake watershed) TMDL.
3. Mercury reductions are related to the Statewide Mercury TMDL.

- NPDES is the acronym for the National Discharge Elimination System. As authorized by the Clean Water Act, the NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. In most cases, the NPDES permit program is administered by authorized states.

Target

Not applicable – target will vary according to each TMDL.

Baseline

1. Ammonia baseline year = 2004
2. Phosphorus baseline years:
    a. Lower Minnesota River DO TMDL = 2000
    b. Heron Lake = 2009
3. Mercury baseline year = 2008

Geographical Coverage

1. Ammonia: Chippewa River watershed
2. Phosphorus:
    a. Minnesota River Basin
    b. Heron Lake watershed
3. Mercury: Statewide

Data and Methodology

Methodology for Measure Calculation

1. Ammonia reductions required and achieved are related to the Chippewa River Unionized Ammonia TMLD (2004) and the Montevideo WWTP. Baseline pollutant load assumes Montevideo WWTP NH_3-N effluent concentration prior to upgrade was 10 mg/L at nondegradation design flow of 2.47 mgd = 93.5 kg/day. The summer permit limit is 23.3 kg/day so reduction requirement is ~70 kg/day.

FY2009 reduction achieved ,93 kg, is calculated based on 2008 summer average load of 0.62 kg/day. FY2010 reduction achieved (92 kg) is calculated based on 2009 summer average load of 1.09 Kg/day.

2. Phosphorus reductions required and achieved are related to the Lower Minnesota River Watershed Dissolved Oxygen TMDL (2004) and the West Fork Des Moines River Watershed TMDL (Heron Lake).

   a. Minnesota River phosphorus reductions are being achieved in accordance with the requirements of the Minnesota River General Phosphorus permit. Trades between point source dischargers are counted as permit actions. Loads are measured for the critical season (May - September) as designated by the permit. Baseline load (2000) = 590 kg/day. 2008 aggregate permit limit = 482 kg/day. 2008 aggregate TP load achieved = 362 kg/day. 2009 aggregate permit limit = 435 kg/day. 2009 aggregate TP load achieved = 313 kg/day.
   b. Heron Lake reductions are based on the Okabena, Brewster and Lakefield WWTP permits which included 1 mg/L total phosphorus effluent limits when they were reissued in FY2010. A general watershed permit being developed to fully implement the point source portion of the TMDL will require additional reductions from these dischargers. The baseline load is calculated from the average effluent TP concentration in 2009 and the average wet weather design flow for the continuously discharging WWTP(Lakefield) or the volume of a 6"/day discharge for the two controlled discharge WWTPs (Brewster and Okabena). Baseline = 13.58 kg/day. 2009 aggregate load achieved = 6.62 kg/day. 2010 aggregate permit limit = 10.68 kg/day.

3. Mercury reductions required and achieved are related to the Statewide Mercury TMDL (2007). The baseline Mercury load (33.47 kg) was calculated as the average FY2008 Hg limits (concentration) and the effluent flow volumes discharged by the NPDES dischargers with Hg effluent limits. FY2009 and FY2010 reductions required are calculated by subtracting the applicable cumulative Hg loading limits (calculated with the same method as for baseline load) from the FY2008 baseline. FY2009 and FY2010 reductions achieved are calculated by subtracting the cumulative reported mercury load from NPDES dischargers with Hg limits from the FY2008 baseline.

Data Source

1. MPCA WQ DELTA permits database.
2. WLA tracking spreadsheet S:\Graziani_Marco.MG\TMDL\ WLA Tracking.xls

Data Collection Period

FY2009 & FY2010

Data Collection Methodology and Frequency

Data collection methodology involves reviewing applicable TMDL related wasteload allocations for relevant pollutants of concern and calculating appropriate aggregate municipal and industrial wastewater baseline loads and pollutant load reduction requirements specific to each TMDL watershed. Aggregate pollutant loads for the dischargers in each watershed can then be calculated from discharge monitoring report data and compared to baselines and reduction requirements.

Supporting Data Set

	Reduction Required			Reduction Acieved		
	Ammonia Reduction Required	Phosphorus Reduction Required	Mercury Reduction Required	Ammonia Reduction Acieved	Phosphorus Reduction Acieved	Mercury Reduction Acieved
FY2009	70	108	2.26	93	228	28
FY2010	70	158	6.25	92	255	29

Caveats and Limitations

TMDL pollutant load baselines, reduction requirements and reductions achieved have only been calculated for pollutants of concern relevant to the municipal and industrial wastewater sector. State effluent limits for pollutants such as TSS, fecal coliform and pH are established at levels that are protective of water quality and ensure that discharges do not cause or contribute to excursions above the applicable water quality criteria. Measures of municipal and industrial wastewater loads for these pollutants are therefore not considered relevant in an impaired waters analysis.

Pollutant load reduction requirements are measured only for permits that include effluent limits for the pollutant of concern. Permits that have not yet been modified to incorporate TMDL based pollutant load reduction requirements are excluded from these calculations.

Future Improvements

None identified.

Financial Considerations

Contributing Agencies and Funding Sources

**This might also be interpreted as the amount of resources necessary to sustain tracking of this measure, per April 13, 2010 team discussion.

Communication Strategy – to be determined

Target Audience

[who will have the most interest/concern about this measure]

Associated Messages

[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format

[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections

[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

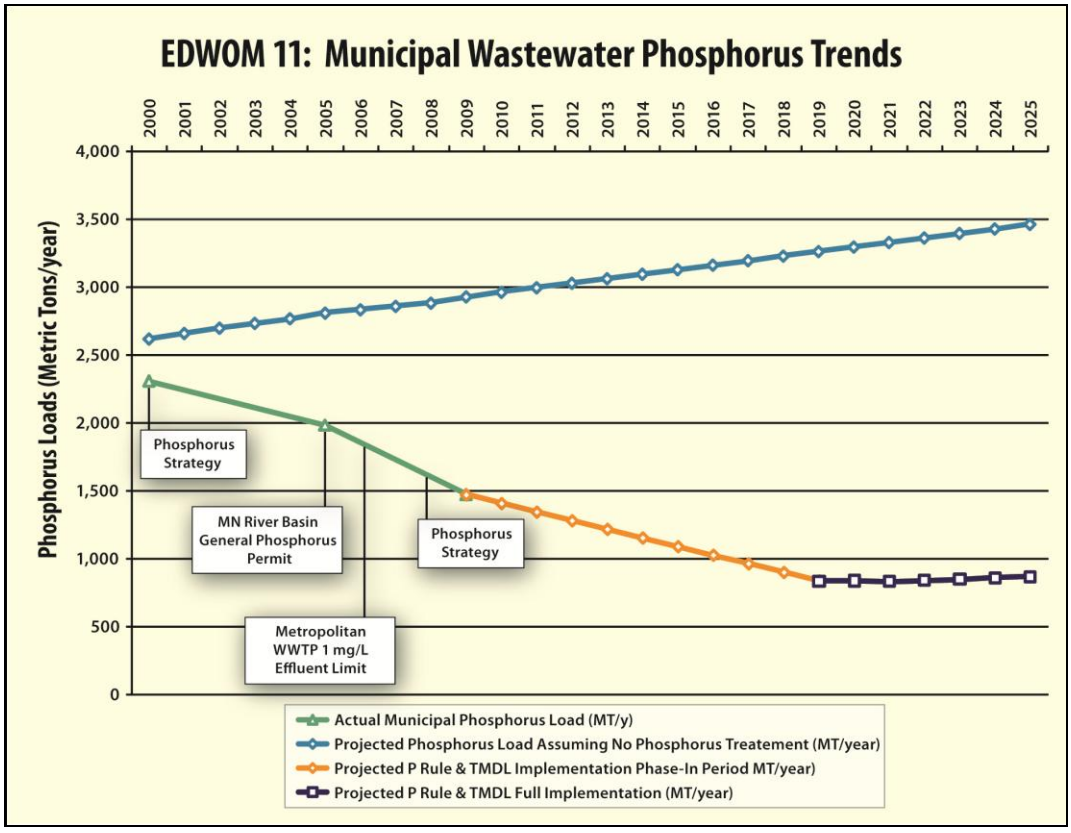
Marco Graziani, Minnesota Pollution Control Agency, Marco.Graziani@state.mn.us

EDWOM 11: Municipal wastewater phosphorus trends

Measure Background

Visual Depiction

This graph represents estimated statewide municipal wastewater treatment facility phosphorus reductions since the year 2000, projects future reductions based on the implementation of current permitting policies and contrasts them to anticipated increases in phosphorus loading that would have resulted from the perpetuation of previous permitting policies.



Measure Description

Statewide municipal wastewater treatment facility phosphorus trends and projections assume a 1% per year population growth rate:

- The **red line** assumes pre-2000 business as usual with effluent phosphorus concentrations of 4 mg/L.
- The **yellow line** represents DMR data reported for 2000, 2005 and 2009.
- The **blue line** (Projected P Rule & TMDL Implementation Phase-In Period) simply joins the actual to the projected loads assuming a 10-year period.
- The **green line** represents full implementation of the P rule and continued phosphorus concentration declines from small municipal WWTPs.

Actual wastewater loads based on discharge monitoring report data. Projected P Rule & TMDL Implementation Phase-In Period assumes a 10-year period to achieve full implementation. TMDL requirements and operational margins of safety will likely reduce future phosphorus loads beyond projected values.

Associated Terms and Phrases

- The Phosphorus Strategy was a permitting approach adopted by the MPCA in 2000. It established policies to assign 1 mg/L effluent phosphorus permit limits for municipal wastewater treatment facilities that had the potential to discharge annual phosphorus loads in excess of 1,800 lbs/year to specific watersheds and waterbodies. Municipal wastewater treatment facilities that were not assigned effluent phosphorus limits were required to monitor influent and effluent phosphorus and develop phosphorus management plans.

- The Minnesota River Basin General Phosphorus permit was issued in 2005 to implement the wasteload allocations established by the Lower Minnesota River Dissolved Oxygen TMDL. It established baseline load and pollutant load reduction requirements for the 39 largest continuously discharging municipal and industrial wastewater dischargers in the 8 major watersheds of the Minnesota River basin.

- The Metropolitan WWTP is the largest wastewater treatment facility in Minnesota with an average annual design flow or 251 mgd.

- The "phosphorus rule" refers to Minnesota Rules Chapter 7053.0255. It codifies the phosphorus strategy but extends its requirements to all Minnesota watersheds.

Target

No target has been determined at this time.

Baseline

Baseline year: 2000

Baseline load: 2,305 MT/y

Geographical Coverage

Statewide

Data and Methodology

Methodology for Measure Calculation

The projections are based on a **1 % per year population** growth estimate.

All municipal ("city") populations are used to calculate municipal flow. All rural ("township") populations are assumed to be outside municipal service boundaries.

92% of the flow and load are assumed to be from cities with populations ≥ 2000.

Loads from municipalities with populations ≥ 2000 are estimated based on flow projections and a 1 mg/L concentration. Loads from municipalities with populations < 2000 are estimated based on flow projections and effluent concentrations that decline gradually based on the reductions shown in the 2000 to 2009 effluent data. They bottom out at 1 mg/L around 2020.

TMDLs and operational margins of safety push actual future loads below the projections.

About the graph:

The **red line** assumes pre-2000 business as usual with effluent phosphorus concentrations of 4 mg/L

The **yellow line** represents DMR data reported for 2000, 2005 and 2009.

The **blue line** (Projected P Rule & TMDL Implementation Phase-In Period) simply joins the actual to the projected loads assuming a 10-year period.

The **green line** represents full implementation of the P rule and continued phosphorus concentration declines from small municipal WWTPs.

Actual wastewater loads based on discharge monitoring report data.

Projected P Rule & TMDL Implementation Phase-In Period assumes a 10-year period to achieve full implementation.

The year 2000 discrepancy between “Actual Municipal Phosphorus Load” and “Projected Phosphorus Load Assuming Non Phosphorus Treatment” reflects pre-2000 implementation of phosphorus effluent limits.

Data Source

WQ Delta database discharge monitoring report data and State demographic center population estimates.

Data Collection Period

2000, 2005, 2009

Data Collection Methodology and Frequency

Supporting Data Set

	Domestic						
	Flow (MG/y)	Conc. (mg/L)	TP Load (MT/y)	Project TP Load @ 2000 Conc (MT/y)	No of Permits		No. of Permits with P Limits
2000	178,106	3.42	2,305	2,305	511		80
2005	210,756	2.49	1,985	2,727	552		100
2009	160,932	2.41	1,471	2,082	573		119

Year	City Population	City > 2000 Population	City > 2000 Pop as % of Tot. City Pop	City < 2000 Pop as % of Tot. City Pop	Actual Municipal Wastewater Flow (MG/y)	Actual Municipal Phosphorus Load (MT/y)	Projected Average Municipal Wastewater Flow (MG/y)	Projected Phosphorus Load Assuming No Phosphorus Treatement (MT/year)	City > 2000 Projected P Rule Implementation Load (MT/year)	City < 2000 Projected P Load (MT/year)	Projected P Rule & TMDL Implementation Phase-In Period MT/year)	Projected P Rule & TMDL Full Implementation (MT/year)
2000	4,257,328	3,900,753	92%	8%	178,106	2,305	172,848	2,617	599	187		
2001	4,324,100	3,964,161	92%	8%			175,558	2,658	609	183		
2002	4,387,230	4,022,758	92%	8%			178,122	2,697	618	175		
2003	4,444,786	4,077,722	92%	8%			180,458	2,732	627	174		
2004	4,500,777	4,129,621	92%	8%			182,732	2,767	635	169		
2005	4,567,652	4,191,489	92%	8%	210,756	1,985	185,447	2,808	644	165		
2006	4,607,356	4,220,005	92%	8%			187,059	2,832	648	164		
2007	4,648,222	4,259,669	92%	8%			188,718	2,857	655	157		
2008	4,686,816	4,294,835	92%	8%			190,285	2,881	660	152		
2009	4,762,705	4,365,483	92%	8%	160,932	1,471	193,366	2,928	671	147	1,471	
2010	4,816,929	4,415,002	92%	8%			195,567	2,961	678	142	1,407	
2011	4,871,153	4,464,520	92%	8%			197,769	2,994	686	137	1,344	
2012	4,925,377	4,514,039	92%	8%			199,970	3,028	694	131	1,280	
2013	4,979,601	4,563,557	92%	8%			202,172	3,061	701	125	1,216	
2014	5,033,825	4,613,076	92%	8%			204,373	3,094	709	120	1,153	
2015	5,088,048	4,662,594	92%	8%			206,575	3,128	717	114	1,089	
2016	5,142,272	4,712,113	92%	8%			208,776	3,161	724	107	1,026	
2017	5,196,496	4,761,631	92%	8%			210,978	3,194	732	101	962	
2018	5,250,720	4,811,150	92%	8%			213,179	3,228	739	95	898	
2019	5,304,944	4,860,669	92%	8%			215,381	3,261	747	88	835	835
2020	5,359,168	4,910,187	92%	8%			217,582	3,294	755	81		836
2021	5,413,392	4,959,706	92%	8%			219,784	3,328	762	70		832
2022	5,467,616	5,009,224	92%	8%			221,985	3,361	770	70		840
2023	5,521,840	5,058,743	92%	8%			224,187	3,394	777	71		849
2024	5,576,064	5,108,261	92%	8%			226,388	3,428	785	72		857
2025	5,630,288	5,157,780	92%	8%			228,590	3,461	793	73		865

Caveats and Limitations

The projections are based on a **1 % per year population** growth estimate.

All municipal ("city") populations are used to calculate municipal flow. All rural ("township") populations are assumed to be outside municipal service boundaries.

92% of the flow and load are assumed to be from cities with populations ≥ 2000.

Loads from municipalities with populations ≥ 2000 are estimated based on flow projections and a 1 mg/L concentration. Loads from municipalities with populations < 2000 are estimated based on flow projections and effluent concentrations that decline gradually based on the reductions shown in the 2000 to 2009 effluent data. They bottom out at 1 mg/L around 2020.

TMDLs and operational margins of safety push actual future loads below the projections.

Projected P Rule & TMDL Implementation Phase-In Period assumes a 10-year period to achieve full implementation.

The year 2000 discrepancy between "Actual Municipal Phosphorus Load" and "Projected Phosphorus Load Assuming Non Phosphorus Treatment" reflects pre-2000 implementation of phosphorus effluent limits.

Future Improvements

Increased frequency of phosphorus monitoring in industrial permits should allow for future estimates and projections to include industrial wastewater loads.

Financial Considerations

Contributing Agencies and Funding Sources

Not applicable.

Communication Strategy

Target Audience

The primary audience would be regulated municipalities and permitting authorities. However, this measure is of interest to anyone interested in the effectiveness of wastewater programs.

Associated Messages

This measure is important to communicate to a variety of audiences to help understand the long term trends in wastewater control measure effectiveness.

Outreach Format

Requires more consideration.

Other Measure Connections

This measure links to other outcome-related measures on environmental trends, as well as financial measures showing inputs and activities related to wastewater funding.

