Milwaukee Estuary Area of Concern

Proceedings from the Stakeholder Input Group Meeting

Kinnickinnic River Section

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* Note that in the meeting this was called the "Culture" group, but social uses is a better description of the issues that this group focused on, and for future purposes, this is the term that will be used.

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Introduction

The United States and Canada established The Great Lakes Water Quality Agreement in 1978, which expresses the commitment of each country to restore and maintain the chemical, physical, and biological integrity of the Great Lakes Basin Ecosystem. As part of a 1987 amendment to the Agreement, the U.S. and Canada designated Areas of Concern (AOCs) to focus efforts on cleaning up toxic pollutants in specific Great Lakes tributaries and harbors that suffered from severe pollution. The United States Environmental Protection Agency (U.S. EPA) works in partnership with state agencies (specifically the Department of Natural Resources in Wisconsin) to implement the AOC program.

The AOC program is intended to guide the first steps toward a restored Great Lakes ecosystem; it is not meant to serve as a framework for full restoration. It is also very geographically focused; therefore, lakewide issues (such as mercury pollution from atmospheric deposition) are beyond its scope. The 1987 amendment to the Agreement established a separate program, the Lakewide Management Plan (LaMP) program, to address whole-lake issues. Other programs, such as the state Impaired Waters Program that implements the Clean Water Act, are working in comprehensive ways to restore the health of Great Lakes water bodies.

The Wisconsin DNR and U.S. EPA regard public participation as a critical part of the process to address toxic pollutants in the AOCs. Those who live and work within AOC communities have local knowledge that is important for implementing the program in ways that align with the needs and values of those communities. Facilitated by UW-Extension, the WDNR brought together a Stakeholder Input Group (SIG) for the Milwaukee Estuary AOC to provide an avenue for collecting input from local stakeholders and for sharing information about AOC-related activities. The proceedings are a means of documenting input from the July 27, 2011, stakeholder meeting and responding to specific comments offered by participants. The WDNR is committed to listening to stakeholders and integrating input when possible (recognizing the limitations of the AOC program).

The purpose of the meeting proceedings is to summarize and synthesize the comments received at the July 29, 2011 meeting, and communicate the degree to which the comments and input can be considered for the purposes of the AOC program. The proceedings are organized by beneficial use impairment (BUI). For each BUI, a goal statement is provided. The goal statements were based on the goals suggested by the International Joint Commission, as presented in the document *Delisting Targets for the Milwaukee Estuary Area of Concern: Final Report* (developed through a separate process and submitted to U.S. EPA in 2008). The targets that are referred to in this document are also from the *Delisting Targets* report. During the meeting, verbal comments were captured by a facilitator for each of the three small breakout groups (See Appendix A for a sample of what was used). Some stakeholders provided written comments via a survey derived from a data table that was distributed prior to the meeting (See Appendix B). The summary of stakeholder comments on the goal is followed by a response from the Milwaukee Estuary AOC Coordinator. The same format is followed for the more detailed delisting targets. For each

BUI, there is also a list of recommendations, priorities, and follow-up items. When applicable, there may also additional resources listed for those who would like to know more about topics related to that beneficial use impairment.

Thanks to all who have participated and given input into the stakeholder meetings. Certainly, there has been a great deal of improvement in the AOC since the '80s, and that's in large part because of the hard work of stakeholders and interested parties. Thank you for the good work you do, and let's continue to work together to make improvements in the Milwaukee Estuary.

1. RESTRICTIONS ON FISH AND WILDLIFE CONSUMPTION

Goal: Waterbody-specific consumption advisories are not in effect for human consumption of fish and waterfowl.

Stakeholder comments about the goal: Overall, comments were supportive of the goal statement for this BUI.

Response to the stakeholders' comments about the goal: The proposed broad goal is something that is in keeping with the spirit of the AOC program.

