**Department of Natural Resources and Environment**
**Water Resources Division**
**Measures of Success**

**February 1, 2011**

## Mission: CLEAN AND SAFE WATER RESOURCES

Welcome to the Water Resources Division's (WRD) Measures of Success. This is our attempt to define the expected outcomes for many of the issues facing the water resources program. We work hard on many activities that affect and/or measure the quality of the waters of our state, and this is how we propose to measure the success in having clean and safe water. It is important to achieve these outcomes such that Michigan has a robust economy in conjunction with clean and safe water resources. Achieving these outcomes will also result in a more robust economy and improved quality of life for Michigan's residents and visitors; for example, water quality improvements at beaches and fewer fish consumption advisories will translate to increased tourism and sporting equipment purchases.

These measures are primarily based on what we can presently measure. There are additional outcomes that are not presently included but desirable. We anticipate that these outcomes and measures will change as we get better at defining and measuring them.

The mission of the WRD is to make Michigan's waters safe and clean for recreating, fishing, drinking, and healthy aquatic ecosystems. Five major goals provide definition to this mission: (1) Enhance Recreational Waters; (2) Ensure Consumable Fish; (3) Protect and Restore Aquatic Ecosystems; (4) Ensure Safe Drinking Water; and (5) Protect Public Safety. For each major goal measurable outcomes (measures of success) are identified.

The use of outcome oriented goals and measurements serves to focus efforts, motivate staff, communicate progress, improve environmental health and compliance conditions, increase our accountability, and foster collaboration. We intend to use these goals and measurements to enlist external assistance, encourage cooperation across organizational boundaries, and encourage discussion about strategic adjustments and priority trade-offs. We also intend to use these goals and measurements to align our work processes and activities in order to attain the outcome focused goals. The goals and outcomes set here are expected to be reviewed and modified as appropriate.

The use of measurements associated with the goals is essential. Measurements provide insights in many areas, including informed priority setting and daily decisions; finding problems and assessing their relative importance; identifying preventable causal factors; and communicating progress and problems. Measurement reinforces the importance of a goal and managerial priorities, and helps us gauge how well prior actions worked and when adjustments are needed.

The goals we are identifying will, on occasion, require us to stretch to meet them. While attainment of these goals is ideal, the immediate objective is the development of cogent strategies to meet them. These strategies will guide the WRD in measuring progress toward the goals; regular use of the data to make informed decisions; and regular reporting on goals, progress, and strategies, including reporting to the public.

The following five goals are intended to represent the outcomes that are expected from the WRD. These goals are rather self-evident, but the specific measurements established for each

goal consider what is needed to assess attainment of the goal, as well as what we are currently able to measure and report.

Limited interpretation of the results is provided. The scale used to portray progress toward meeting the outcomes ranges from Excellent to Poor (Excellent, Good, Fair, Poor) with the category “Don’t know yet” included for where we do not yet have measurements to interpret.

The outcomes included in this document are evolving as we engage and obtain input from other agency staff and our stakeholders. An important, recent contribution to our thinking was provided by the Department of Natural Resources and Environment’s (DNRE) Environmental Advisory Committee in its December 16, 2010, report to the DNRE, “Following the Roadmap: Next Steps in Implementing Outcome-Based Management." The report can be found at: http://www.michigan.gov/deq/0,1607,7-135-3306_30305---,00.html. The report includes important suggestions for moving forward on establishing relevant outcomes and their use, and specific recommendations for additional outcomes in areas related to water resources protection, restoration, and management. The specific recommendations for outcomes related to the WRD are provided in Appendix A: wet weather related programs; wetlands; critical dunes program; and nonnative invasive species. This document includes a start on addressing their recommendations. We intend to pursue further development of these specific outcomes.

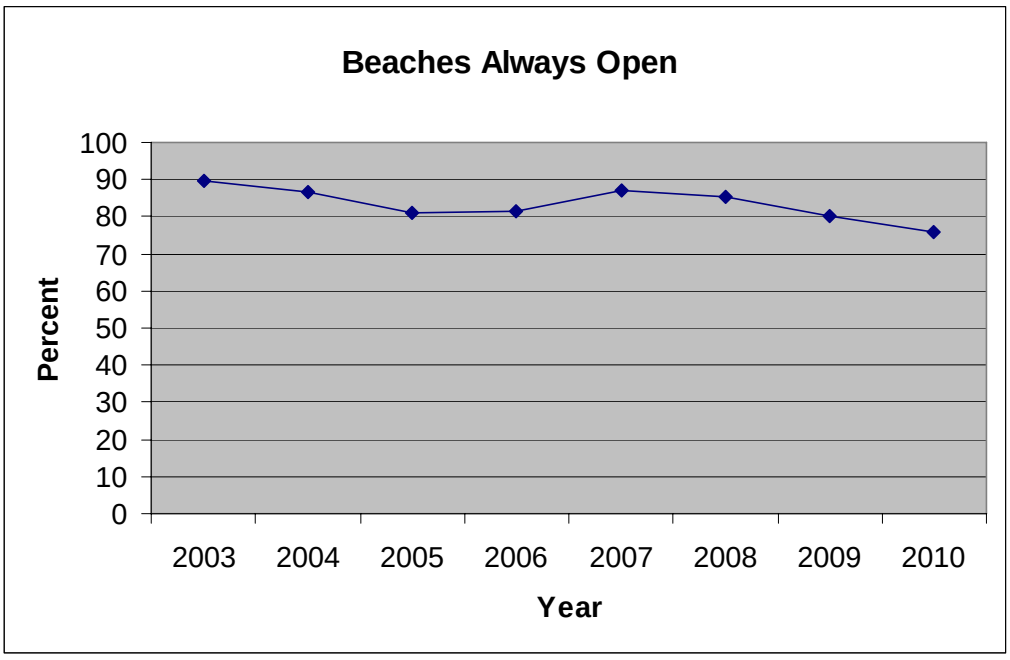
If you have questions or comments on this document, please contact Laura Smith at smithl16@michigan.gov. We are especially interested in comments regarding appropriate outcomes and measures.

## GOAL 1: ENHANCE RECREATIONAL WATERS

Ensure that all recreational waters are safe for human contact.

**Outcome 1**: Clean, safe beaches - By 2014, 100% of Great Lakes and inland lake beaches monitored by beach programs will be safe for swimming.

Measure: Percent of monitored beaches with no closures or advisories due to unacceptable levels of *E. coli* during the recreational season.




How are we doing? Good

Comment: The percentage has fallen in recent years due at least in part to increased monitoring at beaches with known or suspected water quality problems. The DNRE has been working with local communities to identify sources of contamination and to implement corrective actions to restore water quality. Much of this work will be funded from the Great Lakes Restoration Initiative.

**Outcome 2**: Swimmable rivers and streams - All rivers and streams will meet total body contact water quality standards (WQS). This is developed for beaches, but there is no coordinated or compiled monitoring of rivers and streams. This needs to be examined and developed.

Measure: Percent of monitored river/stream miles that meet total body contact WQS from future data.