Measure Points of Contact

Marco Graziani, Minnesota Pollution Control Agency

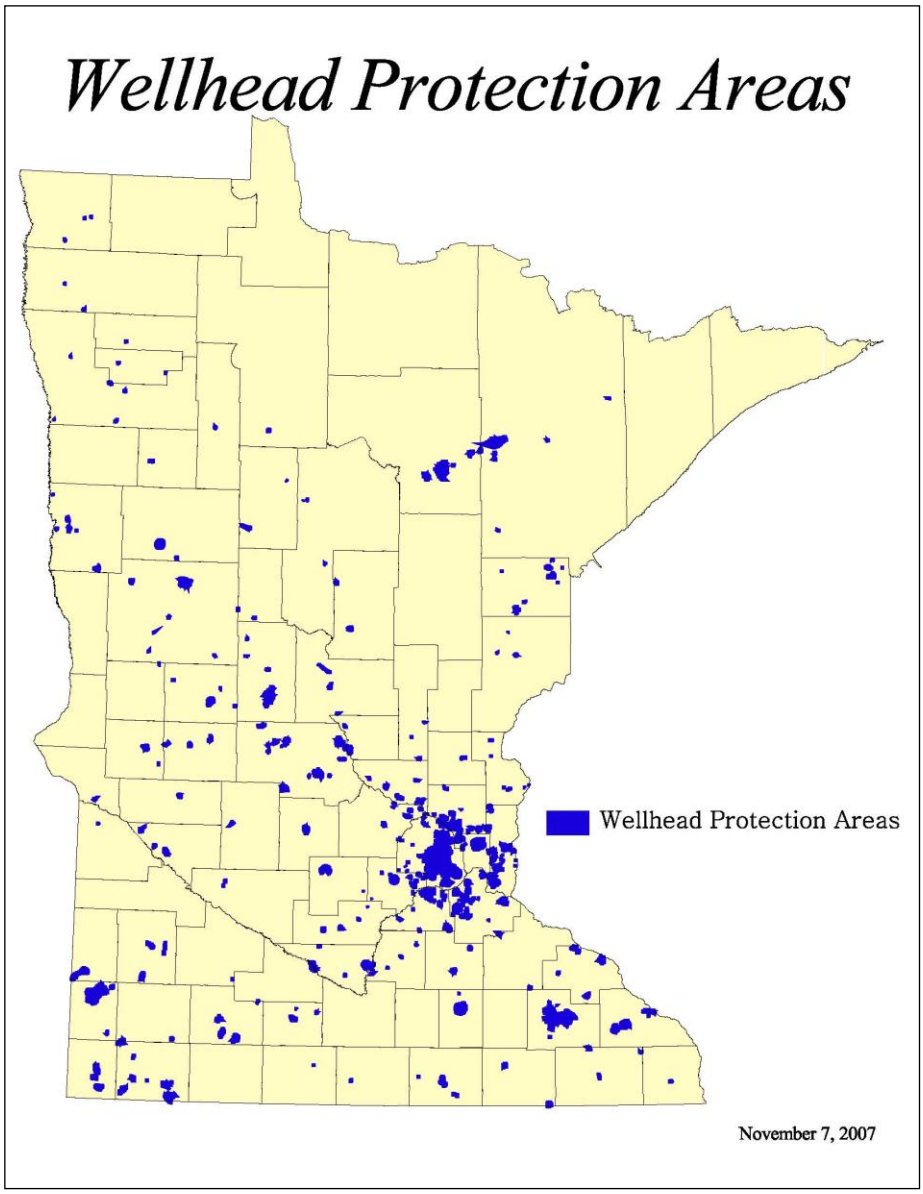
Marco.Graziani@state.mn.us

Partnership and Leveraging Measures (PLM)

PLM 1: Number of new public water supply systems assisted with developing and implementing source water protection plans *(early draft)*

Measure Background

Visual Depiction



Measure Description

Source water protection planning and implementation help the public water supply systems (PWS) protect the source of the drinking water supply by identifying 1) the area that supplies water to the PWS well or wells, 2) vulnerability of that area, and 3) appropriate land and water resource management strategies for protecting the source of drinking water. The goal for number of communities assisted with wellhead protection plans is 30 for FY 2010 and 60 for FY2011.

Associated Terms and Phrases

Drinking Water Supply Management Area (DWSMA). The area delineated using identifiable land marks that reflects the scientifically calculated wellhead protection area boundaries as closely as possible (Minnesota Rules, part 4720.5100, subpart 13).

Drinking Water Supply Management Area Vulnerability. An assessment of the likelihood that the aquifer within the DWSMA is subject to impacts from land and water uses within the wellhead protection area. It is based upon criteria that are specified under Minnesota Rules, part 4720.5210, subpart 3.

Inner Wellhead Management Zone (IWMZ). The land that is within 200 feet of a public water supply well (MR4720.5100, subpart 19). The public water supplier must manage the IWMZ to help protect it from sources of pathogen or chemical contamination that may cause an acute health effect.

Wellhead Protection. A method of preventing well contamination by effectively managing potential contamination sources in all or a portion of the well's recharge area.

Wellhead Protection Area (WHPA). The surface and subsurface area surrounding a well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field (Minnesota Statutes, part 103I.005, subdivision 24).

Well Vulnerability. An assessment of the likelihood that a well is at risk to human-caused contamination, either due to its construction or indicated by criteria that are specified under Minnesota Rules, part 4720.5550, subpart 2.

Target

Total State Population (*2007 estimate from the 2009-2010 Legislative Manual*)	5,263,493
Total population served by community systems (*from MNDWIS*)	4,192,069
Population served by community systems using a groundwater source	2,764,531
All community public water suppliers that use groundwater will have a wellhead protection plan in place	By 2020

Baseline

Minnesota's Wellhead Protection Rule , Minnesota Rules Parts 4720.5100 to 4720.5590, was adopted by the state in December 1997 and applies to community and noncommunity public water supply systems that rely on groundwater for their source of drinking water.

Geographical Coverage

Statewide

Data and Methodology

Methodology for Measure Calculation

Wellhead protection is a legal requirement that has been adopted in Minnesota Rule, 4720. 5100 to 4720.5590. Procedures and time frames for wellhead planning are described by rule.

Data Source

Source Water Protection Tracker and Minnesota Drinking Water Information System, two databases that are maintained by the Minnesota Department of Health.

Data Collection Period

1998 to 2010

Data Collection Methodology and Frequency

Data is continually entered by Minnesota Department of Health and Minnesota Rural Water staff as rule requirements are met and assistance is provided to public water suppliers and the general public.

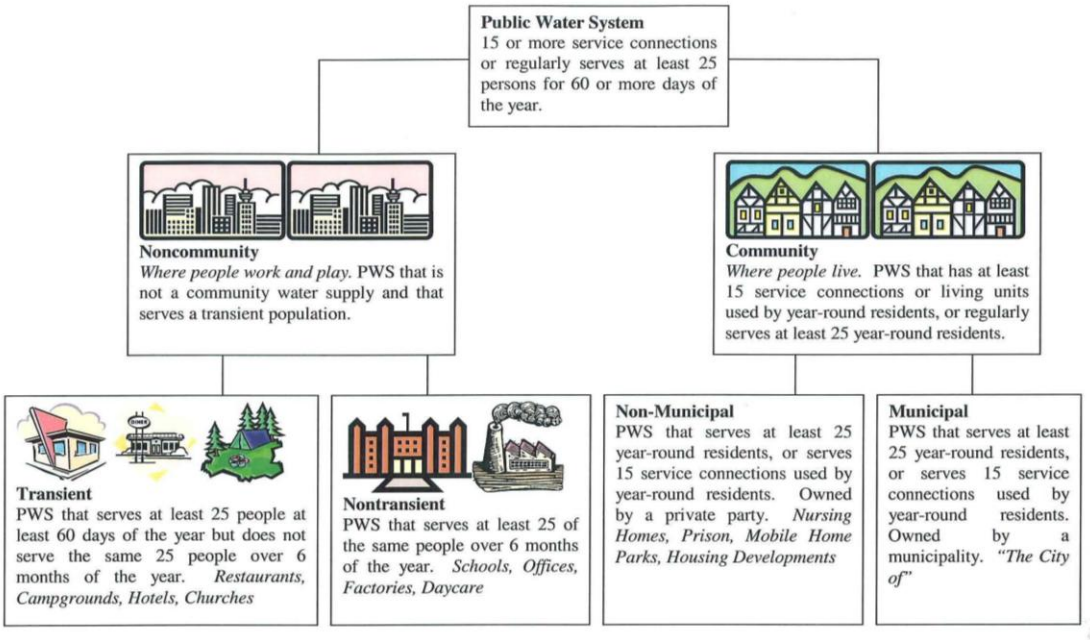
Supporting Data Set

[Provide tabular data used to support measure]

Caveats and Limitations

The Clean Water, Land and Legacy amendment funding provides grants to all types of public water supply (PWS) systems in Minnesota that rely on groundwater. There are approximately 7,300 PWS systems, of which 963 are community PWS systems. Community systems include municipal and non-municipal systems (See figure below). Twenty three of the 963 community systems rely on surface water and, therefore, are not regulated by the wellhead protection rule. The remainder of the state's approximately 7,300 PWS sytems are non-community systems, which include transient and nontransient PWS systems. All of these must manage an inner wellhead management zone that consists of an area defined by a 200 foot radius around a public water supply well. This does not include Minnesota residents that rely on private wells or surface water supplies. Also, wellhead protection plans are required to be amended every 10 years, which limits the number of new community PWS that can be brought into the wellhead protection program (assuming that MDH staff numbers remain stable.)

Figure 2.1 Water System Categories And Definitions



Future Improvements

The Source Water Protection Tracker database is currently being modified to allow measurement of interactions between MDH planning staff and local governments/PWS who are responsible for and the development and implementation of their wellhead protection plan.

Financial Considerations

Contributing Agencies and Funding Sources

US Environmental Protection Agency

Clean Water, Land and Legacy Amendment funding bill ($1,200,000 for 2010 and $1,215,000 for 2011). This supports part of the planning and technical assistance activities for wellhead protection and allows more PWS to be brought into the planning process that would otherwise be possible with established funding.

Reporting for the Clean Water, Land and Legacy Act does not require additional funding.

Communication Strategy – to be determined

Target Audience

[who will have the most interest/concern about this measure]

Associated Messages

[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format

[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections

[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information

Tannie Eshenaur, Minnesota Department of Health

tannie.eshenaur@state.mn.us

651.201.4074

PLM 3: Percent of intensive watershed monitoring performed by local partners *(early draft)*

Measure Background

Visual Depiction
TBD

Measure Description
This measure tracks the percentage of intensive watershed and load monitoring chemistry sites (lakes and streams) within a watershed that are monitored by local partners.

Associated Terms and Phrases
Condition monitoring: Monitoring with the objective of using the data to assess the ambient, or background, condition of a lake or stream reach.

Intensive watershed monitoring: Progressive, nested design for intensively monitoring the biological, physical and chemical integrity of streams and the chemistry of lakes within a major (8-digit hydrologic unit code) watershed. The mouth (or outlet) of each major watershed is monitored monthly on a continual basis for flow and chemical parameters (termed 'load monitoring'). Once every ten years, the outlet of the major watershed and the outlets of its subwatersheds (12 -digit hydrologic unit code) are monitored for biological and physical habitat, and chemical parameters. One-time biological, physical and chemical monitoring is conducted at the outlet of the 14 -digit hydrologic unit code watersheds. All lakes $\geq$500 acres and some smaller lakes are monitored for chemical parameters (there is currently no tool that allows us to assess lakes for biology). There are ~80 major watersheds in Minnesota and intensive watershed monitoring follows a ten-year rotational cycle. Thus, ~6-8 new major watersheds are intensively monitored annually.

Load monitoring: Flow and chemistry monitoring conducted at the mouth (or outlet) of each major watershed. Monitoring is conducted at least monthly, and then more frequently during events (i.e., snowmelt or rain events). The objective of load monitoring is to capture the entire hydrograph, and to determine the pollutant load carried by a stream or river.

Surface Water Assessment Grants (SWAG): Clean Water Fund pass-through grants from MPCA to local groups for condition monitoring activities.

Target
Increased local participation over time.

Baseline
Between 2006 and 2017, depending on the watershed monitoring schedule.

Geographical Coverage
Watershed (major watershed scale)

Data and Methodology

Methodology for Measure Calculation

For streams, this is calculated by dividing the total number of 11/12-digit chemistry monitoring sites within a major watershed by the number of those sites being samples by local partners. For lakes, this would involve dividing the total number of priority lake sites by the total number of priority lakes being monitored by local groups. For load monitoring, this will entail dividing the total number of load monitoring sites by those monitored by non-MPCA partners.

Data Source

Spreadsheet (TBD) tracked by MPCA stream and local/citizen monitoring staff.

Data Collection Period

For streams in each watershed this would be the two-year period during which intensive watershed monitoring occurs (which varies by watershed depending on the statewide watershed monitoring schedule). For lakes the data collection period would be the 10-year assessment window, since we are still in the process of aligning the lake monitoring timing with the IWM stream monitoring. For load monitoring, this assessment can be made annually, as the load network is set and continuously operating.

Data Collection Methodology and Frequency

Collected once during the initial planning for the intensive watershed monitoring effort for the watershed, updated when the SWAG grants are awarded.

Supporting Data Set

GIS layer of IWM sites within each watershed, STORET/EQuIS site data.

Caveats and Limitations

For the first 10-year round of IWM, MPCA is not monitoring/assessing lakes that are already assessed. For this reason, lake priorities for local groups tend to be smaller lakes (<500 acres). Starting with the second round of IWM, our highest lake priorities for aquatic recreation monitoring/assessment will be lakes >500 acres, and we will be recruiting local partners to help us with that sampling. Therefore, this measure will reflect our transition over time to focusing local monitoring recruitment from smaller to larger lakes.

Future Improvements

The idea here is to track local partnership in the monitoring effort; partnership can take other forms that doing some of the monitoring, so it will be important to evaluate if this is providing us with useful information and adjust if we come up with a more useful measure of that monitoring partnership.

Financial Considerations

Contributing Agencies and Funding Sources

No added cost for tracking this measure, other than staff time. MPCA is responsible.

Communication Strategy – to be determined

Target Audience
[who will have the most interest/concern about this measure]

Associated Messages
[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format
[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections
[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information
MPCA Lakes and Streams Monitoring Unit supervisor and SWAG coordinator.

PLM 4: Number of sites monitored by citizen volunteers through the Citizen Lake and Stream Monitoring Programs *(early draft)*

Measure Background

Visual Depiction

Statewide map showing sites monitored by volunteers

Stacked bar graph showing MPCA priority sites and percentages monitored by volunteers. A new graphical outlay that can better display trends may be needed as subsequent years of data are added.

Measure Description

Track volunteer participation in MPCA Citizen Lake and Streams Monitoring Programs, and their assistance in continuous monitoring of sites designated by MPCA as priorities.

Associated Terms and Phrases

CLMP – Citizen Lake Monitoring Program (secchi disk monitoring).

CSMP – Citizen Stream Monitoring Program (transparency tube monitoring).

Target

The ultimate goal is to have 100% of the priority lake and stream sites identified by MPCA within watersheds monitored by citizens.

Baseline

Baseline year is 2010.

Geographical Coverage

Statewide.

Data and Methodology

Methodology for Measure Calculation

For CLMP and CSMP, volunteer participation is tracked as the number of sites monitored, since some volunteers monitor multiple sites and some sites are monitored by multiple volunteers. For the statewide map, the citizen monitoring program databases are queried for sites for which transparency data was received for the most recent field season. Sites monitored through the two programs are combined, and each site (via lake identification number or stream site coordinates) is associated with an 8-digit Hydrologic Unit Code major watershed. The resulting statewide map shows the total sites monitored by volunteers by watershed. For the stacked bar graph, the Citizen Lake Monitoring Program database is queried against a list identifying the priority lake identification numbers to determine if volunteers have monitored one of the priority lakes in the past year. A similar query is run through the Citizen Stream Monitoring Program database to determine if a volunteer has monitored within 500 feet

of the coordinates for the priority stream sites in the past year. Percentages of monitored sites to all priority sites are determined for lakes and streams, and stacked bar graphs are created.

Data Source

The MPCA Citizen Lake and Stream Monitoring databases are required. Site data are joined to GIS layers showing watershed boundaries.

Data Collection Period

Annual updates.

Data Collection Methodology and Frequency

Citizens volunteering through the MPCA Citizen Lake and Stream Monitoring Programs submit transparency data to the MPCA at the end of each field season. MPCA staff enters those data throughout the winter. Program databases are updated annually once the year's monitoring data has been submitted. This measure can be reported upon by May following the end of a monitoring season (i.e., can report out on 2009 citizen monitoring activities in May 2010).

Supporting Data Set

Total volunteers participating in CLMP and CSMP for the past several years:

Timeframe	CLMP	CSMP
Jan-Dec 2006	1188	492
Jan-Dec 2007	1252	495
Jan-Dec 2008	1284	493
Jan-Dec 2009	1255	508

Caveats and Limitations

The Citizen Lake and Stream Monitoring Programs were in existence for many years prior to the passage of the Clean Water Legacy Act, though it is appropriate to report on these volunteers efforts here because this volunteer monitoring does support our current water monitoring activities and recruitment is now aligned to the 10-year watershed approach. There will never be an even distribution of volunteers statewide because our water resources are not evenly distributed. There are watersheds with very little water, so there may be a watershed in which we are never successful in recruiting volunteers. It is easier to recruit volunteers to monitor lakes because of our strong Minnesota heritage of owning lake cabins. It is more difficult to attract citizens to monitor a stream at a specific point (i.e., at our priority location). This may make it difficult for us to achieve our ultimate target of having volunteers continuously monitoring 100% of priority stream sites. Lastly, because new Clean Water funded activities are attracting volunteers to become more active locally, we strongly suspect that we will see a leveling out, and possibly even a decline, in volunteer participation in the MPCA's Citizen Monitoring Programs in the near future.

Future Improvements

There are other Clean Water funded activities that attract volunteers, such as Surface Water Assessment Grants and Clean Water Partnership grants. DNR also has volunteer monitoring efforts (lake level monitoring, Adopt-A-River) that could be tracked and incorporated in this measure, but that may not be as closely tied to CWF resources. This measure should be expanded upon to better reflect the true level of citizen engagement in Clean Water activities.

Financial Considerations

Contributing Agencies and Funding Sources

Communication Strategy – to be determined

Target Audience
[who will have the most interest/concern about this measure]

Associated Messages
[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format
[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections
[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information
MPCA Lakes & Streams Monitoring Unit supervisor (Citizen Lake and Stream Monitoring activities)

PLM 5: Percent of locally-led watershed restoration and protection strategies *(early draft)*

Measure Background

Visual Depiction
TBD

Measure Description
This measure conveys the level of local government involvement in development of watershed restoration and protection strategies which is a planning activity and a key indicator of the potential for future success in implementation, particularly for unregulated, nonpoint source activities.