2008

Target: Removing of this BUI may be determined by the following steps and targets:

1. All known man-made sources of PCBs, mercury, dioxins and furans within the AOC and tributary watersheds have been controlled or eliminated
2. Fish tissue concentrations do not exceed 0.05 ppm for PCBs
3. Waters within the AOC are not listed as impaired due to fish consumption advisories in the most recent Wisconsin Impaired Waters list (provided every even-numbered year to the U.S. EPA)
4. Waters within the AOC do not have special fish consumption advisories due to mercury in the *Healthy Guide for Eating Fish in Wisconsin* for two document cycles. (*Delisting Targets for the Milwaukee Estuary Area of Concern: Final Report*, pp. 31-32)

Stakeholder comments about the target: The group indicated that they wanted to ensure the protection of public health. In particular, there was a concern about whether fish consumption advice would be truly protective of public health for ethnic groups with higher rates of fish consumption.

There were also questions about how long it takes for fish tissue concentrations to decrease after contaminated sediment removal.

Additionally, another respondent indicated that consumption advisories should be the same as that of store-bought food.

Comments from the group indicated that they were also concerned about contaminants of emerging concern.

Response to the stakeholders' comments about the target: With regard to protecting public health, the goal of issuing fish consumption advisories is to protect public health. Fish consumption advice is intended to allow people to receive the health benefits of eating fish while reducing unwanted contaminants (for more information, please see *Choose Wisely: A health guide for eating fish in Wisconsin*. Note also that the document has been translated into Spanish and Hmong). DNR issues waterbody specific consumption advice where such advice is necessary to ensure that public health can be protected for those who harvest fish in waters of the state. The advice is protective of all people because it advises how much should be eaten; that is, DNR advises people how much fish is safe to eat. The point at issue for the stakeholders, it seems, is reaching and convincing people to follow fish consumption advice. Even if the advice were made more stringent, some people won't know about the advice and some will choose not to follow it. DNR has worked with the state Department of Health to develop outreach campaigns that reach segments of the

population whose English-speaking and reading abilities may be limited. Additionally, local health agencies and DNR are working to help reach subsistence anglers.

With regard to the rate of decline of contaminants in fish tissue, fish PCB concentrations will respond as soon as clean forage is available. The rate of response will vary: sooner for fast growing fish and longer for long-lived fatty fish. It is worth noting that even in large fish, tissue concentrations will decrease because fish are still growing and taking in food that is cleaner. The other issue is if all accessible habitat has been cleaned up, the rate of response will reflect how much the fish are still exposed to any remaining PCB deposits. For example, if a clean up occurs in one specific site, but fish still have access to other contaminated areas, the decreases in tissue concentrations may not be as great as would be otherwise expected.

In terms of how fish consumption advice compares to advice for store-bought fish, the FDA sets tolerance levels for contaminants and regulates the interstate sale of fish. The state's advice is more detailed for which fish species and which contaminants are of concern in specific water bodies within the state. According to the FDA, concerns related to industrial chemicals, including heavy metals and pesticides, primarily focus on fish harvested from aquaculture ponds, freshwater bodies, estuaries, and near-shore coastal waters (i.e., areas subject to shore side contaminant discharges), rather than from the open ocean (See Chapter 9 of FDA's *Fish and Fishery Products Hazards and Controls Guidance*). DNR also has assembled guidelines for popular commercial fish that are based on FDA regulations, for which mercury is the primary concern. For more information, please see p. 6 in *Choose Wisely: A health guide for eating fish in Wisconsin*, or contact Candy Schrank, DNR Fish Toxicologist.

DNR and the Department of Health Services are have also assembled fact sheets for fish consumption advisories in each of the five Areas of Concern in Wisconsin. This fact sheet is referenced below and included in this document as Appendix C. In the Milwaukee Estuary AOC, special fish consumption advisories have only been issued for PCBs; the state-wide mercury advisories pertain to fish caught from all waters of the state (see p. 9 in *Choose Wisely: A health guide for eating fish in Wisconsin*).

Contaminants of emerging concern are an important lakewide issue and are best addressed by programs other than the Area of Concern program. They are the focus of research supported by U.S. EPA's Great Lakes National Program Office under other Great Lakes programs. The U.S. Fish and Wildlife Service is carrying out an "Early Warning Program for Emerging Contaminants" project to evaluate the presence and effects of such contaminants. UW-Extension received funding for a "Contaminants of Emerging Concern: Pharmaceutical Waste" project to implement a comprehensive pharmaceutical waste collection, awareness, and education program. U.S. EPA has funded both projects under the Great Lakes Restoration Initiative.