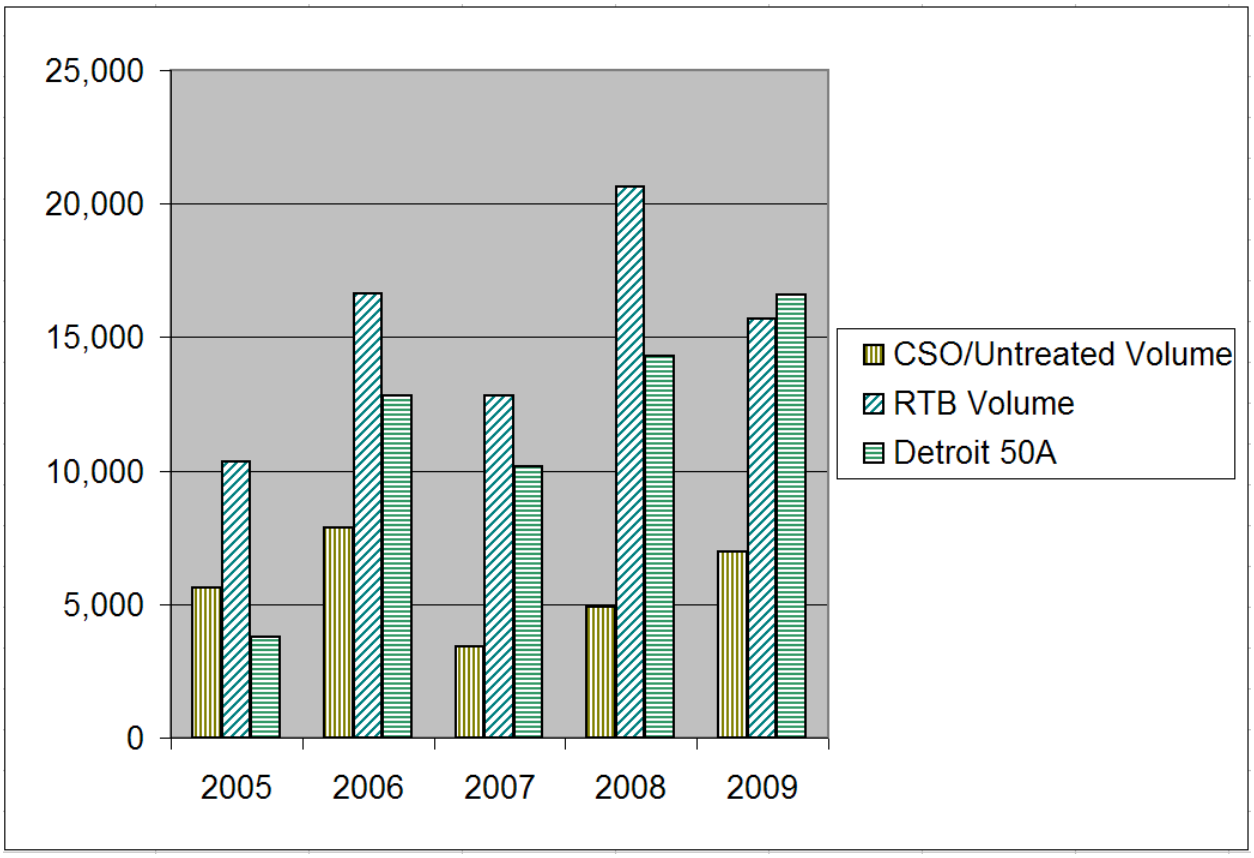
Results 2009: 57%

How are we doing? Poor

Comment: Monitoring conducted in 2009 based on a random sampling design indicates that only 57% of stream miles met the WQS for total body contact. The monitoring was extremely limited as comprehensive *E. coli* monitoring is very expensive. We are evaluating this data and the cost to determine how to obtain meaningful data on an ongoing basis.

**Outcome 3**: Eliminate untreated sewage discharges - The long-term combined sewer overflow (CSO) goal is complete elimination of untreated CSO discharges. For sanitary sewer overflow (SSO), the goal is to minimize untreated SSO discharges, recognizing that SSOs may occur in a well designed and operated sewer system in response to rainfall that exceeds the 25-year, 24-hour storm (our design storm). Initially, our interim goal was to reduce the volume of SSOs discharged annually, from approximately 58 million gallons in 2007 to less than 20 million gallons in 2020, due to events less than the 25-year, 24-hour storm. We now realize this goal needs to be refined.

Measure: Annual volume of untreated CSO/SSO discharges.




**CSO/Untreated, RTB and Related Wet Weather Volume (MG per Year)**

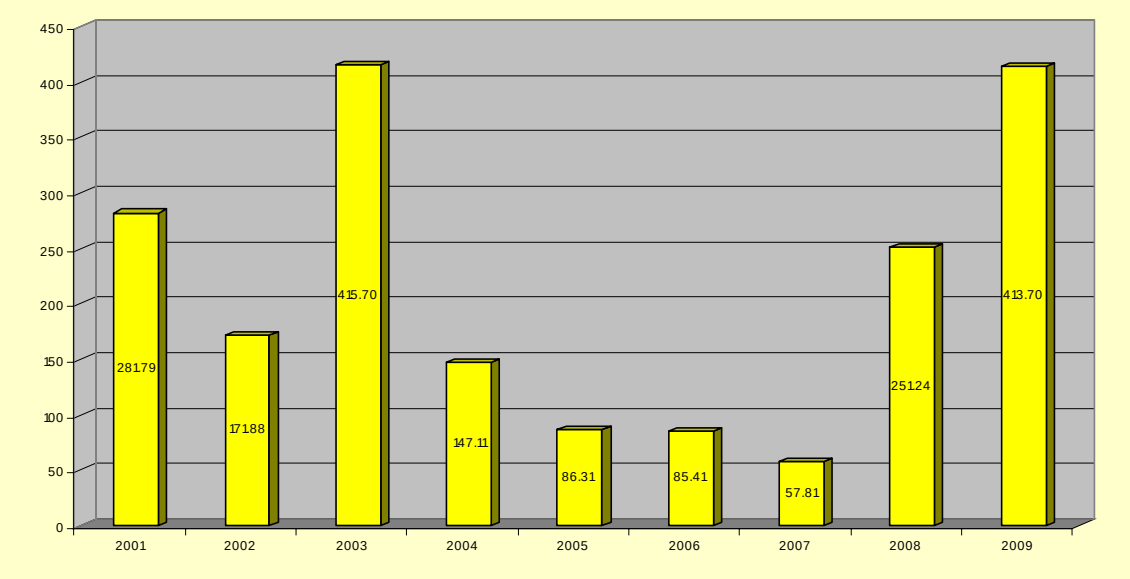
How are we doing? Good

Comment: There has been considerable progress in Michigan in eliminating untreated discharges of sewage. However, the recent economic downturn is causing delays in some major projects, especially those in Detroit and Dearborn. This will result in additional time to meet the goal of elimination of untreated CSOs.

The Detroit Wastewater Treatment Plant (WWTP) and their long-term control plan (LTCP) milestones greatly influence statewide data. In past reports, the discharges from one of Detroit's primary wet weather outfalls have been grouped with untreated CSO discharges. Based upon the fact that discharges from this outfall receive primary treatment through the Detroit plant but they lack disinfection, it is more accurate to characterize these discharges as primary treated excess flow without disinfection (not untreated). Therefore, the discharges from this outfall (50A) have been separated from the CSO/Untreated Volume and the Retention Treatment Basin (RTB) Volume. Discharges from this outfall for past years are likewise reclassified for the purpose of this report and are represented in the figure below.

One of the key components of Detroit's LTCP (1996) was increasing the primary treatment capacity of the WWTP in order to significantly reduce untreated CSOs from the upstream collection system outfalls to the Rouge and Detroit Rivers. This included construction of two additional circular clarifiers, a new pump and other rehabilitation projects at the plant. This project component was completed by 2005 at the cost of approximately $166.5 million dollars.

More important in terms of volume trends is the portion of untreated CSO discharges versus the volume of discharge from RTBs. This is because the goal of the LTCP is to provide adequate treatment of CSO overflows to meet WQS through treatment at an RTB. When comparing annual volume of untreated CSO discharges to the volume of partially treated or adequately treated RTB volumes, statewide progress is evident (see figure above). It is expected that as LTCPs are implemented statewide, the component of the total overflow volume that is the RTB treated volume will continue to increase in the coming years.




**Untreated SSO discharges in million gallons per year**.

How are we doing? Good

Comment: During the period from 2001 through 2007, Michigan made substantial progress in the goal to eliminate SSOs. Data from the last 2 calendar years shows dramatic increases in SSOs. We are reviewing the detailed data to determine the cause for this increase, whether it be related to increase in storm intensity, better reporting, or more failure of municipal systems. Initial reviews indicate that more intense storms are responsible for a large part of this increase. This may be an early indicator of the effects of climate change, as sewer systems designed to handle certain size storms are subjected to more intense storms.

We plan to modify this measure for future reports. We intend to report separately on SSOs not associated with wet weather events, and also report on SSOs from wet weather events where the storm is less than our sewer design standard. We believe these will be better measures of our progress to control SSOs. We recognize the SSOs may occur at very large storms, but controlling SSOs events in these situations is not practical, nor a valid measure of statewide progress.

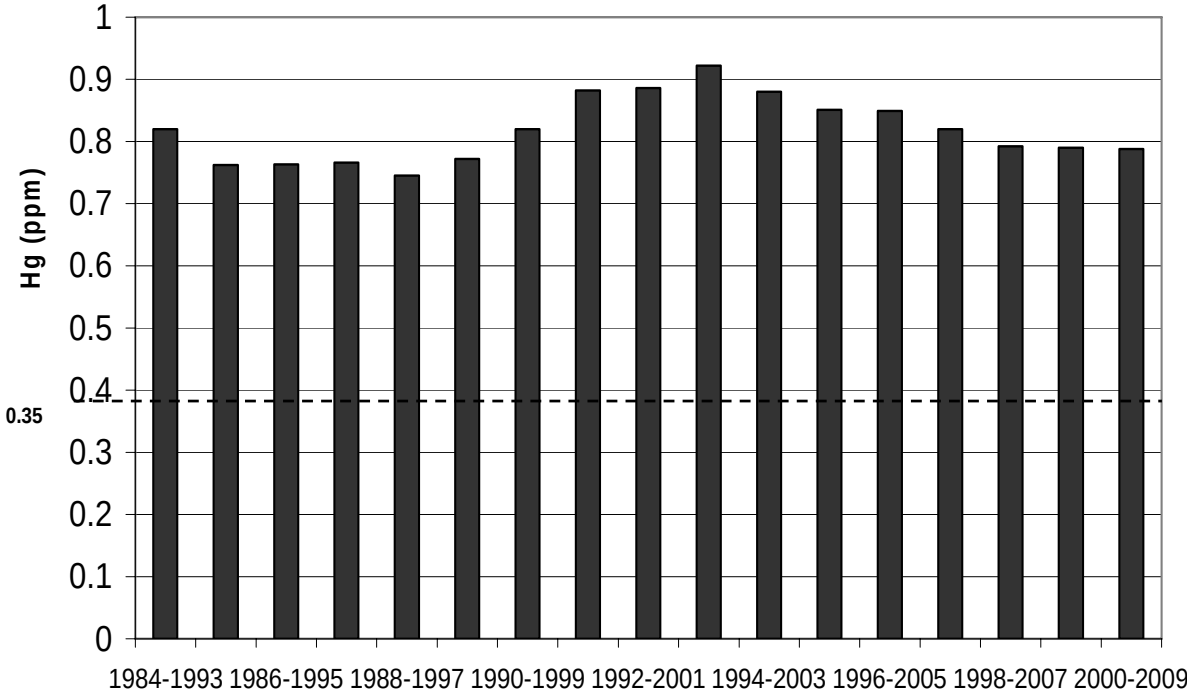
## GOAL 2: ENSURE CONSUMABLE FISH

Protect human health and wildlife by reducing exposure to contaminants in fish to levels that are safe