Associated Terms and Phrases

- Watershed: The surrounding land area that drains into a lake, river or river system. The watershed size used for this measure is at the "major watershed" scale (8-digit HUC). There are 81 major watersheds in Minnesota.
- Watershed Restoration and Protection Strategies are reflective of the planning activities conducted to restore and protect each of Minnesota's 81 major watersheds. The components of these strategies include:
    - Restoration strategies: Planning activities to restore waterbodies not meeting water quality standards ("impaired"), including the development of a Total Maximum Daily Load study (TMDL) for an impaired water. A "TMDL" means a scientific study that contains a calculation of the maximum amount of a pollutant that may be introduced into a surface water and still ensure that applicable water quality standards for that water are restored and maintained. It results in pollution reduction goals for all sources of a pollutant in a watershed.
    - Protection strategies: Planning activities to protect high quality waters that are currently achieving water quality standards.
- "Locally-led" means watershed projects led in whole or in part by local units of government, such as watershed districts, watershed management organizations, counties, and soil and water conservation districts. There are two subcategories of "locally-led" projects:

  1) LGU Lead: An LGU who is a primary contractor for a project using state funding, or one who uses its own financial resources to complete a project (both with PCA oversight). These qualified entities (see how they are selected at: http://www.pca.state.mn.us/index.php/water/water-types-and-programs/minnesotas-impaired-waters-and-tmdls/project-resources/tmdl-financial-assistance-and-contracting.html) typically enter into grant contracts with the Minnesota Pollution Control Agency (MPCA) to complete TMDL studies – also known as "third party TMDLs" –or protection-related projects.

  2) LGU Co-Lead: An LGU is co-leading a project when they have a leadership role in managing the project, such as serving on the project management team with PCA, but is not a lead contractor. In

many cases, these entities may lead the stakeholder involvement process for the project with their own resources or are contracted to do this.

Regardless of the local leadership role, the MPCA maintains oversight of all TMDLs and submits studies to the EPA for final approval. Projects that are not led by local government are often due to a large geographic scale (e.g. the Lake Pepin TMDL covered about half of Minnesota) or high complexity of a project, and are typically led by the MPCA.

- Clean Water Partnership Project – A Clean Water Fund-supported project administered by the MPCA to conduct studies and/or implementation work to protect unimpaired waters.

Target
The MPCA's target for this measure is 80% of TMDL studies are locally led and approximately 100% of protection projects are locally led.

Baseline
Tracking of this measure began in approximately 2004.

Geographical Coverage
Statewide.

Data and Methodology

Methodology for Measure Calculation
This measure was tracked by manually analyzing lists of TMDL projects underway and contracts with LGUs. A qualitative decision was made based on the contract amount and/or known role of a LGU in leading a project. Future tracking would be simplified through a database field for this metric that is completed by a MPCA project manager who is most familiar with the role of a LGU in a project.

Data Source
Spreadsheet generated by a database called Watershed DELTA, which does not currently contain a field for this metric.

Data Collection Period
Data was collected from 2006 to present.

Data Collection Methodology and Frequency
Methodology is described above in the "Methodology for Measure Calculation"; frequency is annually.

Supporting Data Set
A total of 76 TMDL projects initiated from FY 2007–FY 2010 were analyzed and just over 80% of these (61 projects) were determined to be locally-led.

Caveats and Limitations
As noted above, database improvements will be needed to increase the efficiency of tracking this measure by adding a field to note LGU involvement. In addition, it should be determined whether this

measure should be revised to be focus on restoration, rather than protection. It needs to be clarified what programs supported by the Clean Water Fund will be available to support the planning function of protection strategy development. For example, Clean Water Partnership projects supported by the Clean Water Fund are devoted to implementation activities.

Future Improvements

Financial Considerations

Contributing Agencies and Funding Sources

No significant costs are incurred in tracking this measure.

Communication Strategy – to be determined

Target Audience

The Legislature and LGUs.

Associated Messages

[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format

[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections

[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information

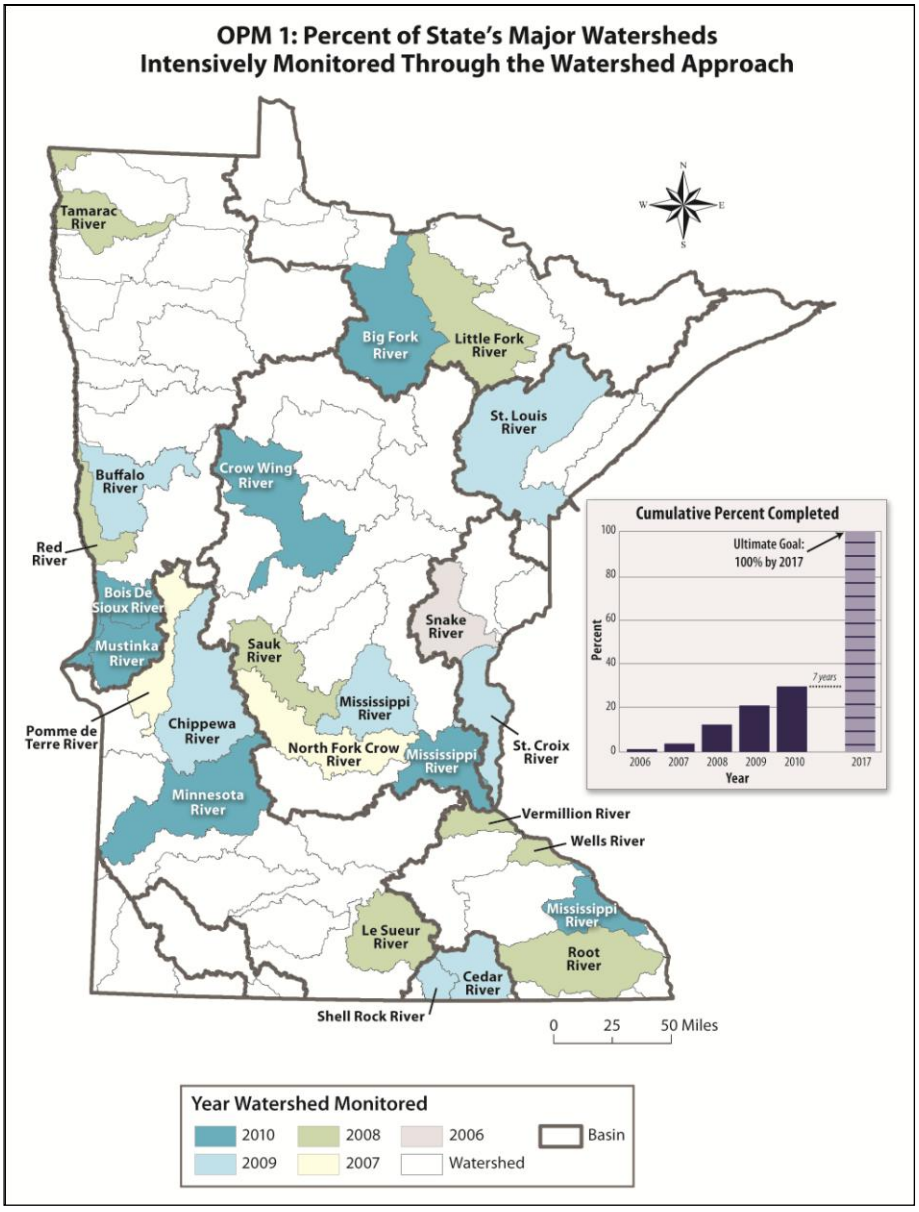
MPCA Regional Division Management Team

Organizational Performance Measures (OPM)

OPM 1: Percent of state's major watersheds intensively monitored through the watershed approach

Measure Background

Visual Depiction



Measure Description

Percent of the state's major watersheds that have been intensively monitored through the intensive watershed monitoring approach. This measure could also be broken down to include total or percent of stream sites monitored and lake sites monitored.

Associated Terms and Phrases

Intensive watershed monitoring: Progressive, nested design for intensively monitoring the biological, physical and chemical integrity of streams and the chemistry of lakes within a major (8-digit hydrologic unit code) watershed. The mouth (or outlet) of each major watershed is monitored monthly on a continual basis for flow and chemical parameters (termed 'load monitoring'). Once every ten years, the outlet of the major watershed and the outlets of its subwatersheds (12 -digit hydrologic unit code) are monitored for biological and physical habitat, and chemical parameters. One-time biological, physical and chemical monitoring is conducted at the outlet of the 14 -digit hydrologic unit code watersheds. All lakes ≥500 acres and some smaller lakes are monitored for chemical parameters (there is currently no tool that allows us to assess lakes for biology). There are ~80 major watersheds in Minnesota and intensive

watershed monitoring follows a ten-year rotational cycle. Thus, ~6-8 new major watersheds are intensively monitored annually.

Major watershed: 8-digit hydrologic unit code (HUC) watersheds in Minnesota; there are 81 in Minnesota.

Target
10 percent per year; 100% through 2017 (end of the first cycle).

Baseline
The first IWM watershed monitoring was done in 2006, but the baseline is 2008 since that was the year the state was fully ramped up for the IWM monitoring effort.

Geographical Coverage
Statewide.

Data and Methodology

Methodology for Measure Calculation
The number of new watershed monitoring starts is recorded for each year, and the cumulative total divided by 81.

Data Source
MPCA spreadsheet tracking watershed starts.

Data Collection Period
2006–2017.

Data Collection Methodology and Frequency
Updated annually based on new watershed monitoring starts; a schedule has been developed for the full 10 years and is updated annually.

Supporting Data Set

Year	Watersheds (annual starts)	Watersheds (cumulative)	Percent
2006	1	1	1%
2007	2	3	4%
2008	7	10	12%
2009	7	17	21%
2010	7	24	30%

Caveats and Limitations
It takes two years to complete the IWM monitoring, so this measure only tracks start dates; assessment follows after the second year of intensive monitoring. This won't always show a steady 10% of

watersheds per year since the size of watersheds (and their associated number of sites) will vary from year to year – the schedule requires us to start between 6 and 8 watersheds each year to stay on track.

Future Improvements

In a year or two we should also begin to track number of watersheds with completed assessments (but we need a couple years to get to this point).

Financial Considerations

Contributing Agencies and Funding Sources

No significant issues

Communication Strategy – to be determined

Target Audience

[who will have the most interest/concern about this measure]

Associated Messages

[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format

[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections

[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information

MPCA Water Monitoring Section

OPM 3: Cumulative number of sites assessed annually for fish contaminant concentrations *(early draft)*

Measure Background

Visual Depiction

a time series of stacked bars that shows 1) the total # of sites assessment by year for fish contaminants, how many of the assessments are supported by each funding sources (either 1) = Clean Water or 2) = other state or federal funds), and the target = 150 sites assessed annually as a horizontal line across

Measure Description

Lakes and rivers impaired by high contaminant levels in fish tissue is the most common type of impaired condition observed in Minnesota. Most fish tissue samples are screened for total mercury contamination but analyses for other contaminants (e.g., PCBs) are also conducted. Because mercury enters Minnesota landscapes principally from the air, Minnesota has adopted a number of strategies to reduce the rate of mercury at which mercury is released into the atmosphere (e.g., banning the use of mercury is certain products, working actively to find and replace mercury containing devices from business or residential setting, or collecting mercury containing waste before they are incinerated, or requiring mercury trapping pollution control equipment to be installed). It is important to assess fish contaminant concentrations over time to evaluate the success of the strategies that have already been implemented and help design and implement new strategies where impaired conditions persist.

Associated Terms and Phrases

methyl mercury –(organically bound form of mercury - as opposed to ionic or free metal form) We actually test for total mercury, which includes methyl, ionic and free metal forms. In practice, this is very nearly the same as testing for just methyl mercury, since over 90% of mercury in fish muscle tissue is consistently in this form. However, it's still more technically correct to express the concentrations we measure as total mercury.

PCBs – polychlorinated biphenyls. PCBS can refer to any of the individual 209 PCB congeners or combinations thereof. Certain mixtures of PCB congeners were commonly manufactured and used for industrial purposes in the past and were know as "Aroclors". PCB residues found in environmental samples such as fish typically resemble certain of the Aroclors, and samples analyzed for this program are compared to Aroclors when quantifying the PCB levels.

Target

The Minnesota Department of Natural Resources working cooperatively with the Minnesota departments of Health and Agriculture and the Minnesota Pollution Control Agency has identified a sampling capacity of 150 sites per year as a target that provides sufficient data to support general planning, outcome reporting, and health assessment needs. This target does not include specialized sampling to address new, emerging, contaminant issues (e.g., PFCs or poly-fluorinated compounds).

Baseline

FY06 was selected as the baseline to represent the level of assessment activity that was being conducted before Clean Water funds first became available in FY07. For the purpose of reporting this measure, FY06 is represented in the graph and data table as Calendar Year 2005. Fish are collected for contaminant analysis during the summer months (which bridge two state fiscal years) and processed and analyzed during the following fall and winter. We have chosen to track and report on our fish contaminant collection efforts based on the timeframe when the samples were collected, even if some of that timeframe covers two fiscal year.

Geographical Coverage

The location of the assessed sites is point data and can be summarized at the statewide, watershed, county, or other applicable scale.

Data and Methodology

Methodology for Measure Calculation

The number of lakes and rivers sites where fish are sampled, processed, and assessed for listed contaminants on an annual basis are counted. Contaminant concentration for multiple species of fish and multiple fish per species are analyzed at each site but it is the number of sites that are counted.

Data Source

DNR's Division of Ecological and Water Resources maintains a database of lake and river sites where fish contaminant data has been collected and the associated contaminant concentrations.

Data Collection Period

Data has been collected annual since calendar year 2005, the start of the data collection period.

Data Collection Methodology and Frequency

The sites included in the measure combine samples collected for a variety of purposes. The purposes include: long-term mercury trend monitoring in lakes, long-term mercury and PCB trend monitoring in rivers, concentration data on popular fish lakes to help set fish consumption advisories, contaminant assessments at the pour-points of major watersheds, and targeted sampling near landfills or spills to assess for localized fish contamination issues.

Supporting Data Set

Calendar Year	Sites Assessed for Fish Contaminant Concentrations		
	With Clean Water Funds	With other state and federal funds	Total
2005	0	87	87
2006	40	70	110
2007	80	132	212
2008	80	56	136
2009	80	59	139
2010	80	68	148

Caveats and Limitations

Because this measure represents a compilation of various fish contaminant monitoring efforts, and different efforts require different numbers of fish samples and measure different pollutants, the measure (number of sites sampled annually) varies over time, even when funding levels don't change. For example, in years when a greater percentage of the collected samples are assessed by PCBs, the total number of sites declines because the PCB analytical method is more expensive. This variation will continue into the future and could be become more pronounced if priorities shift. For example, if a new fish contaminant was added to the list of assessed parameters that was much more expensive to analyze, the number of sites that could be completed annual would likely decline.

Future Improvements

The target for this output measure was developed by looking at the number of programs that use fish contaminant data to help deliver required program activities or to evaluate program success. It was not based on a complete understanding of the factors that influence contaminant concentrations in fish, annual variability in those factors, or a specified timeframe or level of confidence for trend detection. If more specific trend detection targets are developed or our understanding of how contaminants concentrate in fish tissue improves, this output measure may need to be adjusted accordingly.

Ultimately, the goal is to replace this output measure with an outcome measure based on fish contaminant trends.

Financial Considerations

Contributing Agencies and Funding Sources

New funding beginning in fiscal year 2007 from Clean Water sources allowed the number of sites sampled for fish contaminants to increase (represented in data table as calendar year 2006). This measure reflects how the new source of funds allowed existing levels of effort to be expanded.

Communication Strategy – to be determined

Target Audience

[who will have the most interest/concern about this measure]

Associated Messages

[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format

[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections

[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information

Mark Briggs (Mark.Briggs@state.mn.us or 651-259-5078)

Division of Ecological and Water Resources

Minnesota Department of Natural Resources

500 Lafayette Road

St. Paul, MN 55155-4025

OPM 4: Cumulative number of lake biological assessments completed annually *(early draft)*

Measure Background

Visual Depiction

Recommend a time series of stacked bars beginning in 2006 that shows 1) the total # of lake biological assessments conducted and 2) the target (TBD) # of lakes assessed annually as a horizontal line across the figure.

Measure Description

The process of assessing lakes, rivers, and wetlands in Minnesota to guide Clean Water planning, restoration, and protection efforts, envisions the use of biological assessment methods to complement pollutant-based sampling efforts. For example, biota will be used to screen waters to determine if it is impaired, look for the presence of high quality biological species/communities, and track the status of the water over time. The assessment protocol MPCA will use to systematically sample the state's river/stream resources relies heavily on biological-based metrics during its initial phase. Having a comparable approach available to support lake assessment efforts would be desirable but verified and approved biology-based protocols for Minnesota lakes are not yet completed. The Minnesota DNR is taking the lead in developing new lake biological assessment tools; MPCA is participating and would assume a leadership role if these methods were incorporated into their watershed water-quality assessment process. This measure is currently focused on the cumulative number of targeted biological assessments (fish and aquatic plant) completed annually as a measure of the level of work being focused on this effort. Fish and aquatic plants are the focal points of current measure-development efforts in part because various DNR divisions are already heavily invested in collecting fish and aquatic plant data.

Associated Terms and Phrases

Bioassessment – a method that uses the condition of one or more attributes of the biological communities that use a particular habitat to gauge the overall health of that habitat, in this case lake habitats. The biological parameters measured are typically compared to a reference or expected condition that has been developed by assessing a series of habitats that range in condition from high quality to poor. In this context, biological parameters are measured across a range of water quality conditions, from excellent to poor, so that the bioassessment results can help evaluate water-quality conditions.

Fish IBI assessments – the fish index of biointegrity (IBI) is one bioassessment method that uses multiple attributes of fish communities to gauge overall aquatic community health, including water quality condition. This method has been widely used across a wide range of stream/river habitats and is a key component of the protocol that the Minnesota Pollution Control Agency has adopted to assess stream/river condition in Minnesota's 81 major watersheds.

Target

The Minnesota Pollution Control Agency has identified the need to develop two independent and complementary bioassessment tools for lakes. Such tools already exist for Minnesota's rivers/streams

and wetland resources. The targeted level of sampling capacity necessary to meet the objective cannot be finalized until the methods are developed, the types of lakes where they can be used is clarified, and their capacity to detect impacts is better understood. An initial target of conducting fish IBI assessments on 120 lakes per year was established in FY07 but that target was preliminary.

Baseline

The Fisheries Research Unit in the Department of Natural initiated a project in 19?? to test the feasibility of developing a fish IBI assessment method that used the netting data (gillnets and trap net) that the Section of Fisheries collects as part of their regular fish management activities plus additional samples of the near-shore fish community. That initial effort focused on a limited set of lake classes in Minnesota. Based on the success of the initial study, their approach was expanded to include additional lake classes. FY06 was selected as the baseline for this measure because it represents the level of fish IBI assessment activity that was being conducted before Clean Water funds became available.