Recommendations, Priorities, and Follow-Up Actions:

1. The DNR AOC Coordinator will explore working with the state Department of Health Services and the City of Milwaukee Health Department on outreach related to fish consumption advice for subsistence anglers.
2. In the late 1980s a waterfowl consumption advisory was issued for the Milwaukee Estuary. This consumption advisory has not be assessed since that time. A data assessment should occur in order to determine whether or not there should be a waterfowl consumption advisory for the Milwaukee Estuary.

3. Although this meeting focused on the KK River, additional actions on Milwaukee Estuary tributaries are a high priority to address this impairment. The following is a tentative list of sites needing sediment assessment and/or remediation:
    a. Lincoln Creek-Assessment completed through Great Lakes Legacy Act; Phase 1 is underway, Phase 2 still necessary (PBCs)
    b. Menomonee River-Assessment needed from downstream from confluence with Little Menomonee River to the estuary
    c. Solvay Coke Superfund Alternative Site-Remediation and some assessment of adjacent areas necessary (PAHs and metals)
    d. Cedar Creek-Remediation necessary (PCBs)

Additional Resources:

FDA. *Fish and Fishery Products Hazards and Controls Guidance, Fourth Edition*. April 2011. http://www.fda.gov/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/Seafood/FishandFisheriesProductsHazardsandControlsGuide/ucm256690.htm

Wisconsin DNR. *Fish Consumption Advice for the Milwaukee Estuary Area of Concern*. Spring 2011.

Information about the U.S. Fish and Wildlife Service Contaminants of Emerging Concern project: http://www.fws.gov/glri/ToxicEarlyWarning.htm

Information about the UW-Extension Pharmaceutical Waste project: http://fyi.uwex.edu/pharma/

Emerging Contaminant Threats and the Great Lakes: Existing science, estimating relative risk, and determining policies," a report issued by the Alliance for the Great Lakes in August 2011: http://www.greatlakes.org/emerging

2. DEGRADED FISH AND WILDLIFE POPULATIONS

Goal: Healthy, self-sustaining communities of desired fish.

Stakeholder comments about the goal: Stakeholders commented that they would like to change the wording of this goal to be "healthy and native communities of fish and wildlife." They also stated that "self-sustaining" seemed too vague.

Response to the stakeholders' comments about the goal: For the next meeting, we will modify the proposed goal. The term self-sustaining was used in order to capture the desire to see native fish populations that no longer need to be stocked. According to DNR fisheries experts, sturgeon have been stocked on the Milwaukee River since 2006. In 1999, stocking of small-mouth bass and northern pike ceased because natural reproduction was good and previous stocking had bolstered their populations. With regard to this impairment, DNR biologists and the stakeholders present at the meeting have identified an important connection between fish populations and the amount of suitable spawning habitat available in order to sustain and support such populations. It is for this reason that DNR would like to keep "self sustaining" in the goal statement.

In terms of the wildlife component of this goal, at the time that the RAP documents were written, there was essentially no data about wildlife populations. In the first RAP document written in 1991, the wildlife component was not considered to be part of the impairment for the Milwaukee Estuary AOC. The RAP revision in 1994 stated that declines in wildlife populations were likely attributable to degraded water quality and loss of habitat, especially the loss of wetlands (*Milwaukee Estuary RAP*, 1994, p. 2-17). The RAP also said that contaminants present in the AOC are known to affect wildlife reproduction and growth, and so the use should be considered impaired (p. 2-18).

DNR is currently working with its wildlife experts and reviewing scientific literature to determine if relationships between contaminants and wildlife populations have been better characterized within the last 15 years.

2008

Target: This BUI will be considered eligible for delisting when the following have occurred:

1. A local fish and wildlife management and restoration plan has been developed for the entire AOC that:
   - Defines the causes of all population impairments within the AOC
   - Establishes site specific local population targets for native indicator fish and wildlife species within the AOC
   - Identifies all fish and wildlife population restoration programs/activities within the AOC and establishes a mechanism to assure coordination among all these programs/activities, including identification of lead and coordinative agencies
   - Establishes a time table, funding mechanism, and lead agency responsible for all fish and wildlife population restoration activities needed within the AOC.
2. The programs necessary to accomplish the recommendations of the fish and wildlife plan are implemented.
3. Populations for native indicator fish species are statistically similar to populations in reference sites with similar habitat but little to no contamination.