**Outcome 1**: Eliminate mercury contamination.

Outcome 1A: Reduce the mercury levels in edible portions of Great Lakes, inland lakes, and stream fish to below 0.35 mg/Kg (ppm) by 2020.

Measure: Mercury concentrations in the 90th percentile of length normalized walleye, northern pike, or largemouth bass from selected sites in the Great Lakes and inland waters.




**Estimated 90th percentile mercury concentrations in standard length northern pike from inland waters of Michigan for consecutive running 10-year periods.**

How are we doing? Poor

Comment: There has been essentially no change over time. The mercury concentration in these fish appears to be greatly dependent on the mercury from atmospheric deposition, which is primarily due to burning coal to generate electricity. Currently in Michigan, coal fired power plants discharge about 4,000 pounds of mercury per year to the atmosphere, while point source wastewater facilities discharge less than 20 pounds per year to surface waters. Achieving this goal is premised on the Department of Environmental Quality (DEQ) Mercury

Strategy being implemented as scheduled (by 2015), with appropriate controls on mercury emissions from burning coal.

Outcome 1B: All streams will achieve the mercury WQS of 1.3 ng/L of total mercury as an annual average ambient concentration by 2020.

Measure: Percent of rivers/streams monitored that meet 1.3 ng/L.

Results 2005-2008: Only 56% of stream miles met the WQS based on data from a 5-year monitoring program.

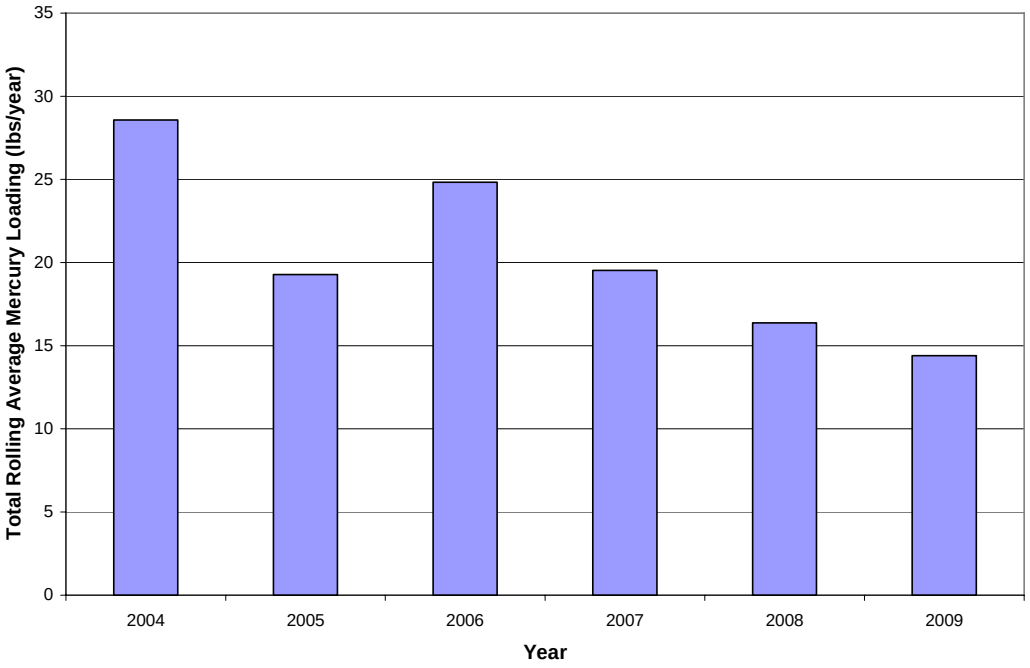
How are we doing? Fair

Comment: Mercury concentrations in flowing waters appear to portray greater progress in controlling mercury than does mercury in fish tissue where it bioaccumulates at levels that may negatively affect human health and wildlife when consumed. Mercury in water also appears to be greatly dependent on the mercury from atmospheric deposition, which is primarily due to burning coal to generate electricity. Achieving this goal is premised on the DEQ Mercury Strategy being implemented as scheduled (by 2015), with appropriate controls on mercury emissions from burning coal.

Outcome 1C: Reduce the load of mercury in permitted point source discharges of mercury with a goal of achieving 1.3 ng/L in all such discharges by 2020.

Measure: Annual mercury loading from representative wastewater treatment plants.

**Figure 4. Six Years of Total Annual Mercury Data from Eleven Wastewater Treatment Plants**

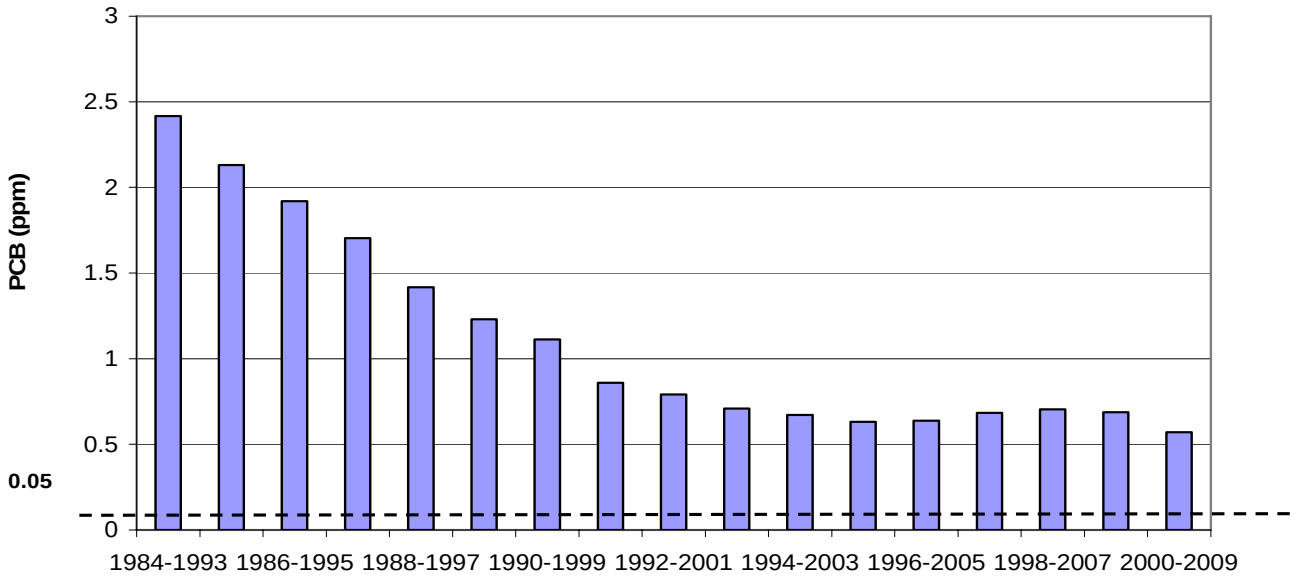


How are we doing? Good

Comment: These permitted point source discharges all have requirements to implement mercury minimization plans and eventually meet a discharge limit of 1.3 ng/L. However, these sources of mercury are dwarfed by the amount of mercury that comes into surface waters from atmospheric deposition, generally from the burning of coal.

**Outcome 2**: Eliminate PCB contamination - Reduce PCB levels in edible portions of Great Lakes, inland lakes, and river fish to below 0.05 mg/Kg by 2025.

Measure: PCB concentrations in the 90th percentile of lipid normalized carp fillets (site dependent) from selected sites not impacted by legacy pollution.