Geographical Coverage

The location of the assessed lakes is point data and can be summarized at the statewide, watershed, county, or other applicable scale.

Data and Methodology

Methodology for Measure Calculation

The number of lakes that are sampled annually using the specialized near-shore sampling methods to collect data of fish IBI assessments are counted. Fish IBI metrics also require gill net and trapnet data from the standard lake survey methods performed by Minnesota DNR's Section of Fisheries but since this data is already available, only the lakes with near-shore sampling are used for the measure calculation. In the future, if near-shore, gill net, and trapnet data collection efforts are more closed linked, the measure calculation may change.

The current lake biological assessment measure does not include the number of lakes where aquatic plants are sampled. A number of programs in the DNR already collect data on aquatic plant communities in lakes. That list includes aquatic plant surveys conducted by the Section of Fisheries as part of their lake survey protocol, aquatic plant assessments conducted by the Section of Wildlife's shallow lakes program, and various programs in the Division of Ecological and Water Resources that conduct surveys looking for rare plants, non-native invasive plants, or characterize lake-wide distribution of aquatic plant communities.

However, the framework of sampling aquatic plants to calculate an aquatic plant IBI has not yet been finalized. Whether any of the existing sampling efforts are sufficient to provide the necessary community attributes is not known. Efforts are underway to define what aquatic plant community attributes would be most useful to produce an effective aquatic plant IBI assessment tool. Once those community attributes are identified, it will possible to define the current level of annual sampling effort and whether an expansion of that effort is needed to meet Clean Water watershed assessment needs.

Data Source

DNR's Division of Ecological and Water Resources maintains a database of lakes where near-shore sampling has been conducted for fish IBI assessments. The data will also be stored in the Section of Fisheries' lakes and streams survey database beginning in 2010. The Section of Fisheries lakes and streams database also house the trapnet and gill net assessment results.

Data Collection Period

Data has been collected annually since 2005, the start of the data collection period. For the purpose of reporting this measure, FY06 is represented in the graph and data table as Calendar Year 2005. Near-shore fish populations are sampled to develop the fish IBI assessment method during summer months (which bridge two state fiscal years) and the samples are verified and analyzed during the following fall and winter. We have chosen to track and report on our fish IBI assessment efforts based on the calendar-year timeframe when the samples were collected, even though that timeframe covers two fiscal years.

Data Collection Methodology and Frequency

The final methods and frequency for this measure have not been selected. The interim measure, a measure of effort equal to the number of lakes with specialized assessments of the near-shore fish community, will be refined once a fill protocol for fish IBI assessments is adopted

Supporting Data Set

Calendar Year	Lakes where specialize near-shore fish samples were collected		
	With Clean Water Funds	With other state and federal funds	Total
2005			
2006			
2007			
2008			
2009			
2010			

Caveats and Limitations

(See comments in Data Collection Methodology and Frequency above)

Future Improvements

The Section of Fisheries will assume responsibility for conducting all three for the survey efforts necessary for fish IBI assessments (near-shore, gill net, and trapnet) beginning in the summer of 2010.

This change will substantially increase the number of near-shore assessments that are completed annually and this measures will need to be revise to reflect that change. This measure may be expanded in the future to include the number of aquatic plant IBI assessments conducted annually in the total.

Financial Considerations

Contributing Agencies and Funding Sources

The Clean Water funding available to do the work described by this measure has changed over the data collection period.

Communication Strategy – to be determined

Target Audience

[who will have the most interest/concern about this measure]

Associated Messages

[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format

[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections

[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information

Point of Contact – David Wright (David.I.Wright@state.mn.us or 651.0259.5155)

Division of Ecological and Water Resources, Lakes and Rivers Monitoring Unit

Department of Natural Resources

500 Lafayette Road

St. Paul, MN 55155

OPM 7: Percentage of Watershed Restoration and Protection Strategies (WRAPs) in-progress/completed

Measure Background

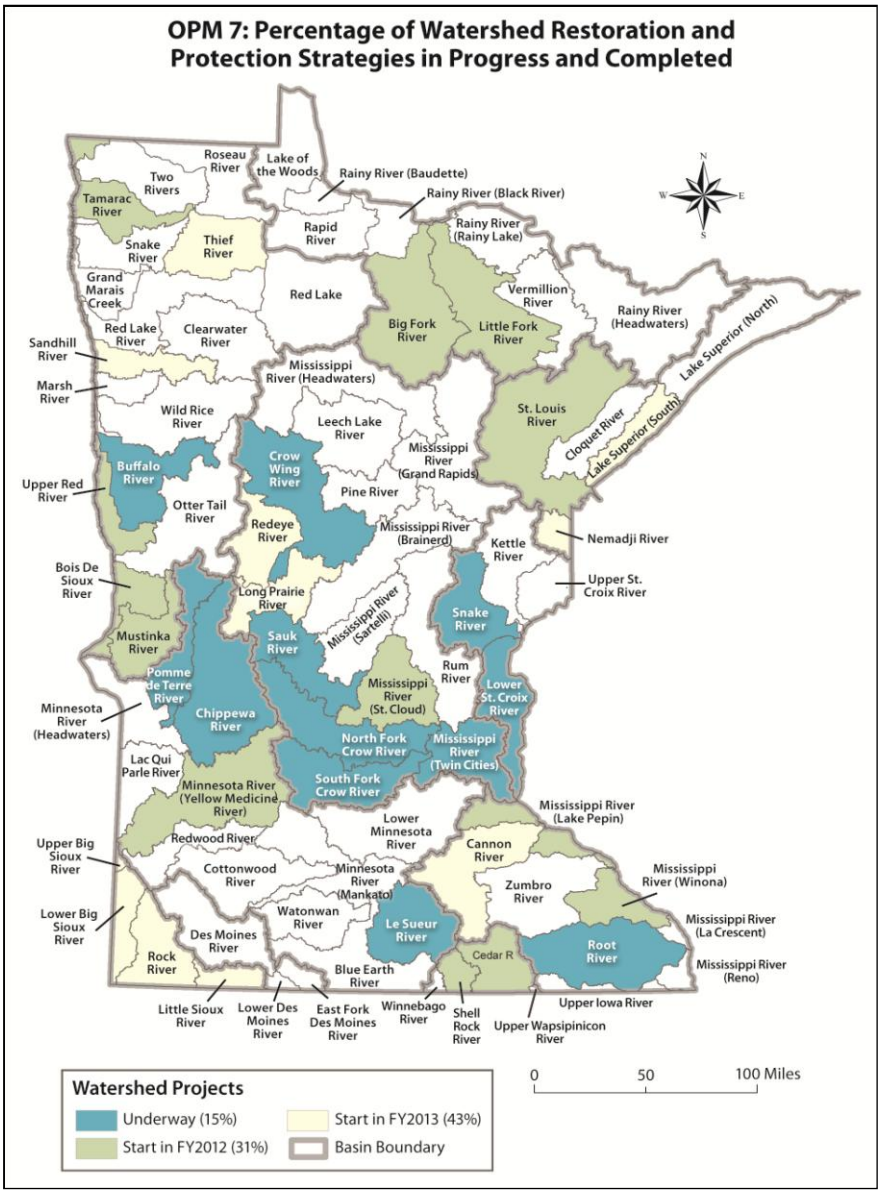
Visual Depiction

Measure Description

This measure describes progress toward development of Watershed Restoration and Protection Strategies (WRAP).

Associated Terms and Phrases

"Watershed Restoration and Protection Strategies" are comprehensive planning tools designed to address both the impaired and unimpaired waters in a major watershed. Each WRAP contains Total Maximum Daily Load projects to restore impaired waters, and protection projects to maintain or improve waters currently meeting water quality standards. WRAP strategy development is the second of a three-phase cycle that begins with monitoring and assessment of a watershed, and concludes with implementation.



"TMDLs" are Total Maximum Daily Load studies that must be completed for every impaired water body listed on the Impaired Waters List, required by section 303(d) of the federal Clean Water Act. TMDLs determine the level of pollution reductions that must be met by point and nonpoint sources in order to attain water quality standards. Permits for point sources and best management practices for nonpoint sources are designed to meet the pollution reduction targets set by the TMDL.

Target
10% of total watersheds each year

Baseline
Fiscal year 2010

Geographical Coverage
Statewide

Data and Methodology

Methodology for Measure Calculation
The number of approved WRAP Strategies are calculated each year and compared against the total required (a total of 81 major watersheds statewide).

Data Source
A database and spreadsheet maintained by the Minnesota Pollution Control Agency.

Data Collection Period
FY 2010 to present

Data Collection Methodology and Frequency
The data is collected annually, according to fiscal year (July 1 to June 30).

Supporting Data Set

WRAP Strategies In-Progress/Completed	Year Started	Year Completed
Buffalo R. Watershed	2010	
Chippewa R. Watershed	2011	
Crow R. Watershed , N. Fork	2009	
Crow R. Watershed, S. Fork	2011	
Crow Wing R. Watershed	2010	
Le Sueur R. Watershed	2008	
Lower St. Croix R. Watershed	2011	
Mississippi R. Watershed (Twin Cities)	2010	
Pomme de Terre R. Watershed	2008	
Root R. Watershed	2010	
Sauk R. Watershed	2010	
Snake R. Watershed	2010	
Total (as of 12-30-10)	**12**	
Percent of total major watersheds statewide (81)	**15%**	

Caveats and Limitations
None identified at this time

Future Improvements
None identified at this time

Financial Considerations

Contributing Agencies and Funding Sources
MPCA

Communication Strategy

Target Audience
Legislature, local government and EPA (TMDL tracking) who are tracking to ensure that strategy development work is on pace.

Associated Messages
This measure conveys that the systematic approach toward developing WRAP strategies is moving forward in a systematic and timely way. In so doing, TMDLs are also being developed to restore waters and protection projects are being finished to protect unimpaired waters.

Outreach Format
This will be primarily displayed on websites and in local media or stakeholder newsletters who have an interest in this topic.

Other Measure Connections
This measure is closely connected to the percentage of watersheds that are intensively monitored.

Measure Points of Contact

Agency Information
Jeff Risberg, Minnesota Pollution Control Agency

Jeff.Risberg@state.mn.us

OPM 9: Number of new health-based guidance values for contaminants of emerging concern *(early draft)*

Measure Background

Visual Depiction

Illustration of the molecular structure of the compounds investigated, pictures of the consumer products or pharmaceuticals in which they are used.

Measure Description

Active research combined with our increasing ability to measure minute amounts of chemicals in water raises concerns about people's exposure to very low levels of chemicals over a long period of time, especially during vulnerable periods like fetal development. This measure tracks the number of contaminants of emerging concern for which the Minnesota Department of Health has conducted toxicity and exposure evaluations resulting in health-based exposure limits for drinking water.

Associated Terms and Phrases

Contaminant of Emerging Concern. A chemical substance that has been released or detected or has the potential to migrate to or be detected in Minnesota waters and for which no Minnesota drinking water standards have been established or standards need to be updated to reflect new toxicity information. These chemicals are characterized by:

- a perceived or real threat to public health;
- Minnesota drinking water health-based standards that currently do not exist or need to be updated to reflect new toxicity or occurrence information;
- insufficient or limited toxicological information or toxicity information that is evolving or being re-evaluated; or,
- significant new source, pathway, or detection limit information.

Health Based Values (HBV). Concentrations of chemicals in drinking water at which no adverse health effects would be expected among the general population, including sensitive populations such as pregnant women and infants.

Health Risk Limits (HRLs). HBVs which are promulgated through a formal rulemaking process authorized in the 1989 Groundwater Protection Act (GWPA). Per the GWPA, MDH's authority to promulgate HRLs is limited to chemicals that have been detected in groundwater in Minnesota.

Risk Assessment Advice (RAA). May be based on more limited toxicity data than HBVs or HRLs, or may use new risk assessment methods that are not included in the HRL rules. RAA may include a numerical value or may be qualitative in nature.

Target
Guidance for three chemicals will be developed in FY2010, for an additional seven in FY 2012, for a total of ten for the biennium.

Baseline
While historically MDH developed guidance for contaminants found in groundwater at Superfund sites when there was no preexisting standard, this is a new effort to provide guidance in anticipation of future occurrence in Minnesota drinking water. Funding from the Clean Water amendment provides additional staff and resources to support this effort.

Geographical Coverage
This activity is relevant to the entire state.

Data and Methodology

Methodology for Measure Calculation
Health risk assessment methodology used to develop guidance is consistent with the methodology promulgated as part of the HRL rule revision

Data Source
Information on the process used and contaminants assessed is available in periodic reports for the public authored by the Health Risk Assessment Unit's Contaminants of Emerging Concern staff. Numerous data sources are used to develop health based guidance, depending on the availability of applicable toxicological studies.

Data Collection Period
July 2009–June 2010

Data Collection Methodology and Frequency
Occurrence information is found in ongoing groundwater and surface water monitoring conducted by the MPCA and MDA. Additionally, the USGS, AWWA, and academic institutions conduct monitoring for various research projects.

Supporting Data Set
Available in worksheets online for each contaminant assessed.

Caveats and Limitations
The Clean Water Fund Land and Legacy amendment funding is restricted to evaluating health based guidance for contaminants that have the potential to impact drinking water. For some contaminants, the route of exposure of greatest concern may be something other than drinking water such as use of a consumer product that contains the chemical.

Future Improvements
A taskgroup has been convened to advise CEC staff in developing a process to prioritized contaminants for review and assessment. This process will extend from initial nomination through three possible levels of review, the highest of which will result in a guidance value.

Financial Considerations

Contributing Agencies and Funding Sources

This effort is entirely supported by Clean Water amendment funding, with some in-kind contributions.

Communication Strategy – to be determined

Target Audience

[who will have the most interest/concern about this measure]

Associated Messages

[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format

[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections

[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information

Michele Ross, Minnesota Department of Health

michele.ross@state.mn.us

651.201.4927

OPM 12: Percent of research projects meeting research efficiency goals *(early draft)*

Measure Background

Visual Depiction

Bar graph with ranges of efficiency ratings on the x-axis and number of projects listed on the y-axis. A map depicting the location of each research project within the state could also be included.

Measure Description

A significant portion of the state's resources are being used to fund research related to water. In the case of Clean Water Legacy Act and Clean Water Fund appropriations, approximately 10% are invested in research that characterizes stressors to water quality and quantity, and the strategies and practices to remediate the impact of these stressors. The challenge with evaluating research program efficiency is that the course of research cannot be planned in advance, because it operates on feedback loops from observation and experimentation that result in changes in research priorities and courses of study over time. Moreover, it can be challenging to tie research to ultimate outcomes of a program. In the case of the CWF, the ultimate outcome is to protect and restore waters; however, it's difficult to make the connection between this ultimate outcome and a research project due to time lag and an inability to assign a metric to the knowledge that can be gained through research towards addressing an impairment or protection strategy. In 2008 the National Academies released a report to evaluate the research efficiency of the U.S. Environmental Protection Agency. The recommendations from that study are applicable for evaluating the State of Minnesota's research investments related to water.

References

National Academies. 2008. Evaluating Research Efficiency in the U.S. Environmental Protection Agency. The National Academies Press. Washington DC. [online]. Available at www.nap.edu/catalog/12150 (verified 6 October 2008).

Associated Terms and Phrases

There are several key terms relative to evaluating research efficiency. Details for assessing and quantifying these concepts are presented in the Data and Methodology section. One important term related to developing metrics for any program is outcomes. Outcomes are benefits resulting from a research program. Ultimate outcomes, such as the measures included in the environmental and drinking water outcomes category, include de-listing of water bodies from the 303(d) list of impaired waters. In contrast, intermediate outcomes are short-term such as the contribution of research to a body of knowledge. This measure will attempt to evaluate the latter rather than the former recognizing the challenges associated with metrics for ultimate outcomes. Research efficiency will be based on two metrics for the purposes of this measure: *investment* and *process* efficiency.

Investment efficiency asks the question: is the agency making investments in the right projects? Investment efficiency is best evaluated by expert-review panels that use predominantly qualitative metrics tied to long-term plans. The charge of the panel is to determine that the research embodies the

purpose of the CWLA (relevance), that the research is technically sound (quality), and that the research results will have a significant impact on impaired waters programs and activities given the funds available (performance). The panel can also identify emerging issues and determine their place in research priorities.

Process efficiency asks the question: are the research investments being managed well? Process efficiency can be measured quantitatively by evaluating adherence to pre-determined milestones, timelines, and budgets. Process efficiency refers to inputs, outputs, and intermediate outcomes of a research project/program. Inputs include agency resources such as funding, facilities, and human capital that support research. Outputs are products delivered by a research project such as conclusions and papers published. Intermediate outcomes provide reviewers of a research project or program with tangible metrics of evaluation. Examples of intermediate outcomes may include an improved body of knowledge available for decision-making, integrated science assessments, and newly developed tools and models.

The Data and Methodology section will outline how investment efficiency and process efficiency will be determined.

Target

A target would need to be developed but could be represented at two different scales. One target would be a research efficiency threshold value of X for each individual project. Another target would address all CWF funded research projects with a target X percent of projects above a research efficiency threshold value of X.

Baseline

FY2007 to present.

Geographical Coverage

Statewide.

Data and Methodology

Methodology for Measure Calculation

The research efficiency metric could be based on two components: investment efficiency and process efficiency. Both of these metrics could be quantified using a process similar to that of the evaluation process used in a Request for Proposals (RFP). An evaluation committee would be convened representing the expertise necessary to review the completed projects. This committee could be comprised of multiple state agencies as well as relevant expertise outside the agencies. Each research efficiency metric component would be represented by a table with criteria and associated points totaling 100. The EPA report suggests that investment efficiency should be weighted higher than process efficiency. Consequently, the former could be weighted by 0.80 with the latter weighted by 0.20. The maximum possible research efficiency rating would be 100. The tables below represent both components of the research efficiency metric with criteria and guidance for scoring.