Stakeholder comments about the target: Stakeholders suggested that a target of Fair-Good IBI as an achievable target for fish.

They also stated that they would like to see measures such as improvements in spawning success or reproduction in the target.

Stakeholders also indicated that they would like to see continued improvements in metals in whole fish in order to move towards accomplishing having fishing advice with no limits on fish consumption, presumably for these metals.

Last, some stakeholders also stated that they were concerned about what was an attainable goal for the KK River, especially if monies could be better spent in the development of spawning habitats in the Menomonee or Milwaukee River portions of the AOC.

Response to the stakeholders' comments about the target: With regard to the first, third, and fourth stakeholder comments, given that the portion if the KK River that falls within the boundaries of the AOC is not concrete lined and the proposed work that MMSD has on the KK to do streambank improvements (specifically, MMSD has plans to remove vast amounts of concrete from the KK), and the potentially restorable wetland at the Grand Trunk site, we think that a target of Fair-Good IBIs for fish in the KK River portion of the AOC is an interim target that should be given further consideration. Because of the highly altered state of the portions of the KK that lie upstream of the boundaries of the AOC, and the unrealized potential that some of the portions of the KK within the AOC have, there is good reason to think that by implementing some key projects there could be significant improvements for fish populations in the KK.

In terms of seeing improvements in metals, the concentrations that were presented for metals in fish tissue for this impairment do not apply to fish consumption. The primary contaminants of concern in Wisconsin for fish consumption advice are PCBs and mercury. There are some state criteria for toxicity of metals in fish tissue (primarily in administrative code NR 105), which was why data on metals concentrations in fish was presented. This data and its comparison to relevant standards will be clarified for future meetings.

Recommendations, Priorities, and Follow-Up Actions:

1. DNR recommends using an interim goal of healthy and native communities of self-sustaining fish and wildlife, while also evaluating the wildlife component of the goal.
2. DNR supports the MMSD's continued streambank/flood control projects on the KK River upstream of the AOC boundary. This work is could help increase potential spawning habitat on the KK.
3. DNR strongly supports the rehabilitation of the Grand Trunk wetland site. This site is the only remaining wetland in the estuary itself. Improvement at that site would provide important habitat for fish and wildlife.
4. DNR also supports a project that would help improve in-stream habitat for fish in the portion of the KK River that goes from Chase Ave. to Becher St. This area has naturalized streambanks, but a great deal of the channel itself has been filled in with sediment. If this site were improved, it may be able to provide spawning habitat in the more naturalized portion of the KK River.

3. FISH TUMORS OR OTHER DEFORMITIES

Goal: The incidence of contaminant-related fish tumors and other deformities in the AOC is similar to other minimally impacted sites.

Stakeholder comments about the goal: Some stakeholders agreed with this goal. Others did not, and said that there wasn't very much data for this impairment and that tumor data itself may not provide a good or sensitive indicator of potential problems. This group suggested that embryological studies and survival rates are better indicators, presumably, of fish health.

One other respondent wondered if the Office of the Great Lakes proposed guidelines related to addressing the fish tumors impairment would have statistical significance.

Yet another respondent stated that the goal was insufficient because other causes of tumors and deformities need to be investigated and eliminated.

Response to the stakeholders' comments about the goal: The only data that has been collected for the incidence of fish tumors in Milwaukee was taken by the U.S. Fish and Wildlife Service in the spring of 2011 for a study on contaminants of emerging concern in the Great Lakes. The analysis for this study should be available later this year from the histopathology lab to determine the causes of irregularities in tissues. Although this study collected a small sample size (N=20 for white suckers and N=20 for small mouth bass), this data can be used as a screening-level study in order to determine if a larger-scale study would be likely to conclude that incidence rates in the Milwaukee Estuary AOC are similar to minimally impacted sites. If the small-scale study shows that a larger number of fish have contaminant-related deformities/tumors, then further clean up actions will be necessary before a larger-scale fish tumor study should be done.