**Estimated 90th percentile PCB concentrations in standard lipid carp from inland waters of Michigan for consecutive running 10-year periods.**

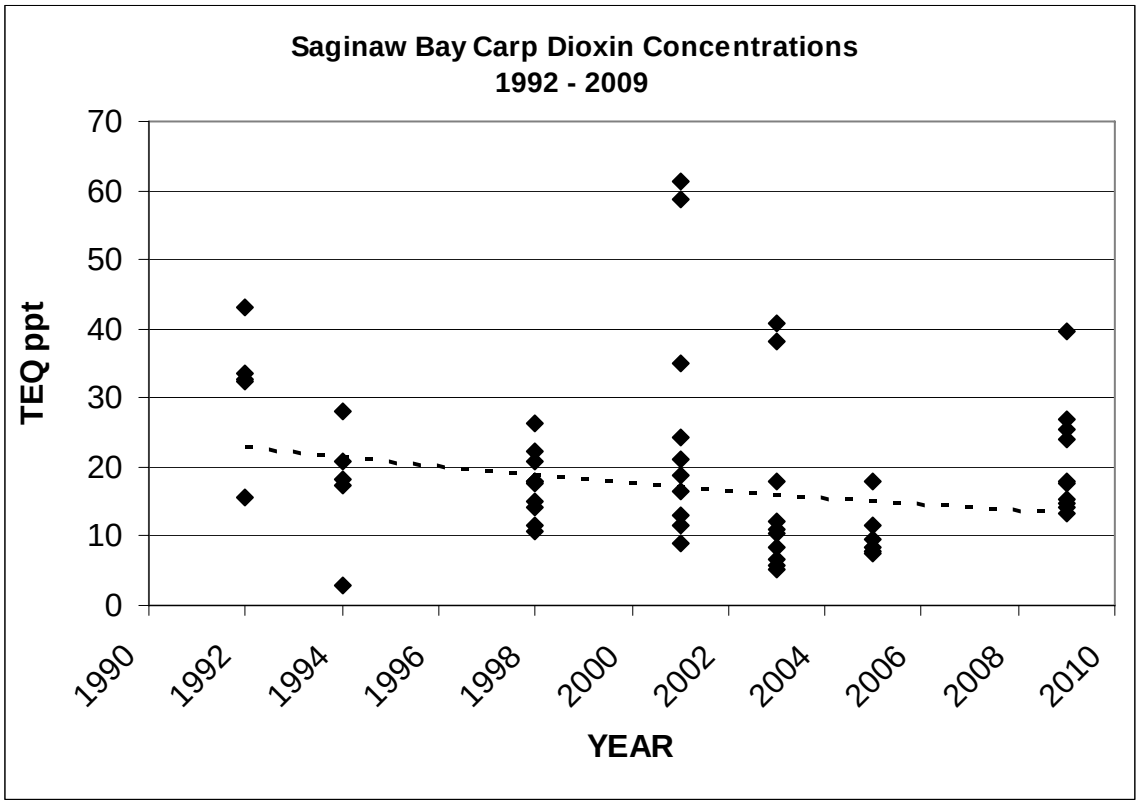
How are we doing? Good overall; fair in recent years.

Comment: PCBs have been banned from open use for 30 years. Point source discharges have been controlled, and several sediment remediation activities for PCBs have been completed. The rate of change in recent years has declined, which is a reflection of the ubiquitous nature of PCB in the environment, its slow degradation rate and the global transport of PCB once it is released.

**Outcome 3**: Eliminate dioxin contamination.

Outcome 3A: By 2025, achieve an average concentration of 0.53 ng/Kg (ppt) dioxin (TEQ) levels in fish in the Saginaw River and Saginaw Bay.

Measure: Temporal trend in lipid-adjusted dioxin TEQ concentrations in whole carp from Saginaw Bay.




How are we doing? Fair

Comment: The primary point source discharge of dioxin has been controlled, a large PCB sediment remediation of the Saginaw River was completed that likely removed dioxins as well, several hot spots of sediment contaminated with dioxin have been removed from the Tittabawassee River, and the downward trend in dioxin concentrations is expected to continue. Additional sediment remediation actions are being planned for the Tittabawassee and Saginaw Rivers and associated floodplains.

## GOAL 3: PROTECT AND RESTORE AQUATIC ECOSYSTEMS

Restore and maintain the physical, chemical, and biological integrity of public trust waters, including inland lakes, streams, wetlands, and the Great Lakes.

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**Outcome 1**: Ensure healthy aquatic biota - Through 2015, ensure that the condition of the state's wadeable streams does not degrade, such that there is no statistically significant increase in the percent of streams rated "nonattaining," and no statistically significant decrease in streams rated "attaining."

Measure: The trend in attainment status of the other aquatic life and wildlife designated use based on benthic macroinvertebrate communities; percent monitored waters attaining the designated use based on an assessment of the benthic macroinvertebrate communities.

Results 2006-2010: Data collected from this 5-year statewide monitoring cycle indicate that 95% of Michigan's rivers and streams attain the aquatic life designated use.

How are we doing? Status - Excellent; Trend - Don't know yet

Comment: These results indicate that Michigan's wadeable streams are largely supporting this aspect of the designated use. Statewide trend data will not be available until 2014 or 2015.

**Outcome 2**: Protect natural hydrology.

Measure 1: Percent of new water withdrawals registered that do not cause an adverse resource impact.

Results 2010: There were 213 new large quantity withdrawals registered between July 9, 2009, when the Water Withdrawal Assessment Process became effective and July 9, 2010; 100% have not caused an adverse resource impact. Three proposed withdrawals were not approved because they were likely to cause an adverse resource impact.

Measure 2: Number of watersheds where new large quantity withdrawals since October 1, 2008, are likely to cause an adverse resource impact.

Results 2010: None due to registered withdrawals between July 2009 and July 2010. There are indications that there may be a few because of withdrawals that were installed, but not registered.

How are we doing: Excellent

Comment: The development of the Water Withdrawal Assessment Process is a major accomplishment toward achieving this goal and it is performing as designed, with excellent results. However, there are not adequate resources available to continue to implement this program, including a credible compliance program.

Measure 3: The average statewide trend in stream hydrology is toward natural flow regimes as measured by the Richards Baker Flashiness Index.

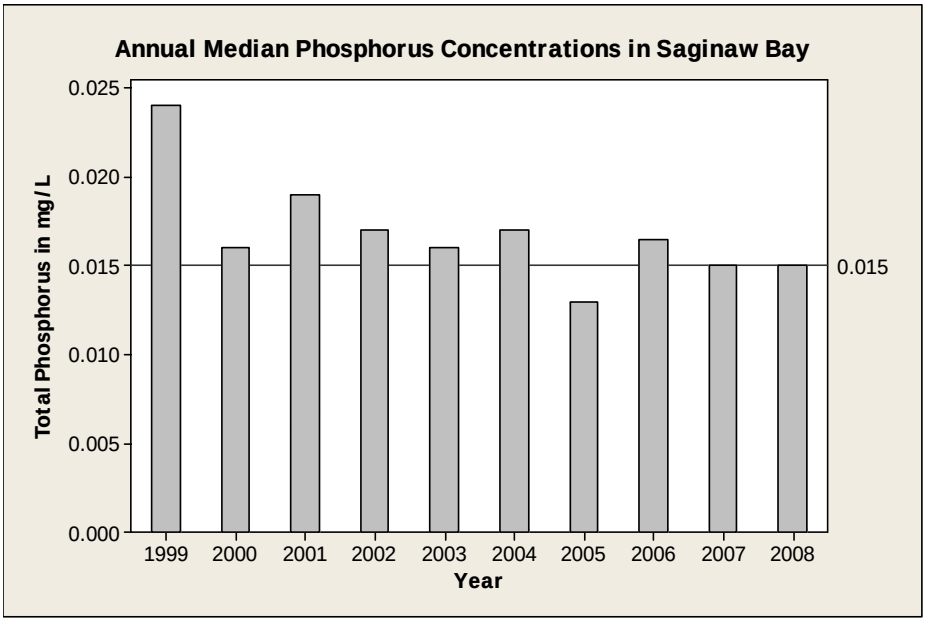
Results:

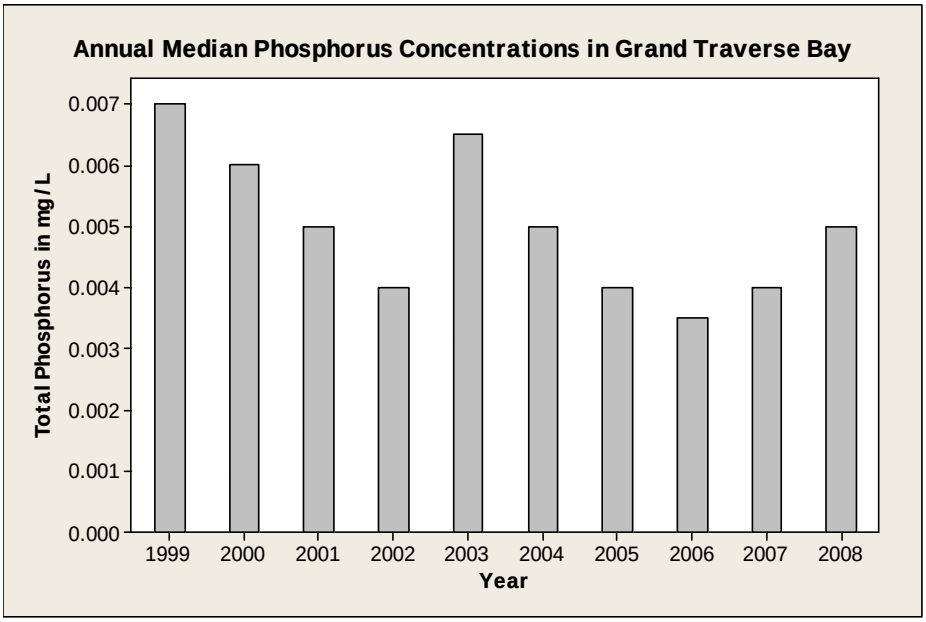
How are we doing? Don't know yet

Comments: Individual trends have been generated for 279 gauged stations that were assessed in 2006. We intend to update the assessment for as many of the stations as possible in 2011, including dropping stations where gauges are no longer maintained. We do not have data to share at this time, and have not yet attempted to condense individual trends at 279 stations into one trend line.