Research Efficiency Criteria			
Investment Efficiency			
Rating	**High**	**Medium**	**Low**
Relevance of the project to the purpose of the Clean Water Fund (Maximum 30 points)	Project will immediately inform an existing TMDL study or restoration/implementation plan and is applicable to multiple watersheds with similar physical and management characteristics.	Project will generally inform an existing TMDL study or restoration/implementation plan and/or is less broad in its applicability to other watersheds.	Project has little relevance to an existing TMDL study or restoration/implementation plan.
Technical soundness and scientific merit (Maximum 35 points)	Methods proposed are technically sound and appropriate for the deliverables proposed.	Methods proposed have moderate shortcomings given the timeline and deliverables proposed.	Methods are inappropriate for the timeline and deliverables proposed. Methods have significant shortcomings.
Performance in terms of timeliness, cost, and overall performance in meeting the objectives and deliverables of the project. (Maximum 35 points)	Relative to the scope and deliverables, the study was budgeted fairly and competitively. Timelines were adhered to and deliverables were met.	Relative to the scope and deliverables, the study had some components that were costly given similar activities. Timelines were generally adhered to and deliverables were met.	The budget did not correspond to the scope and deliverables of the project. Costs were excessive given similar activities. Significant components of the project were not delivered.
Total Score for Investment Efficiency	**100 (maximum score)**	**X 0.80 (weighting factor)**	**80 (weighted maximum score)**
Process Efficiency			
Request for Proposal Process (Maximum 35 points)	RFPs are well defined, widely distributed, and posted in a timely manner.	RFPs are not well defined, narrowly distributed, and with significant time elapsed from crafting the RFP to posting.	RFPs are very poor defined with inadequate public posting and delays from development to posting.
Contract Execution (Maximum 30 points)	Contract execution occurs in a timely manner from proposal selection to contract execution. Workplans are	Some delays to contract execution occur. Workplans are adequately defined with respect to	Significant delays to contract execution occur. Workplans are poorly defined with respect to timelines,

	well defined with clearly defined timelines, reporting periods, and deliverables.	timelines, reporting periods, and deliverables.	reporting periods, and deliverables.
Contract Management (Maximum 35 points)	Good communication between contract manager and principal investigator. Reporting and invoice timelines are adhered to according to the workplan.	Adequate communication between contract manager and principal investigator. Reporting and invoice timelines are generally adhered to according to the workplan.	Poor communication between contract manager and principal investigator. Reporting and invoice timelines are not adhered to according to the workplan.
Total Score for Process Efficiency	**100 (maximum score)**	**X 0.20 (weighting factor)**	**20 (weighted maximum score)**
Grand Total for Research Efficiency Rating	**100 (summation of the previous two components; maximum score)**		

Data Source

The primary data source would be the final report, interim reports, work plan, contract, and RFP associated with the project. Another data source would be the research inventory/database that has been identified as a priority by both the Clean Water Council and Clean Water Fund research team and is currently in the planning stages.

Data Collection Period

State Fiscal Year (but this may be re-evaluated at a later date)

Data Collection Methodology and Frequency

Data would be collected throughout the duration of the individual projects. Multiple projects could be reviewed by the evaluation committee at intervals of 2 to 4 years depending on the number of research projects that have been completed over that period.

Supporting Data Set

State sponsored research inventory/database.

Caveats and Limitations

The use of ultimate outcomes is not appropriate for evaluating research projects due to the significant time lag and other challenges associated with linking de-listing of impaired waters to individual research projects. Furthermore, metrics that focuses on particular aspects of programs such as dollars spent are also inadequate. In contrast the Research Efficiency metric for evaluating research projects and programs is based on investment efficiency and process efficiency. Investment efficiency utilizes an expert review panel to evaluate the relevance, quality and performance of a research project using qualitative measures within the context of the overall strategy program. Process efficiency uses quantitative measures to track dollars and hours devoted to a project.

Research efficiency will always involve professional judgment making it critical that thoughtful consideration is given to the members of the evaluation committee involved in this process.

Future Improvements

This metric will be significantly enhanced by the creation of a centralized web-based inventory of Minnesota water research for use in TMDL studies and other water programs. When complete, users will be able to find information on research projects by searching on categories such as topic, methods, water body, sponsor, funding source, etc.

Financial Considerations

Contributing Agencies and Funding Sources

Much of this metric will involve in-kind contributions from existing state agency staff involved in the management of research projects. Consideration may want to be given to involving reviewers outside of the state agencies such as emeritus academic faculty which may require financial compensation for their participation in a research program review process.

**This might also be interpreted as the amount of resources necessary to sustain tracking of this measure, per April 13, 2010 team discussion.

Communication Strategy

Target Audience

The primary audience will be management staff of each agency sponsoring the research projects as well as legislators and the general public.

Associated Messages

The critical message to convey is the need for state sponsored research to execute the overall purpose of the Clean Water Fund.

Outreach Format

[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections

[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information

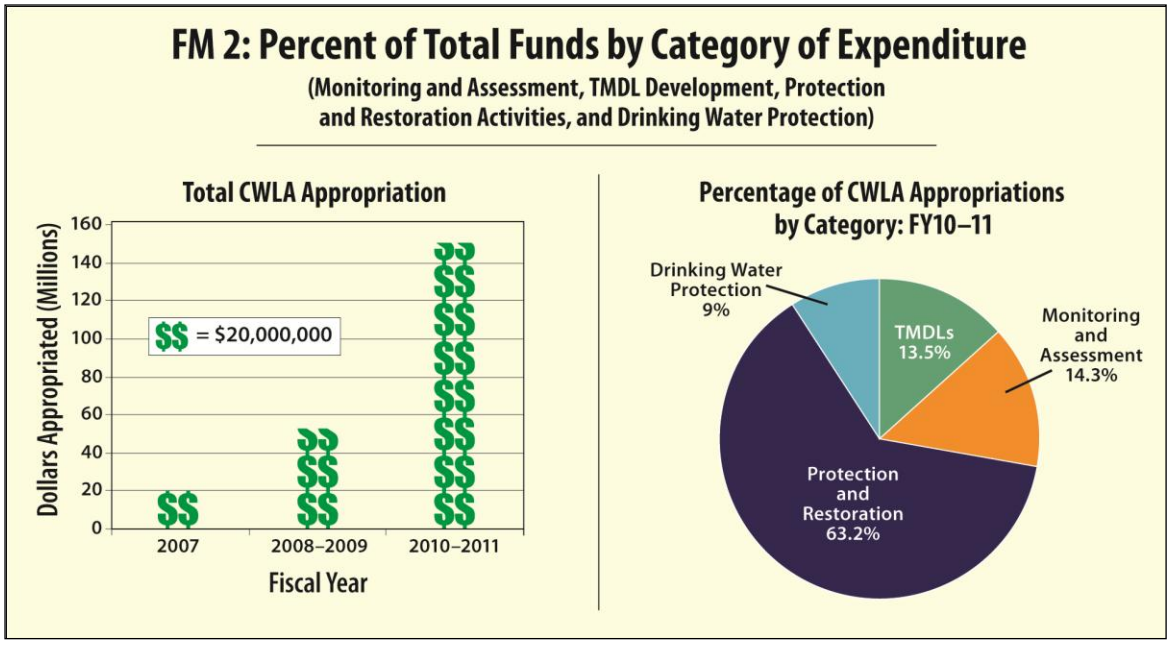
The primary point of contact would be the Clean Water Fund research team and its associated representatives from each agency that are overseeing research initiatives.

Financial Measures (FM)

FM 2: Percent of total funds by category of expenditure

Measure Background

Visual Depiction



Measure Description

This measure communicates the overall amount of Clean Water Legacy Act funding allocated in a particular year and provides a break-down of that funding in specific categories to demonstrate funding trends over time. Categories include TMDLs, monitoring and assessment, protection and restoration, and drinking water protection. This measure provides context for the other financial measures and can be tracked in future years to determine overall appropriation trends.

Associated Terms and Phrases

To better understand this measure, it is necessary to know what projects are tracked under each category. Definitions used in this measure are as follows:

TMDLs: Funding for the development of Total Maximum Daily Load studies (TMDLs) which are federally-required restoration plans that determine pollution reduction levels needed for each source of a pollutant in order to bring an impaired waterbody back into attainment with water quality standards.

Monitoring and assessment: Funding for water quality monitoring work and the assessment activities associated with determining whether a lake, river or stream is meeting water quality standards.

Protection and restoration: Funding for water improvement activities – ranging from installation of best management practices to delivery of public education programs – designed to "protect" higher quality waters that are unimpaired, or "restore" waters that are impaired.

Drinking water protection: These programs and activities are designed to ensure safe and sufficient drinking water statewide through a series of safeguards ranging from source to tap.

Target
There is no specific numeric target for this measure to date. A numeric target for this measure may be appropriate after funding trends over time are established.

Baseline
Fiscal year 2007 serves as the baseline for this measure.

Geographical Coverage
Statewide

Data and Methodology

Methodology for Measure Calculation
The information for this measure is calculated every biennium according to appropriations for each major category.

Data Source
The data for this measure are provided by the Clean Water Fund Interagency Team following biennial appropriations.

Data Collection Period
Data for this measure span fiscal year (FY) 2007 through FY 2011. Clean Water Legacy funding for drinking water/groundwater did not begin until FY 2010-2011 biennium.

Data Collection Methodology and Frequency

Supporting Data Set

Clean Water Funded Category	Percentage by Year*		
	FY 2007	FY 2008-2009	FY 2010-2011
TMDL	12.7	38.2	13.5
Monitoring and Assessment	8.6	27.6	14.3
Protection and Restoration	78.7	34.2	63.2
Drinking Water Protection	n/a	n/a	9

*Total appropriations by year: FY 2007: $24.95M; FY 2008-2009: $53.975M; FY 2010-2011: $152.245M

Caveats and Limitations
None at this time

Future Improvements
None at this time

Financial Considerations

Contributing Agencies and Funding Sources
Funding displayed in this measure are for the programs and activities of the Minnesota Pollution Control Agency, Board of Water and Soil Resources, Department of Natural Resources, Department of Health, Department of Agriculture and Public Facilities Authority. These agencies also direct funding to a myriad of local government and nonprofit agencies.

Communication Strategy

Target Audience
Stakeholders with interest in this measure include the State legislature, the Clean Water Council, and state agency partners.

Associated Messages
This measure is intended to demonstrate a focus on funding implementation activities. Although there are no numeric targets for this measure, the trend should demonstrate a majority of CWF funding going to implementation activities.

Outreach Format
The principle outreach format for this measure is on the websites of state agencies and possibly the Legislative Coordinating Commission's site.

Other Measure Connections
This measure doesn't explicitly link to other measures, but does help to shed light on what types of projects are receiving funding, which affects progress in under other measure categories. In other words, this measure shows the source of much "inputs" for the "output" and "outcome" measures.

Measure Points of Contact

Agency Information
Jeff Risberg, Minnesota Pollution Control Agency

Jeff.risberg@state.mn.us

FM 3: Dollars spent per watershed on monitoring/ assessment, planning and implementation *(early draft)*

Measure Background

Visual Depiction

TBD

Pie chart or bar graph for each watershed.

Measure Description

This measure will provide a relative sense of the amount of spending per watershed for the 81 major watersheds that comprise Minnesota. It will not detail all appropriated Clean Water Funding, as many activities supported by the Clean Water Fund (e.g., groundwater protection activities) are not watershed-based. Rather, it will account for dollars that are spent on a watershed basis and show the distribution of those dollars statewide.

Associated Terms and Phrases

Watershed: The surrounding land area that drains into a lake, river or river system. The watershed size used for this measure is at the "major watershed" scale (8 digit HUC). There are 81 major watersheds in Minnesota.

Monitoring includes:

- Condition monitoring – Monitoring consistently throughout the open water season with the objective of assessing the ambient, or background, condition of a lake or stream reach.
- Load monitoring - Flow and chemistry monitoring conducted at the mouth (or outlet) of each major watershed. Monitoring is conducted at least monthly, and more frequently during events (i.e., snowmelt or rain events). The objective of load monitoring is to capture the entire hydrograph (or variation in the amount of water flowing past a location per unit time), and to determine the pollutant load carried by a stream or river.
- Surface Water Assessment Grant (SWAG) – An MPCA grant that passes through funding to local partners for the purpose of conducting condition monitoring.

Assessment: The process of summarizing the biological, chemical and physical data available for a lake or stream site and comparing the data against water quality standards to determine if designated uses are supported. Implementation of protection activities: Implementation of practices to prevent degradation of a waterbody that is currently meeting water quality standards.

Planning includes:

- Restoration strategies: Planning activities to restore waterbodies not meeting water quality standards ("impaired"), including the development of a Total Maximum Daily Load study (TMDL) for an impaired water. A "TMDL" means a scientific study that contains a calculation of the maximum amount of a pollutant that may be introduced into a surface water and still ensure that applicable water quality standards for that water are restored and maintained. It results in pollution reduction goals for all sources of a pollutant in a watershed.
- Protection strategies: Planning activities to protect high quality waters that are currently achieving water quality standards.

Implementation includes:

- Restoration activities: Implementation of best management practices, improved sewage treatment or other pollution reduction measures to bring an impaired waterbody into attainment with water quality standards. These activities are often funded in response to an approved TMDL.
- Protection activities: Implementation of best management practices to maintain and improve waterbodies currently meeting water quality standards.

Local partners : Eligible regional and local government units, state agencies, political subdivisions, joint powers organizations, tribal entities, special purpose units of government, as well as the University of Minnesota and other public education institutions, according to the rules of the funding program (MN Statutes 114D.15). Eligible nonprofit or other nongovernmental organizations, according to the rules of the funding program.

Target

No target has currently been identified.

Baseline

FY 2007-present

Geographical Coverage

Coverage is by watershed and statewide.

Data and Methodology

Methodology for Measure Calculation

Monitoring/Assessment: For condition stream monitoring conducted by MPCA staff, the total cost of staff salary and program activities per year will be divided by the number of stream sites within the various watersheds begun that year. For condition lake monitoring conducted by MPCA staff, the total cost of staff salary and program activities per year will be divided by the number of lakes monitored within the various watersheds begun that year. For load monitoring sites, the total cost of staff salary and program activities per year will be divided by the number of load sites statewide. Then, the per site costs for lake, stream and load monitoring by MPCA will be multiplied by the number of sites/lakes within each watershed.

For sites monitored by local partners through Surface Water Assessment Grants, a per-site monitoring cost will be estimated by dividing the total amount of grant funding awarded by the number of lake and stream sites monitored by grantees each year. Cost to monitor stream sites will be weighted 2:1 to lakes to account for the fact that streams are monitored more frequently than lakes. The same process of estimating a per-site cost by dividing the total amount of funding given to subcontractors by the number of load monitoring sites sampled will be used for funding passed through to local/state partners to conduct both chemistry and flow monitoring through load monitoring contracts. The cost of all sites within each major watershed will then totaled for a per-watershed cost estimate.

TMDLs/restoration strategies: Spending on all LGUs and contractors was summed for all contracts and grants.

Protection strategy development:

Implementation:

Data Source

Monitoring/Assessment (MPCA): Salaries for MPCA monitoring and assessment staff are stored in MAPs/SWIFT. The total number of lake and stream sites monitored by MPCA staff by watershed is tracked in MPCA databases. The per-watershed estimate for MPCA to monitor and assess sites is calculated manually. Information on which sites are being monitored through SWAGs and in what watersheds these sites are located is pulled from STORET/EQuIS. The amount of funding awarded annually is pulled from MAPS/EQUIS. The per-site estimate and the summed cost of funding passed through by watershed are calculated manually. A similar process is used to calculate load monitoring pass-through funding.

TMDLs/Restoration strategies (MPCA) – Watershed DELTA

Implementation (BWSR, MPCA, MDA, DNR, PFA?)

Data Collection Period

Fiscal year

Data Collection Methodology and Frequency

Data should be collected annually.

Monitoring /Assessment: SWAG contracts are finalized the spring after the start of a new fiscal year, and sites monitored through SWAGs are established in STORET/EQuIS in early summer after a contract has been executed. Therefore, the earliest the watershed estimates can be made is 1.25 years after the start of a new fiscal year (i.e., can report on FY11 by the end of the first quarter of FY12). Staff salary estimates per watershed could be developed within 6 months after the start of a new fiscal year (i.e., can report on FY11 by the start of the second quarter of FY11).

TMDLs/Restoration strategy: Database data was analyzed manually, with all non-MPCA spending considered. Time spent by MPCA staff was not included.

Protection strategies:

Implementation:

Supporting Data Set

Monitoring Assessment:

TMDLs/Restoration strategy: Spending information was combined for FY07–10. The statewide and pilot watershed totals are included in the matrix.

Protection strategy:

Implementation:

Caveats and Limitations

Overall: Many Clean Water Fund appropriations are not dedicated to watershed work. Therefore, it's important to recognize that the costs documented in this measure only reflect funding spent on water activities employed via the watershed approach, and do not reflect all Clean Water Fund appropriations.

Monitoring/assessment: Making estimates by fiscal year is difficult, as the FY divides the field season. Note that the monitoring/assessment FY estimate will actually be the cost to monitor and assess the watershed sites begun the summer of the new FY (i.e., FY11 estimate will be the cost to monitor and assess the 2010 watershed sites). Because the monitoring and assessment work is split between MPCA staff and local partners, data is stored in many areas, and much of the data manipulation must be done manually, a large amount of work must be undertaken to break expenses down by watershed.

TMDLs/Restoration strategies: Because the DELTA database is not designed to easily collect information on this measure, a significant amount of time was required to do this. It was also difficult to determine which contracts should count toward this measure – all non-state agency spending or just contracts to local government.

Future Improvements

A future improvement would be to include the amount of state agency staff time and any other agency-related costs on a watershed basis.

Financial Considerations

Contributing Agencies and Funding Sources

[Only complete if applicable; narrative or numeric (possibly display as a table)]

MPCA, BWSR, MDA, PFA?

**This might also be interpreted as the amount of resources necessary to sustain tracking of this measure, per April 13, 2010 team discussion.