Furthermore, incidence rates of tumors at minimally impacted sites have been documented, and DNR's Office of the Great Lakes has used these incidence rates and performed rigorous statistical analyses to help guide its approach to assessing the fish tumor impairment. The sampling design suggests a relatively large data collection effort in an attempt to achieve an acceptably high and known degree of confidence in the study results. For more detailed information about DNR's sampling strategy for this BUI, please contact Andy Fayram, Great Lakes Monitoring Coordinator.

While embryological studies and survival rates may have value for understanding fish health, the International Joint Commission has chosen specific criteria for assessing the impairment. The original criteria in 1991 was:

> "When the incidence rates of fish tumors or other deformities exceed rates at unimpacted control sites or when survey data confirm the presence of neoplastic or preneoplastic liver tumors in bullheads or suckers."

At the time, it was known that harmful chemicals, particularly polycyclic aromatic hydrocarbons (PAHs), were highly correlated with higher incidence rates of certain types of tumors. Since 1991, PAH-related tumors are better understood, and while pre-neoplastic and neoplastic liver tumors can be caused by chronic exposure to PAHs, other types of lesions can also be caused by exposure to PAHs. There are also other types of tumors and deformities that can be caused by things other than PAH exposure, such as certain types of pathogens (please refer to Blazer et al. 2006, Hard 1988, and Rafferty et al. 2010). Because things other than contaminants can cause tumors and deformities, choosing to focus on contaminant-related (i.e, liver) tumors addresses the intent of the listing criteria and also creates greater efficiency.

2008

Target: Delisting may occur if:

- All known major sources of PAHs and chlorinated organic compounds within the AOC and tributary watershed have been controlled or eliminated.
- A fish health survey of resident benthic fish species, such as white suckers, finds incidences of tumors or other deformities at an incidence rate of less than 5 percent.

Stakeholder comments about the target: The group addressing this particular issue did not provide specific comments on either the 2008 target or the DNR Office of the Great Lakes proposed guidelines. Rather, this group suggested that creel censuses and social networking sites should be used to enhance reporting.

Another respondent stated that we should wait for the 2011 data before evaluating whether to move ahead towards delisting this impairment.

The group also suggested that shifts in the sex of fishes and other reproductive problems should be included in this impairment.

Response to the stakeholders' comments about the target: Creel census data and social networking venues may be valuable for assessing the "healthy fish communities" goal discussed under the "Degraded Fish and Wildlife Populations" BUI; however, they would not be appropriate for assessing this impairment. Since this impairment is focused on contaminant-related tumors that are found in fish livers, laboratory analysis (known as histopathology) is necessary to assess the status.

At this point, DNR is awaiting the results of the sampling that occurred in 2011 before deciding whether to move forward on a larger-scale study to determine if fish tumors exist at higher rates in the AOC.

The results from the U.S. Fish and Wildlife Service study will help determine if reproductive issues among fishes are a concern in the Great Lakes.

Recommendations, Priorities, and Follow-Up Actions:

1. DNR will await 2011 results for the Milwaukee Estuary.
2. If the results from 2011 show that there are relatively few contaminant-related tumors among the smaller sample sizes, DNR will move forward with pursuing a larger fish tumor study.
3. If the results from 2011 show that there are higher levels of contaminant-related tumors, then sources of contaminants that may be contributing to the problem will have to be re-examined and controlled or eliminated before another sampling event occurs.
4. The Solvay Coke Superfund site, which contains elevated amounts of PAHs (and metals), should be remediated.

Additional Resources:

V.S. Blazer, J.W. Fournie, J.C. Wolf, M.J. Wolfe. "Diagnostic criteria for proliferative hepatic lesions in brown bullhead *Ameiurus nebulosus*." *Diseases of Aquatic Organisms*. Vol. 72: 19–30, 2006.

G.C. Hard. "Fish tumors and ecological surveillance: a cautionary example from Port Phillip Bay." *Journal of the American Water Resources Association*. Vol. 24, (5): 975–980, 1988.