**<u>Outcome 3</u>**: Meet the total phosphorus goal in Saginaw Bay of 15 µg/L and maintain a neutral trend in total phosphorus in Grand Traverse Bay.

Measure: Phosphorus concentrations and trends in Grand Traverse and Saginaw Bays.






How are we doing? Excellent for Grand Traverse Bay; Good for Saginaw Bay

Comment: In Saginaw Bay, the phosphorus reductions have occurred slowly. Recent efforts have been refocused by the Saginaw Bay Coastal Initiative including the "muck" on the beach issue. However, the presence of invasive species such as the zebra mussel and quagga mussel, changing lake levels, and other factors have complicated this situation. Additional studies are underway to try to further understand these interactions.

**Outcome 4**: Reduce the rate of introduction of aquatic invasive species into the Great Lakes to 1 species every 30 years by implementing preventive measures.

Measure: Number of new aquatic invasive species introduced into the Great Lakes.

Result: Based on available studies, the current rate of introduction is estimated to be about 1 species every 8 months.

How are we doing? Poor

Comments: Significant and bold action is needed to meet this outcome. In addition to this measure, the following program outputs were developed.

Program Output: The number of oceangoing vessels under the Michigan ballast water permit.

Results: 2009 - 110; 2010 - 174

How are we doing? Excellent on Michigan's permit, but overall effectiveness is doubtful.

Comment: Michigan has led the nation in efforts to prevent future introduction of aquatic invasive species into the Great Lakes. However, support from the

federal government and Canada is needed to accomplish this goal, and that support has been very slow in coming. In April 2009 the Michigan DNRE filed a petition challenging the United States Environmental Protection Agency (USEPA) General Vessel Permit in the 6th Circuit court. The petition claims that the USEPA failed to immediately and comprehensively regulate the discharge of ballast water from oceangoing vessels in the Great Lakes in a manner that satisfies WQS through the Great Lakes ecosystem and adequately protects those waters against further introductions of harmful invasive species when it issued the Vessel General Permit. A settlement agreement is nearly finalized that will move this process forward.

Program Output: Hydrologic separation between the Great Lakes Basin and the Mississippi River Basin, especially in the Chicago area waterway system.

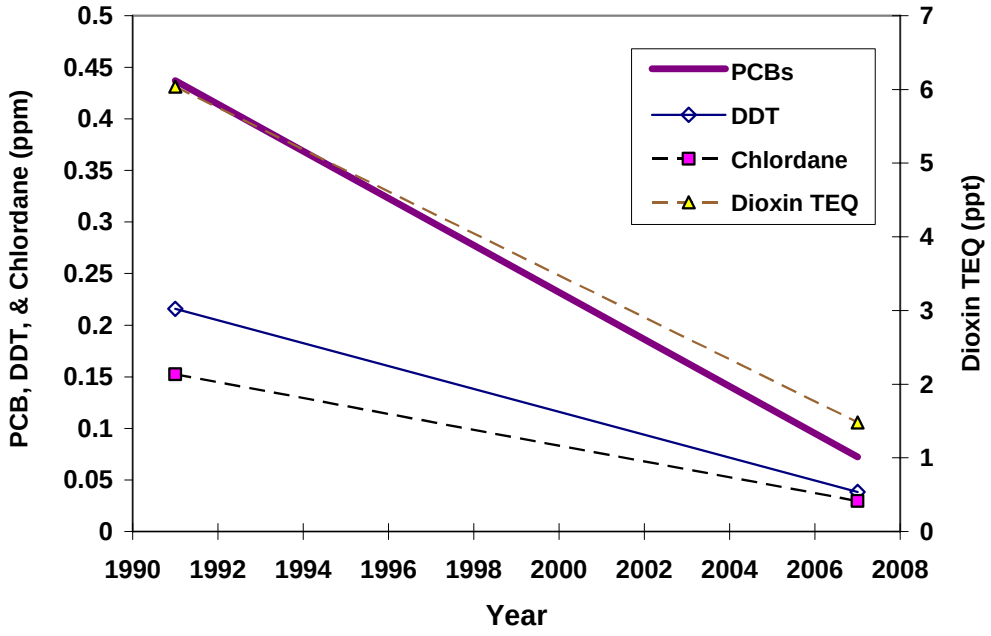
Results: The basins remain connected with no immediate plans for separation.

How are we doing? Poor

Comment: Michigan continues to participate in activities to promote hydrologic separation of the two basins. These activities include participation in the Asian Carp Regional Coordinating Committee and the use of legal action in the form of ongoing lawsuits calling for the development and implementation of plans to permanently and physically separate carp-infested waters in the Illinois River basin, the Canal, and connected waterways from Lake Michigan; and the implementation of immediate actions to close some of the locks on the Chicago Sanitary and Ship Canal and connecting channels, operate electric barriers in the canal at maximum efficiency, and monitor for Asian carp and eradicate any Asian carp found. In addition, the United States Army Corps of Engineers plans to conduct a feasibility study, Great Lakes and Mississippi River Interbasin Study of the range of options and technologies available to prevent the spread of aquatic nuisance species between the Great Lakes and Mississippi River Basins through the Chicago Sanitary and Ship Canal and other aquatic pathways. A final recommended plan resulting from the study is expected in 2015.

**Outcome 5**: Enhance the quality of the Outstanding International Resource Waters – Lake Superior Basin.

Measure 1: Temporal trend in concentrations of PCB, DDT, chlordane, and dioxins in Lake Superior (Keweenaw Bay) lake trout, with a goal of maintaining measurable declines.

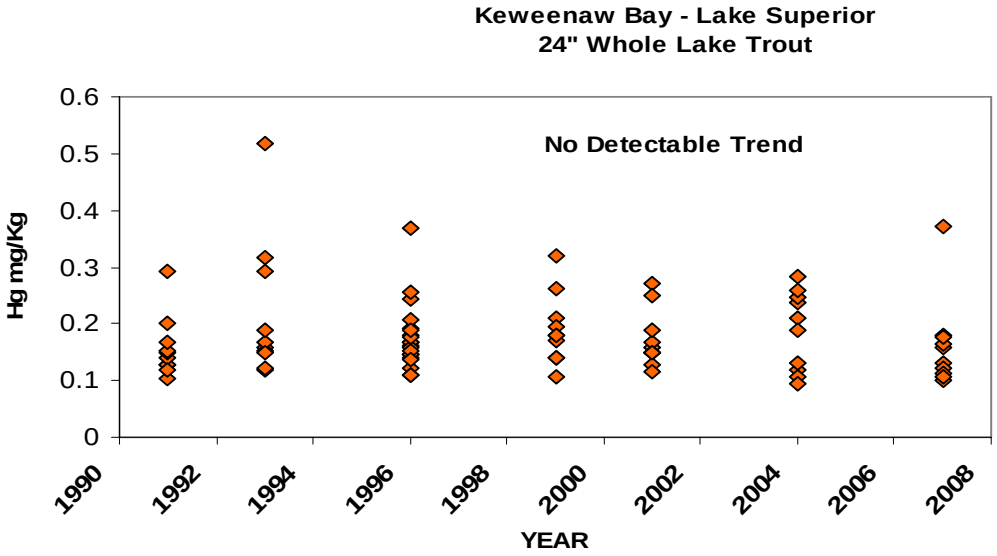



**Temporal trends in Lake Superior lake trout contaminant concentrations.**

How are we doing? Excellent

Comment: Lake trout have been collected from Keweenaw Bay every 2 to 3 years since 1991 and analyzed as whole fish. Temporal trends in contaminant concentrations are evaluated using regression techniques on that dataset. We expect these declines to continue.

Measure 2: Concentrations of mercury from Lake Superior lake trout, with a goal to begin showing measurable declines by 2020.