Communication Strategy -- to be determined

Target Audience
[who will have the most interest/concern about this measure]

Associated Messages
[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format
[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections
[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

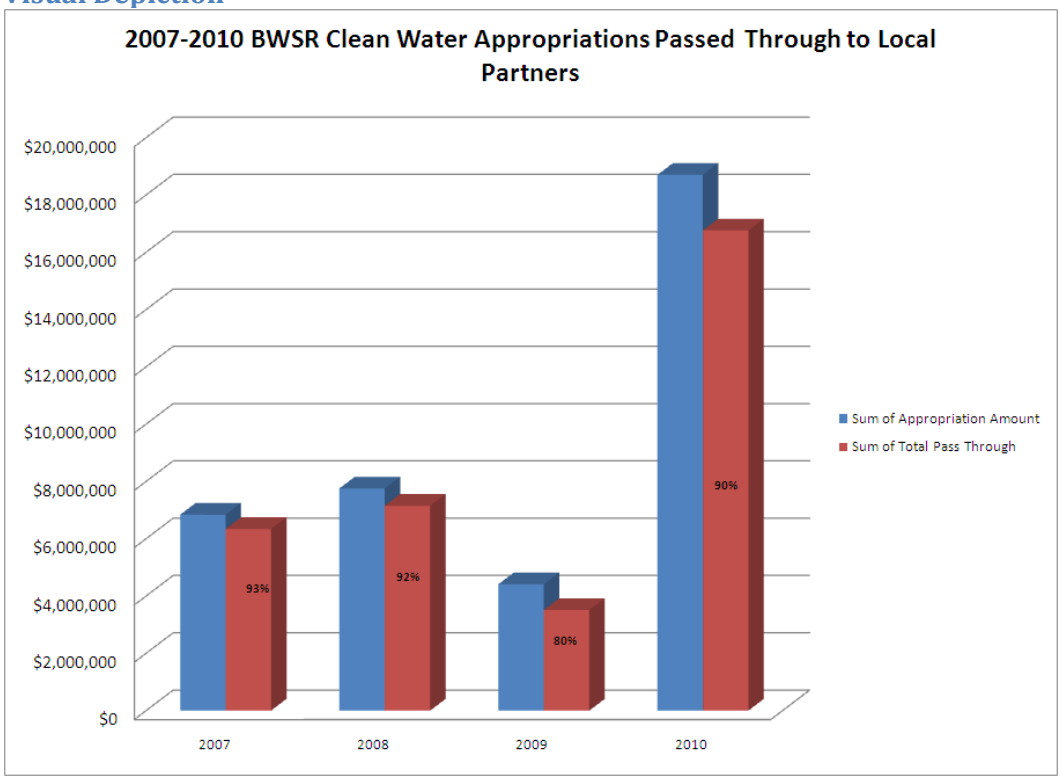
Measure Points of Contact

Agency Information
Monitoring/Assessment: MPCA Water Monitoring Section manager

FM 4: Dollars passed through to local partners *(early draft)*

Measure Background

Visual Depiction



Measure Description

This measure provides statewide and watershed specific numbers for the amount of Clean Water funding passed through to local partners on monitoring, watershed planning (TMDLs and Protection strategies), and implementation (protection and restoration activities).

Associated Terms and Phrases

Drinking water protection:

Implementation of restoration activities: Implementation of best management practices, improved sewage treatment or other pollution reduction measures to bring an impaired waterbody into attainment with water quality standards. These activities are often funded in response to an approved TMDL.

Implementation of protection activities: Implementation of practices to prevent degradation of a waterbody that is currently meeting water quality standards.

Local partners : Eligible local government units, state agencies, political subdivisions, joint powers organizations, tribal entities, special purpose units of government, as well as the University of Minnesota and other public education institutions, according to the rules of the funding program (MN Statutes 114D.15). In addition, eligible nonprofit or other nongovernmental organizations, according to the rules of the funding program.

Monitoring:

Condition monitoring – Monitoring consistently throughout the open water season with the objective of assessing the ambient, or background, condition of a lake or stream reach.

Load monitoring - Load monitoring: Flow and chemistry monitoring conducted at the mouth (or outlet) of each major watershed. Monitoring is conducted at least monthly, and then more frequently during events (i.e., snowmelt or rain events). The objective of load monitoring is to capture the entire hydrograph, and to determine the pollutant load carried by a stream or river.

Passed through: Clean Water funding (including one-time 2007 Clean Water Legacy appropriations) that is appropriated to state agencies and then distributed to local partners through contracts, grants, loans, etc.

Protection strategies: Planning activities to protect high quality waters that are currently achieving water quality standards.

Surface Water Assessment Grant (SWAG) : An MPCA grant that passes through funding to local partners for the purpose of conducting condition monitoring.

TMDL development: Planning activities to assist in the development of a Total Maximum Daily Load study (TMDL) for impaired water. A "TMDL" means a scientific study that contains a calculation of the maximum amount of a pollutant that may be introduced into a surface water and still ensure that applicable water quality standards for that water are restored and maintained. It results in pollution reduction goals for all sources of a pollutant in a watershed.

Target
No target has currently been identified.

Baseline
FY 2007-present

Geographical Coverage
Coverage is by watershed and statewide.

Data and Methodology

Methodology for Measure Calculation

Monitoring - For sites monitored by local partners through SWAGs, a per-site monitoring cost will be estimated by dividing the total amount of grant funding awarded by the number of lake and stream sites monitored by grantees each year. Cost to monitor stream sites will be weighted 2:1 to lakes to account for the fact that streams are monitored more frequently than lakes. The same process of estimating a per-site cost by dividing the total amount of funding given to subcontractors by the number of load monitoring sites sampled will be used for funding passed through to local/state partners to conduct both chemistry and flow monitoring through load monitoring contracts. The cost of all sites within each major watershed will then be totaled for a per-watershed cost estimate.

TMDLs/restoration strategies: Spending on all LGUs and other local partners was summed for all contracts and grants.

Protection strategy development:

Implementation activities: For implementation programs administered by BWSR, grant recipients are required to enter financial data in eLINK, BWSR's web-based reporting and tracking tool. This financial information includes CWF grant dollars, and other local, state or federal dollars used as matching funds for the project. More information on eLINK is available at www.bwsr.state.mn.us/outreach/eLINK/manual/index.html.

Drinking Water Protection:

Data Source

Monitoring (MPCA) – Information on which sites are being monitored through SWAGs and in what watersheds these sites is pulled from STORET/EQuIS. The cost of each contract is pulled from MAPS/SWIFT. The per-site estimate and the summed cost of funding passed through by watershed are calculated manually. A similar process is used to calculate load monitoring pass-through funding, though all information comes from program staff who manually gathers the site locations and their major watershed associations.

TMDLs/Restoration strategies (MPCA) – Watershed DELTA

Protection Strategies

- BWSR:
- MDA:
- MPCA
- DNR:

Implementation activities –

- BWSR: For programs administered by BWSR, local grant recipients are required to enter financial data in eLINK, BWSR's web-based reporting and tracking tool. More information on eLINK is available at www.bwsr.state.mn.us/outreach/eLINK/manual/index.html.

- MDA:
- MPCA
- DNR:
- PFA

Drinking Water (MDH, others?)

Data Collection Period

Fiscal year starting with 2007

Data Collection Methodology and Frequency

Watershed data are collected annually.

Monitoring: SWAG contracts are finalized the spring after the start of a new fiscal year, and sites monitored through SWAGs are established in STORET/EQuIS in early summer after a contract has been executed. Therefore, the earliest the watershed estimates can be made is 1.25 years after the start of a new fiscal year (i.e., can report on FY10 by the end of the first quarter of FY11).

TMDLs/Restoration strategy: Database data was analyzed manually, with all non-MPCA spending passed through to local partners considered. Time spent by MPCA staff was not included.

Protection strategies:

Implementation activities (BWSR, MPCA, MDA, DNR, PFA)

For data that is entered in eLINK, BWSR staff extracts the data by querying eLINK for BMPs implemented with Clean Water Fund dollars. Local grant recipients enter financial information into eLINK every six months, recording only those BMPs that are fully implemented at that time.

Drinking Water protection:

Supporting Data Set

Monitoring: SWAG = $1.1 million in 2010; $1.7 million in 2009, $1.9 million in 2008, $1.1 million in 2007.
Load monitoring = $

TMDLs/Restoration strategies: Spending information was combined for FY07-10. The statewide and pilot watershed totals are included in the matrix. Total for TMDLs: $8,316,051.44 This includes all CWLA spending from 7/1/07-1/1/10 on contracts with LGUs (approx. 49% of all $ spent on contracts). Database needs to better address this measure.

Protection strategies:

- BWSR:
- MDA:
- MPCA
- DNR:

Implementation activities

- BWSR:

Fiscal Year	Sum of Appropriation Amount	Sum of Total Pass Through
2007	$ 6,840,000	$ 6,340,000
2008	$ 7,753,000	$ 7,153,000
2009	$ 4,413,000	$ 3,513,000
2010	$ 18,705,000	$ 16,762,217
Grand Total	**$ 37,711,000**	**$ 33,768,217**

- MDA:
- MPCA
- DNR:
- PFA:

Drinking Water Protection

Caveats and Limitations

Monitoring: Because SWAG and load monitoring contracts cover sites located in more than one watershed, a per-site estimate must be calculated manually. This is a time-consuming process.

TMDLs/Restoration strategies: Because the DELTA database is not designed to easily collect information on this measure, a significant amount of time was required to do this.

Future Improvements

Financial Considerations

Contributing Agencies and Funding Sources

[Only complete if applicable; narrative or numeric (possibly display as a table)]

**This might also be interpreted as the amount of resources necessary to sustain tracking of this measure, per April 13, 2010 team discussion.

Communication Strategy – to be determined

Target Audience

[who will have the most interest/concern about this measure]

Associated Messages

[relates to measure description; what does this measure convey and why is it important to communicate this measure to the target audiences]

Outreach Format

[where will this measure be used, such as newsletters, websites, reports, etc.; include frequency of each format and any specifics about how presentation of the measure should vary for each outreach format]

Other Measure Connections

[what are the other measures that link to this measure to provide a comprehensive and accurate message/story]

Measure Points of Contact

Agency Information

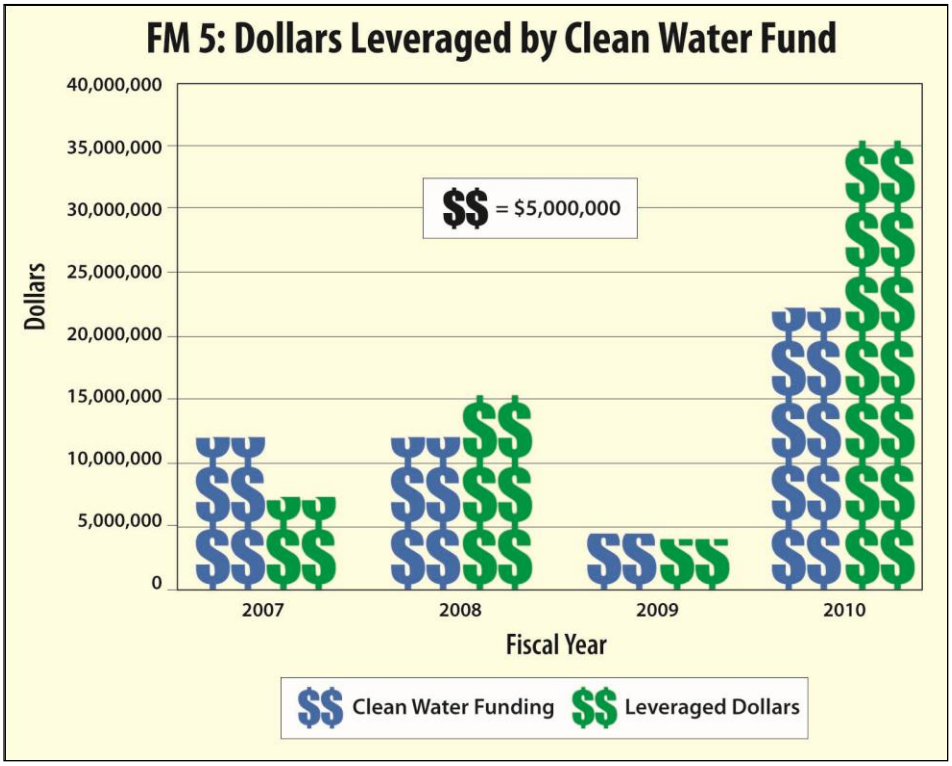
Monitoring: MPCA Lakes and Streams Monitoring supervisor (SWAG); MPCA Ground Water and Flow Monitoring Unit supervisor (load monitoring)

FM 5: Dollars leveraged by Clean Water Fund

Measure Background

Visual Depiction

The graphics depict the annual amount of leveraged dollars calculated statewide by the various agencies receiving Clean Water funding.



Measure Description

This measure communicates the dollars leveraged through Clean Water Fund appropriations including one time (FY 2007–2009) Clean Water Legacy Act appropriations. The Clean Water appropriations comprise funding from multiple state grant and loan programs. It is a direct financial measure of dollars spent on implementation activities.

Associated Terms and Phrases

To better understand this measure, it is necessary to understand the following terms and phrases:

1. Clean Water Funding: For this measure, the term Clean Water Funding refers specifically to Clean Water Grants distributed to local governments for BMP implementation through special Clean Water Fund appropriations to various State grant and loan programs, including one-time (FY 2007–2009) Clean Water Legacy Act appropriations and ongoing Clean Water Fund appropriations starting in FY10. A list of CWF grant and loans programs can be found at http://www.cdf.leg.mn/.

2. TMDL Grant Program is designed to fund up to 50% for a maximum of $3 million for mandates resulting from an USEPA approved TMDL and Agency approved implementation plan that requires capital improvements that are beyond their current NPDES permit.
3. Phosphorus Reduction Grant program is designed to fund up to 75% (until June 30, 2010), and after that 50% for a maximum of $500,000 for more stringent treatment for phosphorus treatment to 1.0 mg/L or less due to a permit requirement.
4. CWF Ag BMP Loan Program – A water quality program that provides zero interest loans to local units of government who in turn provide low interest loans to individuals for agricultural Best Management Practices that help implement agricultural non-point source pollution priorities in TMDL implementation plans.
5. Clean Water Legacy Grant Program – A grant program administered through BWSR with one time (FY 2007-2009) Clean Water Legacy Act appropriations. More information regarding this program can be found at http://www.bwsr.state.mn.us/CWL/index.html .
6. Clean Water Fund Grant Program – A grant program administered through BWSR with Clean Water Fund appropriations. More information regarding his program can be found at http://www.bwsr.state.mn.us/cleanwaterfund/index.html .
7. Clean Water Partnership Grant Program – A grant program administered through the MPCA's Clean Water Fund appropriations. It is designed to provide implementation funding to local units of government who are implementing protection-focused implementation activities. Grant recipients must pay for 50% of total project costs.
8. BWSR – Minnesota Board of Water and Soil Resources
9. DNR – Minnesota Department of Natural Resources
10. MDA – Minnesota Department of Agriculture
11. MDH – Minnesota Department of Health
12. MPCA – Minnesota Pollution Control Agency
13. PFA - Minnesota Public Facilities Authority

Target
There is no specific numeric target for this measure.

Baseline
FY 2007 serves as the baseline for this measure.

Geographical Coverage
Statewide

Data and Methodology

Methodology for Measure Calculation
For the purpose of this measure, required match dollars are included as part of the dollar amount leveraged. To calculate this measure, state agency staff collects financial information by each program and sum these figures to provide a single dollar amount for the state.

Data Source

Component programs of the Clean Water Fund Grants	Responsible State Agency	Funding Availability*	Data Source for Leveraged Funds
TMDL Grant Program	PFA	FY07, 08, 09, 10	PFA spreadsheet Project applications MPCA reviewed and approved accepted as-bid
Phosphorus Reduction Grant program	PFA	FY07, 08, 09, 10	PFA spreadsheet Project applications MPCA reviewed and approved accepted as-bid
Clean Water Legacy Grants	BWSR	FY07, 08, 09	eLINK
Clean Water Fund Grants	BWSR	FY10,	eLINK
Ag BMP Loans	MDA	FY07, 08, 09, 10	AgBMP Loan Program database
Clean Water Partnership Grants	MPCA	FY10, 11	MPCA spreadsheet
St. Louis River Direct Appropriation	MPCA	FY 10, 11	MPCA spreadsheet
Forest Stewardship Grants	DNR	FY07	[ask DNR]
Source Water Protection Grants	MDH	FY2010,2011	[ask MDA]

Data Collection Period

FY 2007 - FY 2010

Data Collection Methodology and Frequency

For programs administered by PFA, data collection involves reviewing accepted as-bid contract awards as compared to accepted grant award.

For programs administered by BWSR, funding cycles are on an annual basis. Local grant recipients are required to enter financial information regarding leveraged funds in eLINK, BWSR's web-based reporting and tracking tool. More information on eLINK is available at www.bwsr.state.mn.us/outreach/eLINK/manual/index.html.

Supporting Data Set

Table 1. PFA Clean Water Grant Funds

Fiscal Year	TMDL and Phosphorus Grants	Leveraged Dollars	% Leveraged
2007	$ 3,321,607	$ 3,787,380	114
2008	$ 4,074,712	$ 9,061,728	222
2009	$ 523,000	$ 523,000	100
2010	$ 7,039,235	$ 9,999,026	142

Table 2. BWSR Clean Water Grant Funds

Fiscal Year	BWSR Clean Water Funding	Leveraged Dollars	% Leveraged
2007	$ 7,375,000	$ 2 ,263,260	31

2008	$ 6,672,730	$ 4,883,139	73
2009	$ 2,641,909	$ 2,209,600	84
2010	$ 11,807,597	$ 21,901,021	185

Table 3. Clean Water MDA Ag BMP Loans

Fiscal Year	CWF Ag BMP Loans	Leveraged Dollars	% Leverage
2007	$ 1,200,000	$ 1,200,000	100
2008	$ 1,250,000	$ 1,250,000	100
2009	$ 1,250,000	$ 1,250,000	100
2010	$ 2,000,000	$ 2,000,000	100
2011	$ 2,500,000	$ 2,500,000	100

Table 4. MPCA St. Louis River Restoration Clean Water Funds

Fiscal Year	MCPA Clean Water Funding	Leveraged Dollars	% Leveraged
2010/2011	$ 750,000	$ 1,993,000	266

Table 5. MPCA Clean Water Partnership Grant Funds

Fiscal Year	MCPA Clean Water Funding	Leveraged Dollars	% Leveraged
2010	$ 1,185,835	$ 1,185,835	100
2011	$ 1,314,165	$ 1,314,165	100

Table 5. Clean Water Funding

Fiscal Year	Clean Water Funding	Leveraged Dollars
2007	$ 11,896,607	$ 7,250,640
2008	$ 11,997,442	$ 15,194,867
2009	$ 4,414,909	$ 3,982,600
2010	$ 22,032,667	$ 35,085,882

Caveats and Limitations

For PFA, the above estimates account for only TMDL or Phosphorus eligible costs. Often other facility improvements are also pursued at the same time to utilize economies of scale and other fixed costs such as equipment mobilization.