S.D. Rafferty, V.S. Blazer, A.E. Pinkney, J.L. Grazio. E.C. Obert, L. Boughton. "A historical perspective on the 'fish tumors or other deformities' beneficial use impairment at Great Lakes Areas of Concern." *Journal of Great Lakes Research.* Vol. 35(4): 496-506. 2009

4. BIRD OR ANIMAL DEFORMITIES OR REPRODUCTIVE PROBLEMS

Goal: The incidence of bird or animal deformities or reproduction problems in the AOC is similar to that of other minimally impacted sites.

Stakeholder comments about the goal: Stakeholders generally seemed to think that a study to determine whether this impairment existed would be necessary before a decision about removing the impairment from the AOC should be made.

The comments from the meetings toxics group were similar to their comments for the fish tumors and other deformities impairment.

Response to the stakeholders' comments about the goal: This impairment is suspected for the Milwaukee Estuary AOC since contaminant levels that were observed in the AOC were similar to other AOCs where reproductive problems and deformities occurred.

DNR staff have been looking into whether relationships between contaminants and deformities/reproduction problems have been better characterized since the mid-1990s.

Pending further information, the specific metrics and statistical evaluation of any potential data that would be collected should be better characterized for future meetings.

2008 Target: This BUI may be delisted if:

- Studies conducted in the AOC indicate that the beneficial use should not be considered impaired, or
- If studies conducted in the AOC determine that this use is impaired, then two approaches can be considered for delisting: (see pp. 36-37 in the document *Delisting Targets for the Milwaukee Estuary AOC*.)

Stakeholder comments about the target: Toxics group commented that social networking sites should be used to enhance reporting.

Response to the stakeholders' comments about the target: Although a good source of anecdotal information, such sites would not meet DNR or EPA quality assurance or quality control requirements for data, and therefore cannot be used in determining the status of an impairment.

Recommendations, Priorities, and Follow-Up Actions:

1. DNR or other partners should work with wildlife experts to determine if the relationship between bird and animal deformities/reproductive problems has been better characterized.
2. DNR will also consider developing a study design to determine whether or not this use is impaired.

5. DEGRADATION OF BENTHOS

Goal: Healthy, self-sustaining communities of desired benthic organisms.

Stakeholder comments about the goal: Stakeholders suggested changing "desired" to "native" and eliminating the term "self sustaining."

Response to the stakeholders' comments about the goal: This change seems sensible, and we will propose the modification at the next stakeholder meeting on the Menomonee River.

2008
Target: Delisting may occur if:

1. Known contaminant sources contributing to sediment contamination and degraded benthos have been identified and control measures implemented, and
2. All remediation actions for contaminated sediments are completed and monitored according to the approved plan with consideration to using consensus based sediment quality guidelines and equilibrium partitioning sediment benchmarks; or
3. The benthic community within the site being evaluated is statistically similar to a reference site with similar habitat and minimal sediment contamination.

Stakeholder comments about the target: At the meeting, it was proposed to include a HBI component into the target. The proposed level was for a HBI rating of "Fair-Good." The Fish and Wildlife group did not agree with using this as a target because although they agreed that this is an element that should be included in the targets, they also thought incidence of toxicity should be included. It was unclear whether they disagreed with the target because there were other components that they thought should be included besides the HBI value, or whether they disagreed altogether with the rating of "Fair-Good." They stated that the HBI only assesses organic pollution and not toxicity, which should also be included in an assessment.

Furthermore, they said that the riverine HBI values should only be used for the upper portion of the river (above Chase Ave) because downstream areas are more similar to estuary- or lake-types of conditions.

They also stated that improvements for benthos may continue since the 2009 remediation project on the KK River.

One individual stated that they did not agree with an HBI rating of "Fair-Good" because he/she wanted to see ratings of "Excellent" that would be commensurate with pre-degradation levels, with improvements paid for by polluters.

Response to the stakeholders' comments about the target: With regard to the first and second points, those can and will be taken into consideration for any subsequent revisions of targets related to this impairment. It should also be noted that for assessment for the state impaired waters program, macroinvertebrate indices of biotic integrity are the preferred metric for assessing macroinvertebrate communities, rather than the Hilsenhoff Biotic Index (HBI).