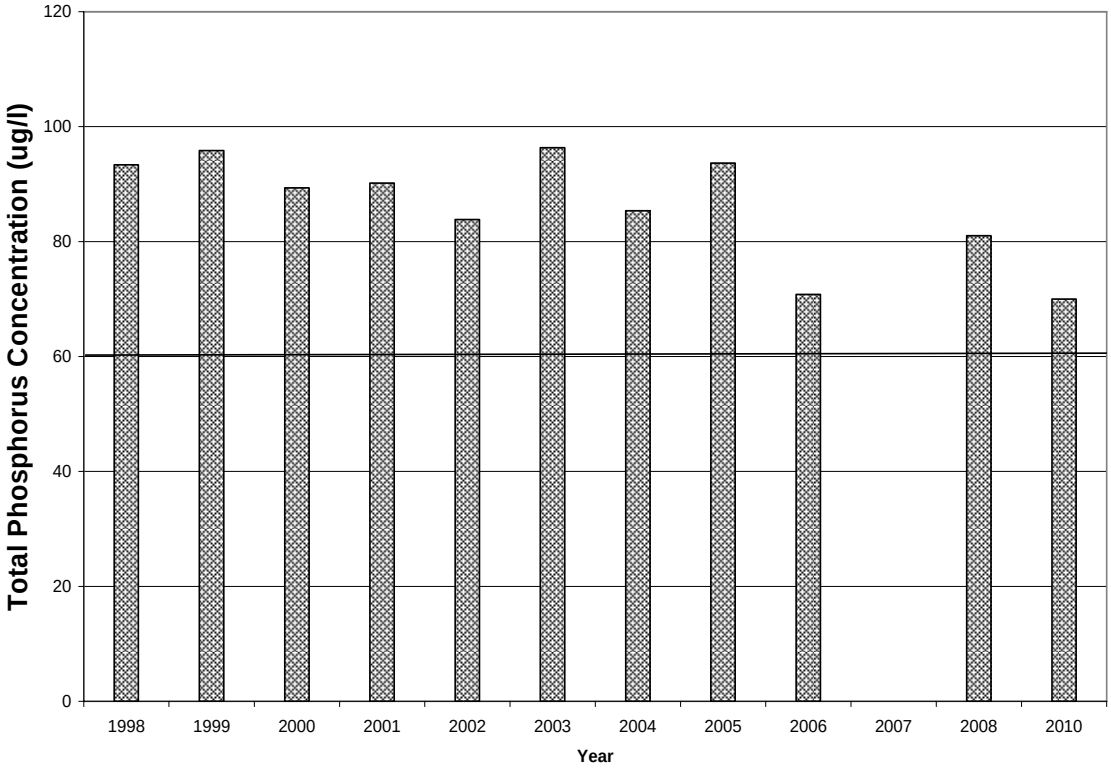

**Temporal trend in whole Lake Superior lake trout mercury concentration.**

How are we doing? Fair

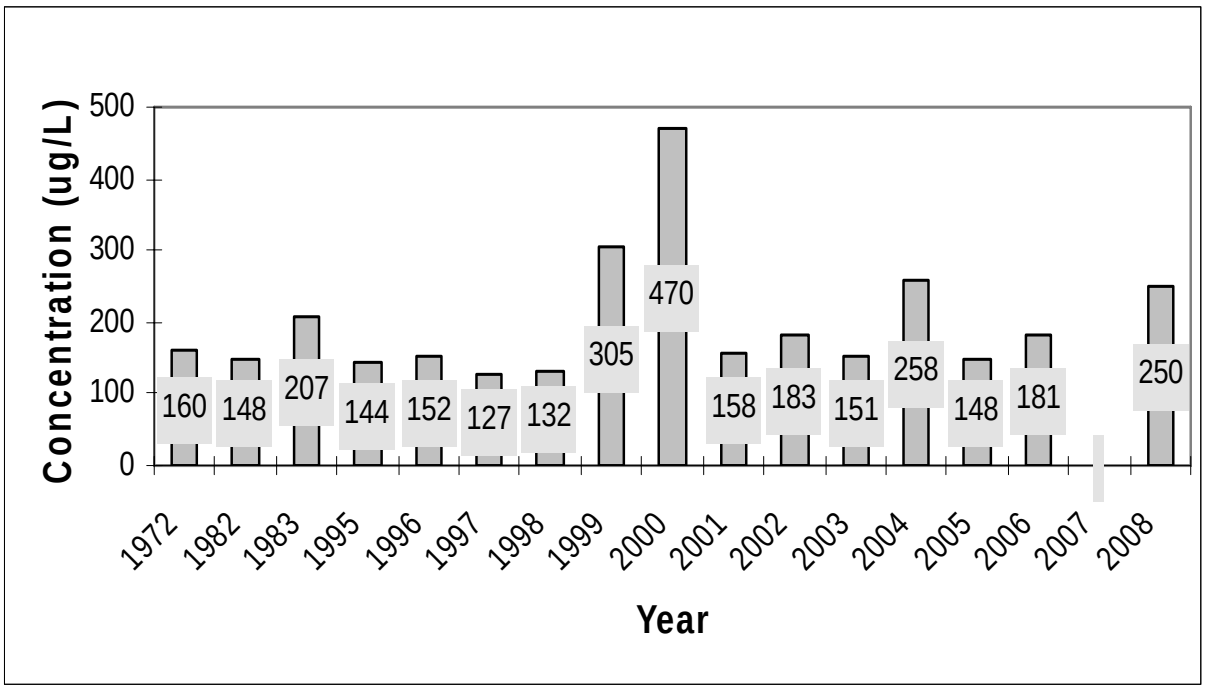
Comment: Although there is no detectable downward trend in mercury concentrations in whole lake trout from Lake Superior, they are not increasing as they are in the other Great Lakes.

**Outcome 6**: By 2020, achieve the total phosphorus targets for the following impaired lakes: Lake Allegan (60 µg/L); Lake Macatawa (50 µg/L); Ford Lake (50 µg/L); and Belleville Lake (30 µg/L).

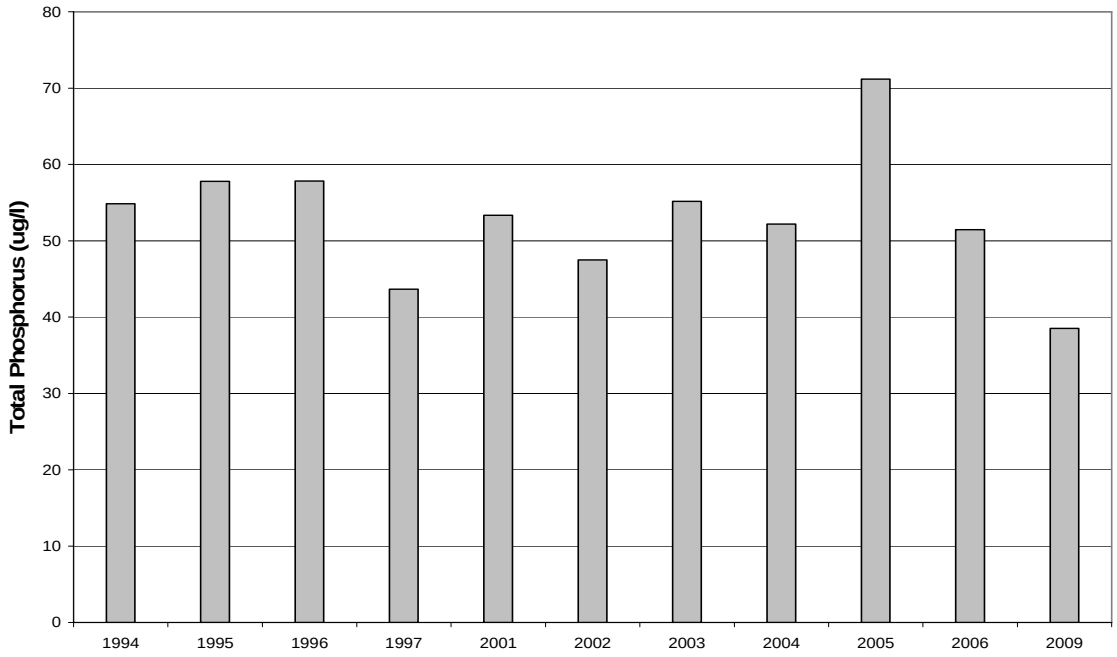
Measure: Total phosphorus concentration in the lakes.