For BWSR, grants administered from the one time (FY2007–2009) Clean Water Legacy act appropriations had no match requirements in FY2007. However, many projects used BWSR State Cost Share program guidelines for their projects and provided a 25% local match. Additionally in FY2007, State bonding funds were a part of the funding package. These bonding projects did not require match, but projects needed to be connected to public land or infrastructure. In FY 2008 and FY 2009, 25% match was required for a portion of the grant dollars, but not all. Starting in FY2009, BWSR introduced a $30,000 grant minimum and starting in FY 2010, BWSR required a 25% match requirement for all grant dollars.

For MDA, in FY11, up to $300K may be used for administrative purposes; any amount not used for that purpose by the end of the fiscal year will be added to the program's revolving loan funds.

Future Improvements

Financial Considerations

Contributing Agencies and Funding Sources

Communication Strategy

Target Audience

Stakeholders with interest in this measure include the State legislature, the Clean Water Council, and state agency partners.

Associated Messages

This measure depicts how much non-state funds the Clean Water Fund is leveraging and is a direct measure of dollars being spent of implementation. On average, for fiscal years 2007–2010, Minnesota has leveraged $1.2 non-state dollars for every $1 of Clean Water Funds.

Other Measure Connections

Measure Points of Contact

Agency Information

Bill Dunn, Clean Water Revolving Fund Coordinator, Minnesota Pollution Control Agency
520 Lafayette Road North
Saint Paul, MN 55155
Phone 651.757.2324

Conor Donnelly, Board of Water and Soil Resources

Dwight Wilcox, Minnesota Department of Agriculture

Appendix B: Effectiveness Measures and Key Audience Questions from July 20, 2009 Team Meeting

Minnesota Clean Water Legacy Effectiveness Tracking Clean Water Council/Inter-Agency Staff Team

Materials and Activities for July 20, 2009 Meeting

On Monday, July 20, 2009, we will work on next steps for refining the measures identified in the Clean Water Legacy Effectiveness Tracking Framework. Please review the attached materials in advance of our meeting, scheduled to take place from 9:00 am – 12:30 pm, to ensure we maximize our time together.

Meeting Materials

Materials for this meeting include two tables of measures. The two tables are a result of a reorganization of the table generated based on brainstorming during the June 2009 meeting.

- **Table 1** contains 10 implementation questions that have shared target audiences. Some of these shared implementation questions have existing measures, while others require additional or new measures. Most of these questions require targets to serve as benchmarks for each measure.
- **Table 2** contains the remaining 41 implementation questions that are unique to specific target audiences. Similar to the implementation questions in Table 1, some have existing measures but there several that require new or additional measures. Most of the implementation questions in Table 2 also require targets.

Meeting Goals

The goals of the July 20, 2009 meeting are as follows:

- To complete the development of measures and associated targets for implementation questions that share multiple target audiences;
- To continue refining and narrowing measures and associated targets for implementation questions that are unique to a specific target audience.

Activities to Achieve Goals

The activities for the July 20, 2009 meeting will focus on achieving the two goals.

To complete the development of measures for shared implementation questions, we will focus the initial portion of the meeting on addressing gaps in Table 1. Activities will include the following:

1. Review each implementation question to determine if the identified existing measures are appropriate.
2. Where needed, develop a new measure for tracking an implementation question.
3. Once the measures are finalized, select the appropriate target to serve as a benchmark for the measure(s).

- ✓ In preparation: Please take some time prior to the meeting to review the identified existing measures, consider potential new measures where gaps exist, and consider appropriate targets (including rationale for the target). Having these thoughts in advance of the meeting will allow us to exchange and discuss options, rather than brainstorming them as a group during the meeting.

To continue refining and narrowing measures and associated targets for implementation questions that are unique to a specific target audience, we will focus Table 2. Activities will include the following:

1. Review each implementation question under each target audience to determine if there are any to eliminate from the list.
2. After going through the entire list, review the new suite of implementation questions. If the remaining implementation question has an existing measure, determine if the existing measure is appropriate.
3. Where needed, develop a new measure for tracking the implementation question.
4. Once the measures are finalized, select the appropriate target to serve as a benchmark for the measure(s).
   - ✓ In preparation: Please take some time prior to the meeting to review the list of 41 implementation questions that are specific to target audiences and determine if there are any you would recommend deleting from the table. Of those you would recommend keeping, consider if existing measures are appropriate or if additional or new measures are necessary. Consider recommendations for targets. Having these thoughts in advance of the meeting will allow us to exchange and discuss options, rather than brainstorming them as a group during the meeting

Table 1. Potential Implementation Questions and Associated Measures with Shared Target Audiences

Potential Implementation Questions[1]	Appropriate Measures for Answering Questions		Considerations for Potential Targets
	Existing Measures[2]	Potential New[3] Measures	
Shared Audiences: Citizens and non-governmental organizations			
1. Is our taxpayer money being used effectively? • Do they have a plan that I can understand? • Are they making progress toward the plan? • Are programs working together and not duplicating effort? • Is money being spent on the ground or is it going to research? • How quickly are we seeing changes?	a) # and % of 303(d) impaired waters (total and by listing year) with MPCA approved protection/restoration implementation plans (MPCA; organizational performance) b) Degree of implementation of targeted BMPs (as specified in implementation plans or protection plans) (?; organizational performance)/ % of projects completed relative to implementation plan estimates (?; organizational performance) c) Number of watersheds with interagency condition monitoring involvement/cooperation (MPCA; partnerships/leveraging) d) Number of watersheds with involvement of more than one agency (NWS, USGS, COE, MDNR, MPCA, MDA; partnerships/leveraging) e) $$ spent by MPCA (annually/biennially) on monitoring and assessment (MPCA; organizational performance) f) % of load monitoring sites and milestone sites with decreasing/increasing trends in pollutant load or concentration (MPCA; environmental measures) g) Trend in key water quality parameters on "trend" lakes in watershed (MPCA task suggested by DNR; environmental measures)/ # and % of lakes with increasing/decreasing water quality (MPCA; environmental measures)		a) Team will need to define the target # and % of impaired waters (total and by listing year) with MPCA approved plans; could involve looking at the # and % of plans during a selected baseline year and then setting targets over a 25 year period b) Team will need to define the target degree of BMP implementation over time or define the target % of completed projects over time (e.g., 25% by end of year 1, 50% by end of year 2, etc.)

[1] Assumption is that questions are from members of the target audience to state agency staff responsible for managing Clean Water Legacy Act funding.
[2] Taken from Appendix B "Final Framework and Measures" without modification
[3] Identified during meeting on June 3, 2009

Potential Implementation Questions[1]	Appropriate Measures for Answering Questions		Considerations for Potential Targets
	Existing Measures[2]	Potential New[3] Measures	
Shared Audiences: Citizens, non-governmental organizations, legislature, local governments, state agency managers			
2. Is our water getting cleaner? • Can we swim? • Can we recreate? • What are the aesthetics? • Can we eat the fish? • Are our water supplies safe to drink?	a) # and % of lakes/lake acres and stream miles supporting/not supporting designated uses (by use, based on random monitoring) (MPCA; environmental measure) b) # and % of lakes with increasing/decreasing water quality (MPCA; environmental measure) c) Overall trend in fish tissue mercury concentrations in MN lakes (MPCA task that includes DNR data; environmental measure)	[Consider new measures that specifically address questions related to recreation, aesthetics, and water supplies]	
Shared Audiences: Citizens, Clean Water Council, state agency managers			
3. Are we coordinating between the two divisions of the Legacy funding to avoid gaps and duplication of effort?	[No existing measures identified to adequately assess this question.]		
Shared Audiences: Citizens and local government			
4. When is something going to happen in my watershed (schedule and equity)?	[No existing measures identified to adequately assess this question.]		
Shared Audiences: Legislature, non-governmental organizations, local government			
5. Are the actions balancing both regulated and unregulated sectors/sources?	[No existing measures identified to adequately assess this question.]		
Shared Audiences: Legislature, non-governmental organizations, Clean Water Council, state agency managers			
6. Are we meeting the specific outcomes required in the Act and the appropriations bills?	a) Waterbodies assessed for fish contamination concentration v. identified CWL annual target (DNR; organizational performance) b) Lake IBI assessments completed v. identified CWL annual target (DNR; organizational performance)	[Need to add in other measures that address the specific outcomes of the CWLA and appropriations bill]	a) CWL annual target b) CWL annual target

Potential Implementation Questions[1]	Appropriate Measures for Answering Questions		Considerations for Potential Targets
	Existing Measures[2]	Potential New[3] Measures	
Shared Audiences: Public water supplies, non-governmental organizations, academia			
7. Who received grants and what were they used for?	[No existing measures identified to adequately assess this question.]		
8. How were grants selected?	[No existing measures identified to adequately assess this question.]		
Shared Audiences: Non-governmental organizations, Clean Water Council, state agency managers			
9. Is the process transparent as possible?	[No existing measures identified to adequately assess this question.]	Develop measure/index that embodies factors related to transparency (public participation, access to data, etc.)	
Shared Audiences: Local government and state agency managers			
10. How much money being spent on the ground versus going to agencies for administration?	a) Ratio of agency admin: project awards or program dollars (?; organizational performance)		a) Team should define desired ratio

Table 2. Potential Implementation Questions and Associated Measures Unique to Specific Target Audiences

Potential Implementation Questions[4]	Appropriate Measures for Answering Questions		Considerations for Potential Targets
	Existing Measures[5]	Potential New[6] Measures	
A. Target Audience: Citizens **Communication Considerations:** Explain the importance of research and assessment in the overall implementation process.			
1. What is the return on our investment?	[No existing measures identified to adequately assess this question.]		
2. Will we be done in 25 years?	[No existing measures identified to adequately assess this question.]		
B. Target Audience: Legislature **Communication Considerations:** Emphasize the importance of effective communication to the public.			
3. How much money is being spent?	[No existing measures identified to adequately assess this question.]		
4. How much money is being leveraged in matching dollars from local, state, and federal monies? (asked by special committees working on water and resource issues)	a) Ratio of CWLA $ to total project $ b) $ and time invested by local, state, and federal entities on local TMDLs (MPCA; partnerships/leveraging)		a) Define desired ratio of CWLA $ to total project $ b) Define desired $ and amount of time invested on local TMDLs; could entail selecting a baseline year (pre-CWLA) and showing the increasing trend annually
5. Are there other costs (i.e., economic impacts) to protecting and restoring our waters (e.g., lost opportunities for growth or plant expansions)?	[No existing measures identified to adequately assess this question.]		

[4] Assumption is that questions are from members of the target audience to state agency staff responsible for managing Clean Water Legacy Act funding.
[5] Taken from Appendix B "Final Framework and Measures" without modification
[6] Identified during meeting on June 3, 2009

Potential Implementation Questions[4]	Appropriate Measures for Answering Questions		Considerations for Potential Targets
	Existing Measures[5]	Potential New[6] Measures	
6. Are there other economic benefits associated with water quality improvements (e.g., increased tourism and property values)?	[No existing measures identified to adequately assess this question.]		
7. How much local participation do we have?	a) % of SWAG grants with volunteer participation (MPCA; partnerships/leveraging) b) $ spent by MPCA on local/citizen monitoring efforts (CLMP, CSMP, SWAG) (MPCA; partnerships/leveraging) c) Cumulative total of volunteers (active and inactive) that have participated at one time or another in CLMP, CSMP, SWAG (MPCA; social measures)		a) Define desired % of grants with volunteer participation (e.g., 80%) b) Define desired $ amount and time frame; potentially select a baseline year to show increasing or decreasing trends c) This might not have a target total number of volunteers, but might want to show increasing trend from a baseline year
8. How well are we communicating progress?	[No existing measures identified to adequately assess this question.]		
9. Do we have the resources, data, and information needed to support reporting and auditing?	[No existing measures identified to adequately assess this question.]		
C. Target Audience: Public water suppliers **Communication Considerations:** Demonstrate cooperation and synergy between surface water and ground water			
10. Will the actions we take under the plans be effective? Is wellhead protection working?	[No existing measures identified to adequately assess this question.]	Trends in treatment (increasing/decreasing/no change)	

Potential Implementation Questions[4]	Appropriate Measures for Answering Questions		Considerations for Potential Targets
	Existing Measures[5]	Potential New[6] Measures	
11. Have the plans resulted in prevention of contamination?	[No existing measures identified to adequately assess this question.]	Trends in treatment (increasing/decreasing/no change)	
12. Is substantial implementation occurring?	a) Degree of implementation of targeted BMPs (as specified in implementation plans or protection plans) (?; organizational performance)/ % of projects completed relative to implementation plan estimates (?; organizational performance)		
D. Target Audience: Non-governmental organizations [See Table 1; no implementation questions that are unique solely to this target audience.] **Communication Considerations:** None identified specific to this target audience.			
E. Target Audience: Clean Water Council **Communication Considerations:** Identify mechanisms and approaches for tracking and communicating prevention, including surrogate measures such as stakeholder support and outreach. Develop "wellness" stories to highlight prevention successes.			
13. What is the cost-benefit of funded projects?	[No existing measures identified to adequately assess this question.]		
14. Is there balance among funding for outreach, education, and research?	[No existing measures identified to adequately assess this question.]		
15. Is there balance between funding for restoration and protection?	[No existing measures identified to adequately assess this question.]		
F. Target Audience: Industry groups **Communication Considerations:** Identify businesses benefitting from clean water and ask them to speak out as advocates for action.			
16. What are the actions associated with the CWLA going to cost me and how will they affect my bottom line?	[No existing measures identified to adequately assess this question.]	[Consider developing measures for (a) sources and (b) water-related businesses (e.g., tourism)]	

Potential Implementation Questions[4]	Appropriate Measures for Answering Questions		Considerations for Potential Targets
	Existing Measures[5]	Potential New[6] Measures	
17. Is there balance in the sectors targeted? (alternative: Is what I am asked to do proportionate to my contributions to the problem?)	[No existing measures identified to adequately assess this question.]		
18. Have we had a voice in the process?	a) # of substantive comments received and incorporated into each TMDL	[This question probably needs a measure that goes beyond the TMDL process]	
19. Has our voice been heard in the process?	a) # of substantive comments received and incorporated into each TMDL	[This question probably needs a measure that goes beyond the TMDL process]	
20. Are some of the resources generated helping me to offset my costs (alternative: Am I getting my share of the resources available?)	[No existing measures identified to adequately assess this question.]		
G. Target Audience: Local governments **Communication Considerations:** None identified specific to this target audience.			
21. Are we getting our share of the available resources?	[No existing measures identified to adequately assess this question.]		
22. What is the sequencing of projects in my area?	[No existing measures identified to adequately assess this question.]		
23. Are the activities new or do they build on existing programs and plans (i.e., do they avoid reinventing the wheel and creating more work)?	[No existing measures identified to adequately assess this question.]		
24. What are the changes to the list of impaired waters and the associated pollutants of concern?	[No existing measures identified to adequately assess this question.]		

Potential Implementation Questions[4]	Appropriate Measures for Answering Questions		Considerations for Potential Targets
	Existing Measures[5]	Potential New[6] Measures	
25. Are we preventing impairments?	[No existing measures identified to adequately assess this question.]		
26. What is the balance between restoration and protection?	[No existing measures identified to adequately assess this question.]		
27. How is the CWLA affecting development?	[No existing measures identified to adequately assess this question.]		
28. How coordinated are the agencies?	a) Number of watersheds with interagency condition monitoring involvement/cooperation (MPCA; partnerships/leveraging) b) Number of watersheds with involvement of more than one agency (NWS, USGS, COE, MDNR, MPCA, MDA; partnerships/leveraging)		
29. Are there unintended consequences of implementation decisions?	[No existing measures identified to adequately assess this question.]		
H. Target Audience: State-level agency managers **Communication Considerations:** None identified specific to this target audience.			
30. What mechanisms have we put in place to avoid unintended consequences in implementation decisions that result in shifting the problem?	[No existing measures identified to adequately assess this question.]		
31. How are we addressing unintended consequences?	[No existing measures identified to adequately assess this question.]		
32. Are we making progress on all self-imposed goals? Includes: • Statutory outcomes • Schedule • Implementation actions • Delisting	[No existing measures identified to adequately assess this question.]		

Potential Implementation Questions[4]	Appropriate Measures for Answering Questions		Considerations for Potential Targets
	Existing Measures[5]	Potential New[6] Measures	
33. Are we meeting budgets?	[No existing measures identified to adequately assess this question.]		
34. Are we being cost-effective within and across projects?	a) Average MPCA cost per site for intensive stream, load monitoring, and lake monitoring (MPCA; organizational performance) b) Average cost per site for SWAG projects (MPCA; organizational performance)		a) Define target average cost for monitoring b) Define target average cost for SWAG project
35. Where is the funding being spent across the state?	[No existing measures identified to adequately assess this question.]		
I. Target Audience: Academia (Focus: Education and Outreach) **Communication Considerations:** None identified specific to this target audience.			
36. Is the appropriate amount of money going to education and training of current water professionals?	a) Development and participation in UM and MNSCU certification and training programs and other conferences		
37. How effective are citizen outreach activities?	a) % of TMDL projects with pre & post social indicator survey (CAP study; social measures) b) Develop CAP survey and identify constraints to BMP adoption (?; social measures) c) Public behavior change measures for MS4 public education and participation and minimum control measures (?; social measures)		
38. Are we investing in higher education for future water professionals?	a) # of UM and MNSCU undergraduate and graduate courses including definition of engineering license related du diligence guidelines (?; social measure)		
J. Target Audience: Academia (Focus: Research) **Communication Considerations:** None identified specific to this target audience.			
39. Is enough funding going to research?	[No existing measures identified to adequately assess this question.]		

Potential Implementation Questions[4]	Appropriate Measures for Answering Questions		Considerations for Potential Targets
	Existing Measures[5]	Potential New[6] Measures	
40. Is the right research being done?	a) # of research projects to determine adequacy of models used in TMDLs (?; organizational performance)	[Consider developing an additional measure that addresses research beyond TMDL models]	
41. Is the right expertise being engaged?	[No existing measures identified to adequately assess this question.]		