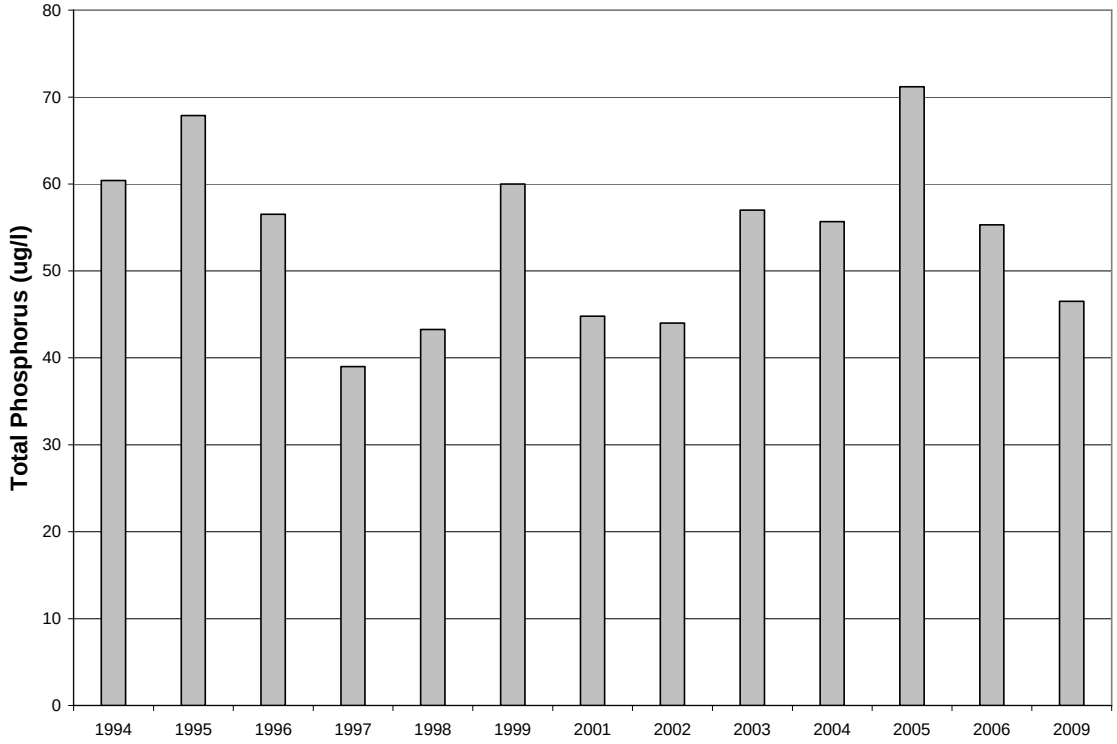

**Lake Allegan Average Total Phosphorus Concentration by Year**




**Lake Macatawa Total Phosphorus Concentrations by Year**




**Ford Lake Total Phosphorus Concentrations by Year**




**Belleville Lake Total Phosphorus Concentrations by Year**

How are we doing? Poor for Lake Macatawa; Fair for Lake Allegan; Good for Ford Lake; Fair for Belleville Lake

Comment: Lake Allegan, Ford Lake, and Belleville Lake may be showing some signs of a decline in phosphorus levels. In the Lake Allegan watershed, point sources have reduced their phosphorus discharges, and nonpoint source reduction efforts have been underway. Total phosphorus concentrations in Ford Lake were under the target in 2009 due to point and nonpoint source loading reductions to the Middle Huron River watershed. However, nuisance blooms are still occurring and the lake will need some additional time to meet designated uses. Belleville Lake is not responding as well to phosphorus reductions in the watershed due in part to internal phosphorus loadings and lake dynamics and will require additional time and load reductions to achieve the desired target. Lake Macatawa does not show any evidence of a decline in phosphorus levels in spite of several activities undertaken to reduce nonpoint sources of phosphorus.

**Outcome 7**: Restore, create, or enhance 500,000 acres (approximately 10% of historic losses) of wetland by 2079.

Measure: The number of wetland acres voluntarily restored, created, or enhanced.

Results: By the end of 2010 approximately 50,000 acres (about 1% of historic losses) had been restored statewide.

How are we doing? Fair

Comments: The WRD is currently relying on landscape level Geographic Information System-based assessments to track wetland restorations, generating only an approximate measure of progress toward the outcome. We are working with other organizations and agencies to develop a more specific wetland restoration tracking system and to meet this outcome. In order to meet the desired outcome, nearly 33,000 acres will need to be restored, created, or enhanced in Michigan every 5 years. Funding from the Great Lakes Restoration Initiative is expected to significantly improve the rate of wetland restoration in Michigan.

**Outcome 8**: By 2012, eliminate 20 specific instances where the WQS is not met.

Measure: The number of water quality impairments removed from the nonattainment list between 2002 and 2012.

Results: There were 20 instances of WQS restorations documented between 2006 and 2010.

How are we doing? Excellent

Comments: Elimination of specific instances of water quality impairments is likely much higher than 20. The WRD does not currently have the ability to track these changes from the 2002 nonattainment list because the database and standard water quality assessment unit size have changed. In addition, the current tracking system does not account for the full spectrum of water quality restorations. This outcome is based on one of the USEPA's national goals for restoring water quality and may change once the current planning cycle is over.

**Outcome 9:** By 2012, fully restore 10 stream segments or lakes to meet all WQS.

Measure: The number of stream segments and lakes with nonpoint source-related WQS impairments that were removed from the nonattainment list between 2002 and 2012.

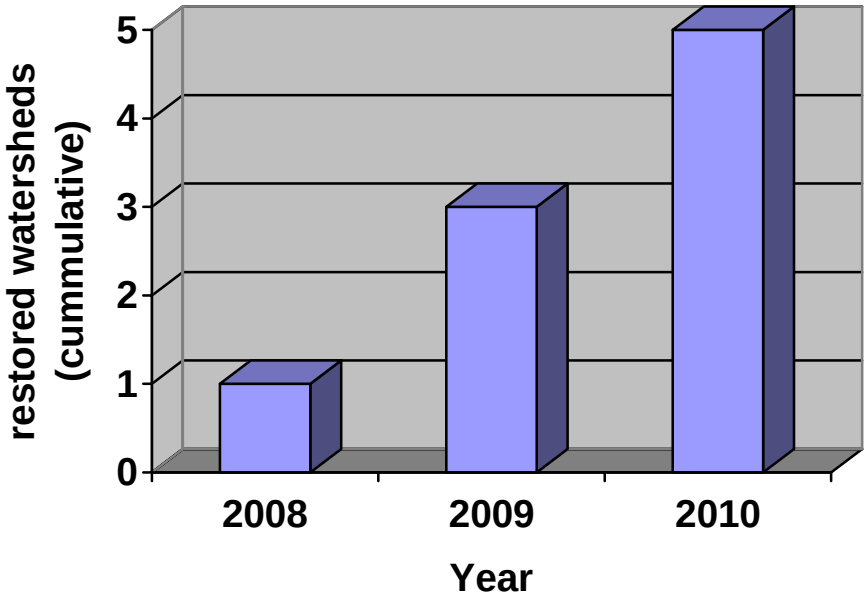
Results: Five streams in the upper peninsula have been fully restored and now meet all WQS.

How are we doing? Fair

Comments: Results may be higher than reported due to tracking deficiencies described in the comments for the previous outcome (number 8). This outcome is based on one of the USEPA's national goals for restoring water quality and may change once the current planning cycle is over.

**Outcome 10:** By 2012, improve water quality conditions in 5 watersheds impaired by nonpoint source pollution.

Measure: A watershed is improved if one or more water quality impairment is removed for at least 40% of the impaired water bodies or impaired miles/acres, or there are significant watershedwide improvements, as demonstrated by valid scientific information, in one or more water quality parameters associated with the impairments. Improvements must be documented as compared to the 2002 nonattainment list. This outcome is based on one of the USEPA's national goals for restoring water quality and may change once the current planning cycle is over.




How are we doing? Excellent

Comments: We have documented restoration or improvement in 5 12-digit HUC watersheds.

**Outcome 11**: By 2015, a minimum of 50% of the shoreline protection permits issued by the DNRE pursuant to Part 301, Inland Lakes and Streams, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, shall utilize natural shoreline design (bioengineering) or similar methods.

Measure: Percent of shoreline protection permits issued for natural shoreline designs.

Results:

How are we doing? Don't know yet

Comments: The permit tracking database tracks this information but has not yet been queried to determine our progress. This is a relatively new focus for the DNRE. We have been actively working with our partners through the Natural Shoreline Partnership and the Michigan Inland Lakes Partnership to develop educational materials and promote natural shoreline design. We expect to see an increase in the percent of permitted shoreline protection projects that use natural shoreline design.

## GOAL 4: ENSURE SAFE DRINKING WATER

**Outcome 1**: Ensure that groundwater is safe to drink.

Measure: Groundwater meets all applicable health-based standards for drinking.

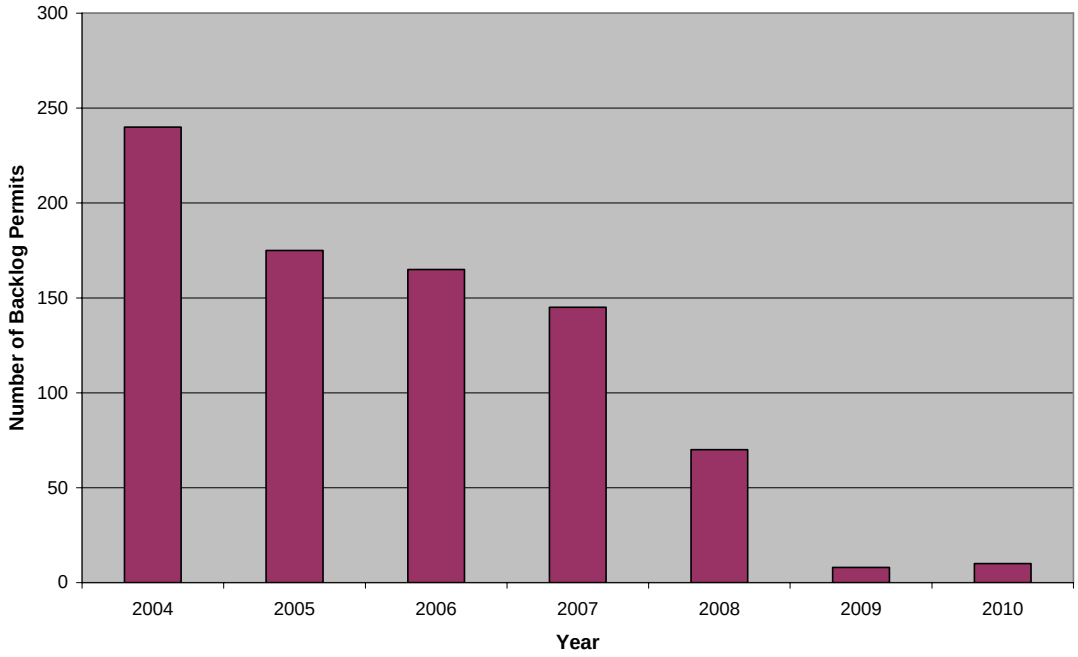
How are we doing? Don't know yet

Comment: There currently is no coordinated or compiled groundwater monitoring in Michigan. This needs to be examined and developed. This was identified as a departmentwide issue to be addressed in the future Strategic Plans with multiple divisions involved. In the interim, the following program outputs will be used to measure progress.

Program Output 1: The Groundwater Discharge Permit backlog will be eliminated, meaning that the permits will be timely with up-to-date limits and requirements to protect groundwater.

Measure: Number of Groundwater Discharge Permits that are in the backlog.

**Figure 1: Number of Groundwater Permits in Backlog**




How are we doing? Excellent

Comment: The Groundwater Discharge Permit backlog was essentially eliminated by 2010. When implementation of the Backlog Elimination Plan began in 2004, there were 240 groundwater permit applications for which no

permit action had been taken. At the end of fiscal year 2009, only 8 groundwater permit applications from the original 240 did not have final permit decisions.

Program Output 2: By 2014 permitted groundwater discharges will not be creating or contributing to metals mobilization in groundwater.

Measure: Groundwater Discharge Permits with limits and requirements that prevent metals mobilization in groundwater.

Results 2009: 92% (101 of 110 permits)

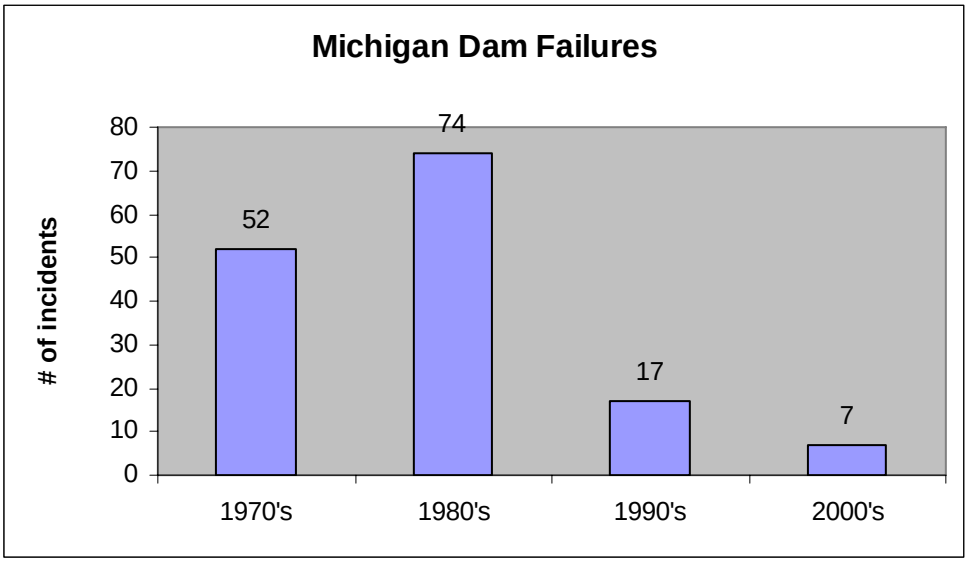
How are we doing? Good

Comment: There is difficulty in addressing this goal because this is a relatively newly discovered issue that is a result of practices that have been allowed for the past 30 years. This requires some time to understand the issue, develop the knowledge, and implement the practices to address the issue. By 2012, it is expected that all permits will include limits and requirements to address this problem. Data evaluation will continue during the field test period to ensure that the metal mobilization problem will be eliminated at the end of the permit cycle.

## GOAL 5: PROTECT PUBLIC SAFETY

**Outcome 1**: Ensure there are no dam failures in conditions less than the flood designs.

Measure: Total dam failures per decade.




How are we doing? Good

Comment: The number of dam failures has dramatically declined since the passage of the Dam Safety Act in 1990. The act requires regular dam inspections that identify possible problems and requires the owner to address serious issues that endanger the dam. We have not historically conducted assessments of the flow conditions under which a failure occurred. These assessments will be conducted for any future dam failures.

## APPENDIX A

Excerpt from "Following the Roadmap: Next Steps in Implementing Outcome-Based Environmental Management. Recommendations of the Environmental Advisory Council December 16, 2010"

The following list of program areas is not exclusive or exhaustive of all the possible choices. That is, interested parties (including the DNRE), could ultimately choose to move forward with only some of the items identified and/or choose to add additional program areas for the development of outcomes.

**We recommend that outcomes be developed in the following priority program areas.**

**Wet Weather Related Programs**

Many of the challenging water impairments in urban watersheds are related to wet weather events. The regulatory framework for managing wet weather is defined by specific regulatory programs: storm water, combined sewer overflows, and sanitary sewer overflows that are largely managed on independent tracks. Yet the costs and water quality benefits of programs within and between these tracks vary enormously. **In order to create a common basis to evaluate alternatives and tradeoffs and facilitate coordinated efforts, interested parties should develop a statement of unifying outcomes for managing wet weather issues that cuts across individual program areas.**

**Wetlands**

Part 303, Wetlands Protection, defines regulated wetlands and their importance to Michigan's citizens and provides a process for authorization of construction activities in wetlands under both state and federal law where such impacts are unavoidable. The program as administered by the DNRE also provides assistance to landowners in identification of wetlands, promotes wetland restoration, provides for monitoring and assessment of wetland resources, and encourages public support through education and stewardship. The state has established the goal of restoring 500,000 acres of wetland by 2079 through partnerships with other state, federal, and private agencies. Due to budgetary constraints in 2009, the state considered elimination of the Michigan wetland program, returning regulation of activities in wetlands to federal agencies under Section 404 of the Clean Water Act. Instead, the Legislature passed Public Act 120 of 2009, which amended the wetland (and related) law and provides program funding for three years while a statutory-created Wetland Advisory Council evaluates the program and make recommendations for improvement. In developing its report, due August 15, 2012, **the Council is encouraged to consider agreed-upon outcomes for Michigan's wetlands program and the policies and resources necessary to achieve those outcomes.**

**Critical Dunes Program**

The DNRE regulates activities that significantly alter the physical characteristics of dunes in the 70,000 acres of designated critical dune areas. The governing statute, which dates to 1989, contains difficult decision-making criteria and provides little guidance as to how the DNRE is to apply those criteria. The DNRE has implemented several program improvements recommended by a work group of affected interests convened in 2008. But the underlying program implementation issues have not been resolved. The improving economy will soon increase development pressure in the high-value dune areas with resulting pressure for program reform. These program reforms are likely not possible without agreement on the fundamental purposes of regulating development in critical dunes. Further, the role of regulation should be designed with reference to the full range of private and public sector activities encouraging appropriate dune management. **Interested parties should agree to the outcomes for critical dune protection and development in order to determine the nature of, and role of government in, appropriate dune management.**

**Non-Native Invasive Species**

Non-native invasive plant, animal, or microbial species are having dramatic economic and environmental impacts on native plant and animal communities as well as human health. Generally speaking, most of the coordination, control and management of non-native invasive species has reacted to rather than prevented introductions, and has been limited by media specific activities dictated by available funding sources. The number of existing non-native invasive species that are already well established and spreading rapidly throughout Michigan and the certainty of new introductions require strategically focused efforts. This strategic focus could be provided by a statement of the desired outcomes for invasive species management that illustrates why the management of invasive species is environmentally and economically important. **Interested parties should develop a statement of desired outcomes that encourages consistent action by involved agencies, determines the scale of treatment and prevention techniques, and focuses efforts at prioritized sites.**