Proposed Performance Management Constructs and Sample Measures

Building Four Levels of Community Capacity for Public Involvement in MPCA Watershed Projects

1. **Community Member -- The degree to which a connection exists between community members' core values, knowledge and concerns about water issues, and how they engage in environmental behaviors and civic actions.**

    - ❖ Community members are aware of watershed issues
    - ❖ Community members express concern about water resources and impacts on their community
    - ❖ Community members actively participate in water resource stewardship

2. **Civic Relationships -- The degree to which social networks encourage information and idea exchange, build trust, and engender a shared identity around the restoration or protection of a local waterbody.**

    - ❖ Trusting relationships and social networks exist in the community
    - ❖ Relationships and social networks foster information and idea exchange around watershed issues
    - ❖ Relationships and social networks extend beyond community boundaries.

3. **Organizations -- The degree to which community organizations and institutions (structures, processes and culture) promote leadership development, pool and leverage resources, encourage intra-community and regional communication and coordination, apply adaptive learning, and sustain community participation in watershed planning and decision making.**

    - ❖ Community organizations/institutions promote awareness, concern, and watershed stewardship
    - ❖ Community organizations/institutions develop conservation leaders

- ❖ Community organizations/institutions pool and leverage resources for the good of the community and the watershed
- ❖ Community organizations/institutions engage in long-term, coordinated actions at the watershed scale.

4. **Program Evaluation -- The degree to which watershed project effectively assess and monitor community capacity for civic engagement in terms of:**
   a. **Community member learning, involvement and actions**
   b. **Community relationships and social networks**
   c. **Organizational/Institutional effectiveness**

   The degree to which the project uses information from community capacity assessment to:
   d. **Influence civic actions and behaviors relative water quality improvement goals**
   e. **Strengthen social networks and information exchange around water resource protection**
   f. **Develop community organizations and institutions that promote sustained community participation in watershed projects and**
   g. **Plan and track project performance.**

- ❖ Citizens and stakeholders believe that the watershed plan reflects their values and needs
- ❖ The LGU provides ongoing feedback to citizens and stakeholders throughout the watershed planning process
- ❖ Citizen leaders, in partnership with LGUs, involve the community at large in deliberating tradeoffs associated with specific waterbody restoration or protection scenarios

Community Capacity Levels and Indicators

Modified by C. Hilmoe for MPCA Distribution from
Mae A. Davenport, Ph.D., Department of Forest Resources, University of Minnesota

It has become increasingly evident to science and policy experts that healthy ecosystems and healthy social systems are interdependent and mutually supporting. In coupled social-ecological systems management, three questions emerge from the linkages between nature and culture as demonstrated in the science and management of water resources and watersheds: (1) What drives communities to engage in sustainable watershed management? (2) What constrains communities from engaging in sustainable watershed management? (3) How can resource professionals, policy-makers, and citizens build community capacity to protect watershed health?

Community capacity is the interaction of human capital, organizational resources, and social capital existing within a given community that can be leveraged to solve collective problems and improve or maintain the well-being of that community. It may operate through informal social processes and/or organized efforts by individuals, organizations, and social networks that exist among them and between them and the larger systems of which the community is a part. (Chaskin et al. (2001, p. 7))

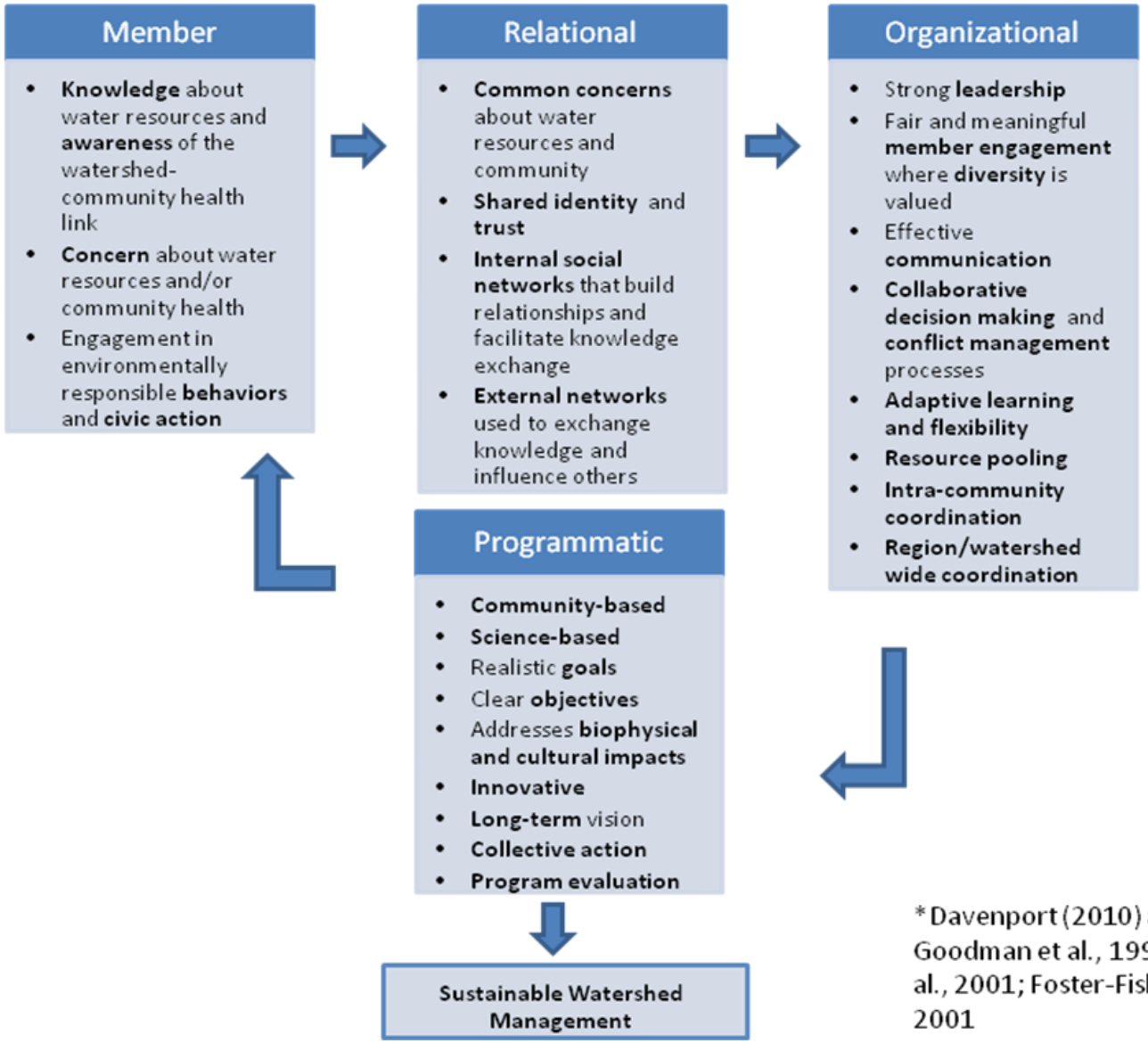
While *community capital* encompasses a variety of resources or assets (e.g., physical, financial, human) upon which a community can draw in times of need, *community capacity* refers to the activation or mobilization of these assets toward social or institutional change. Put differently, a community may possess a broad range of capitals needed to cope with problems but lack the capacity to realize common goals, make decisions collaboratively, and act collectively.

Dr. Mae Davenport, University of Minnesota, has developed a model of community capacity for sustainable watershed management based on an extensive literature review in fields of psychology, sociology and public health, empirical research and ongoing dialogue with water resource professionals and policy-makers (see reverse). This model provides a framework for understanding, assessing, and evaluating community capacity for sustainable watershed management and civic engagement. The model offers insight into community strengths and weaknesses, core capacities and incapacities that should inform ecosystem- and watershed-based projects. **These four levels of capacities are mutually supporting. A high level of programmatic capacity is likely to contribute to member capacity by increasing awareness of and concern for water resources.**

- **Member level capacity** refers to community members' awareness of, knowledge about, and concern for water resources and community health that altogether contribute to individual conservation stewardship and civic action.
- **Relational capacity** encompasses interpersonal relationships and social networks within communities that promote information and idea exchange. External networks are also significant and reflect community members' ability to develop informal relationships with member of other communities.
- **Organizational capacity** includes non-government and government organizations as well as institutional arrangements that support collaborative decision-making, leadership development, adaptive learning, resource pooling and coordination within and across communities.
- **Programmatic capacity** relates to conservation, education, and civic engagement programs that communities create and sustain to sustainably manage watersheds. For these programs to be effective they should address both community and scientific/ecological needs, have realistic goals and clear objectives, be innovative and visionary, encourage collective action and include program monitoring and evaluation.

MPCA staff are using this model to help set goals, identify and/or design products and services, and evaluate the performance of a system to be used to build community capacity for public involvement in MPCA watershed projects. The model guides efforts to build necessary state-wide civic infrastructure and leadership base at a local level.

Community Capacity Levels and Indicators*



*Davenport (2010) adapted from Goodman et al., 1998; Chaskin et al., 2001; Foster-Fishman et al., 2001

Minnesota Pollution Control Agency

Building Community Capacity for Public Involvement in Watershed Projects

Regional Division, Watershed Section

What Is It?

Engaging a community means more than simply allowing citizens to react to the policies and decisions already developed by government organizations. The goal is to make sure a community has safe and productive environments where citizens and stakeholders can come together to dialogue about issues of concern to them and create their own visions and strategies for change in their communities. Building community capacity also involves finding and developing citizen leaders that can carry these strategies forward through implementation.

How Do We Encourage It?

State agencies can provide the leadership, tools and coordination to help local project teams assess, build and tap a community's capacity to engage the public. This must happen on a project by project basis, learning as we go and improving techniques and tools over time.

What Approach Will We Use?

The Minnesota Pollution Control Agency (MPCA) project teams will be encouraged to use a simple planning framework (see other side) that uses an assessment of conditions within the community to guide choices about public involvement actions. Actions need to reflect a community's unique circumstances, needs and constraints. This planning framework is part of a system of products and services to be defined by feedback from users, project teams, public involvement specialists and others and to be tested bit-by-bit within watershed projects. Based on early feedback, the initial vision for this Community Capacity Support Service includes:

1. **Community capacity strategic planning cycle** – A protocol (working draft, generic scenario) for implementing this planning framework will be available in the fall of 2010. Three additional documents will eventually accompany the framework: (a) An overlay cross-referencing current practices to its steps; (2) a process map that relates parts of a watershed project (including local comprehensive water planning) through time, the affiliated people and organizations and some touch points within the process for public involvement; and (3) sample budgets. Work plan boilerplate language is currently available.

2. **Interactive Idea Bank** – An interactive multi-media electronic archive of best practices and research on public involvement, video clips, success stories, personal narratives, etc., will help project teams think outside-the-box.

3. **Specialist network** – A consortium of practitioners and organizations specializing in group dynamics and civic leadership development will provide project teams access to skills and expertise they cannot justify developing within their own ranks.

4. **Practitioners' forum** – On-line or Video forum to tap collective knowledge across the state. A platform for invited speakers to share expertise.

5. **Performance tracking framework** – A means for local citizens and state/local governmental agencies to track project and program progress, appreciate their real accomplishments, and communicate success to key sponsors and other stakeholders.

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Know the Community

1. **Frame the problem:** Describe the water issues in a community's own terms. See water quality issues through relevant lens: health, economics, children's world, food, recreation and destination, property values, etc.
2. **Assess potential for engagement:** Local institutions, culture, and history affect a community's readiness to involve citizens. Identify and characterize audiences to be targeted by civic engagement actions.

Choose Best Ways to Involve People

Actions that are relevant to local citizens and to the water resource problem can be identified and strategically grouped according to the preceding assessment.

Integrate Civic Engagement into the Project Plan

Recruit citizens, stakeholders, partners to finalize and participate in the plan. Create a project performance management scheme.

Engage Citizens

Track progress; lessons learned. Make stories, anecdotes and indicators of success visible.

Learn and Adjust

Adapt engagement practices; reframe the problem; grow sponsorship as progress is made.

This plan-do-check framework enables *seamless transitions* between different phases of the total maximum daily load (TMDL) and Watershed Project process: Analysis, Planning and Implementation. The framework encourages project teams and their citizen members to plan their civic engagement actions strategically, based on accurate assessment of community values, beliefs, and points of view regarding options and choices to accomplish watershed protection and restoration. By enabling adaptive management continuity across phases of work handled by different Agencies and organizations, the framework supports interagency coordination.

Figure ES 1 Rapid Assessment Summary Matrix for Community Social Capital

Summary of Community Social Capital factors: *Name of community:* ***Doniphan, Missouri***

	Factors								
Source:	Collective Actions	Social Structure	Demographics	Built Environment *(Infrastructure)*	Information & Communication	Civic Dialogue	Perceived Social Capital	Human Capital	Results
Checklist	↑	↑	↘	↘	↑	X	X	X	X
Workshop	↗	↗	X	↗	↘	↗	↗	↗	↗
Summary	↗	↗	↘	↔	↗	↗	↗	↗	↗

***KEY**

Favorable ↑ Somewhat Favorable ↗ Moderate ↔ Somewhat Unfavorable ↘ Unfavorable ↓

*Copy and paste the correct arrow into each box.

The top row of boxes includes only factors from the community checklist. Boxes containing an X were not factors measured on the checklist.

The middle row includes only factors from the community rating sheets completed during the workshop. Boxes containing an X were not factors measured at the workshop.

The bottom (summary) row is an overall summary for each factor that combines the checklist and workshop ratings.

Proposed Social Measures for the Clean Water Legacy Effectiveness Measures Project
October 13, 2010

Introduction

During the Team meeting on September 16, 2010, Cynthia Hilmoe and Lynne Kolze presented an overview of their efforts focused on developing social measures. One document shared with the group entitled "Proposed Performance Management Constructs and Sample Measures" provide four levels of community capacity for public involvement. During this discussion, Ms. Hilmoe and Ms. Kolze stated that quantifiable measures related to the four levels of community capacity have not yet been developed, but the intent is to do so at the very local watershed level.

At this point in time, the Team has gaps in the existing effectiveness measures framework for Social Measures. The goal is to identify quantifiable social measures at a broader scale for use in the effectiveness measures framework that are consistent with the ongoing social measures work reflected in the four levels of community capacity for public involvement.

Relationship to Existing Social Measures Efforts

Using the "Proposed Performance Management Constructs and Sample Measures" document, as well as the EPA Region 5 *Social Indicator Planning and Evaluation System (SIPES) for Nonpoint Source Management Handbook*, a suite of potential social measures has been developed for the Team's consideration. This suite of social measures would help to fill the existing gaps in the effectiveness measures framework.

The proposed social measures are intended to relate to the first level of community capacity for public involvement presented by Ms. Hilmoe and Ms. Kolze. This level is presented below.

1. Community Member -- The degree to which a connection exists between community members' core values, knowledge and concerns about water issues, and how they engage in environmental behaviors and civic actions.

- **Community members are aware of watershed issues**
- **Community members express concern about water resources and impacts on their community**
- **Community members actively participate in water resource stewardship**

The EPA Region 5 SIPES Handbook presents a suite of recommended core social indicators. The proposed suite of social measures for the effectiveness measures framework also relate to EPA's core suite of measures. The goals and associated outcomes and measures from the SIPES Handbook that relate to the proposed social measures are presented below.

Goal 1: Increase target audience awareness

Awareness Outcome 1: Increase awareness of relevant technical issues and/or recommended practices in critical areas

- Awareness Indicator 1: Awareness of consequences of pollutants to water quality
- Awareness Indicator 2: Awareness of pollutant types impairing water quality
- Awareness Indicator 3: Awareness of pollutant sources impairing water quality
- Awareness Indicator 4: Awareness of appropriate practices to improve water quality

Goal 2: Change target audience attitudes

Attitudes Outcome 1: Change attitudes to facilitate desired behavior change in critical area

- Attitudes Indicator 1: General water-quality-related attitudes
- Attitudes Indicator 2: Willingness to take action to improve water quality

Goal 5: Increase target audience adoption of NPS management practices

Behavior Outcome 1: Increase adoption of practices to maintain or improve water quality in critical areas

- Behavior Indicator 1: Percentage of critical area receiving treatment
- Behavior Indicator 2: Percentage of target audience implementing practices in critical areas
- Behavior Indicator 3: Ordinances in place that will reduce nonpoint source stressors

Proposed Social Measures for Team Consideration

There are three categories of proposed social measures: awareness, perceptions and willingness to take action, behavior change. The proposed measures under each of these categories is presented below.

Awareness Measures

Percentage of surveyed stakeholders participating in TMDL kick-off meetings or watershed residents who can:

1) Correctly identify impairments

2) Correctly identify sources of impairments

3) Identify the ways in which they might contribute to the impairment

4) Correctly identify critical areas in the watershed

5) Identify the purpose of the TMDL effort

6) Identify the purpose of Clean Water Legacy Funds

Perceptions and Willingness to Take Action Measures

Percentage of surveyed stakeholders participating in TMDL public meetings or watershed residents with a:

1) Willingness to take XX action (e.g., install rain gardens, scoop poop, maintain septic system every 5 years, forgo lawn treatments, use pervious pavement).

2) Perception that by taking XX action will help water quality conditions improve

3) Perception if XX type of stakeholder would take action, water quality conditions would improve

Behavior Change Measures

Percentage of surveyed stakeholders participating in TMDL public meetings or watershed residents who have:

1) Installed one of the TMDL recommended BMPs on their property

2) Attended a workshop related to one of the TMDL recommended BMPs

3) Applied for some type of financial assistance to install one of the TMDL recommended BMPs on their property

Review Charge to the Team

In reviewing the proposed social measures, the Team is asked to consider the following:

1) Which of these measures would be most meaningful in communicating implementation effectiveness?

2) Are measures under all sub-categories necessary?

3) Are there existing sources of data to support any of these proposed social measures?

4) Considering where the social measures gaps are identified on the effectiveness measure framework (see below), are there other social measures the Team would like to nominate?

An Interagency Performance Management Framework for Minnesota
Clean Water Funding Measures (9.12.10 draft)