Although "Excellent" HBI values may be ideal, they also may not be practical. Even if there are no point sources of pollution, nonpoint source pollution continues to be the largest source of organic

pollution in the watershed. This is further compounded by the fact that the entire KK River is an urban stream, and restoring the river to pre-settlement conditions is not achievable.

Recommendations, Priorities, and Follow-Up Actions:

1. DNR will propose changing the goal to "healthy native communities of benthic organisms."
2. The U.S. Geological Survey will also be collecting benthos samples to compare populations in Wisconsin's Lake Michigan Areas of Concern with similar areas that are not AOCs. This data collection will take place in 2012, and more information about the study design can be found in Appendix D.
3. DNR will also work with the Water Evaluation team to determine how issues of organic pollution and toxicity can be captured in targets for this impairment.

6. RESTRICTIONS ON DREDGING ACTIVITIES

Goal: Sediment quality is such that additional disposal restrictions (and associated costs) are not imposed for dredging activities.

Stakeholder comments about the goal: The toxics group at the meeting did not agree with the goal as stated. They stated that this was a "legacy" goal and that there is a need to look at uses other than dredging, e.g., ecological and toxicological aspects, of contaminated sediments. They stated that bioassays would provide a more reliable indicator.

They stated that this concern is wider than simply the boundaries of the AOC with upstream effects of contamination feeding into the AOC.

Another individual commented that ongoing monitoring was necessary until surface runoff is clean and legacy sources of contamination identified and removed.

Response to the stakeholders' comments about the goal: Examining the ecological and toxicological aspects of contaminated sediments is better matched to addressing the fish and wildlife impairments, the fish tumors/deformities impairment, the benthos impairment, and the wildlife reproductive problems and deformities impairment.

DNR recognizes the fact that upstream sources of pollution pose a challenge to making progress in the AOC. To that end, DNR modified the boundaries of the AOC in order to ensure that legacy pollution in the watershed, which would end up ultimately in the Milwaukee Estuary and eventually out into Lake Michigan, would have the opportunity to be addressed through the Great Lakes Legacy Act. Great Lakes Legacy Act provides opportunities to clean up legacy contamination in U.S. Areas of Concern. Although the Milwaukee and Menomonee River portions of the AOC were expanded in order to tap into this funding, the KK River, however, did not require an expansion of its boundaries.

In terms of the actions still needed on the KK River, at this time DNR would like to see continued green infrastructure projects in the KK River watershed to minimize the amount of storm water runoff that makes its way into the river. In 2009, the DNR and EPA completed a project to remove legacy contamination from a portion of the KK River that contained sediments contaminated with high levels of PCBs. As far as other known sources of contamination in the KK River, there may be additional contamination underneath the concrete-lined portions of the KK River that are upstream from the AOC boundary, but this contamination is currently not bioavailable, and once the concrete is removed, the sediments will be analyzed and disposed of in accordance with state administrative rules, in particular NR 347, so that the contamination will not be released. The Solvay Coke Superfund site is another remedial action that should be completed in order to address this impairment in the KK River portion of the AOC.

2008 Target: Delisting of this BUI can occur when:

1. Contaminated sediment hot spots within and upstream from the AOC have been identified.
2. Implementation actions to remediate contaminated sites have been completed. As a source control measure and for AOC remediation, known contaminated sites must be addressed before delisting is possible.

3. There are no restrictions on routine navigational dredging done by the U.S. Army Corps of Engineers and/or private dredging companies due to contamination originating from controllable sources within the AOC.

Stakeholder comments about the target: The toxics group stated that they didn't agree with the target. They cited that issues related to toxic contamination are wider than simply the boundaries of the AOC with upstream effects of contamination feeding into the AOC.

Response to the stakeholders' comments about the target: The first and second components of the target itself identifies that contaminated sediment hotspots within and upstream of the AOC have been identified and controlled before delisting is even possible, so the concerns of the group are encompassed in the current target.

Recommendations, Priorities, and Follow-Up Actions:

1. Await post-remediation data in order to determine the full success of the 2009 Great Lakes Legacy Act project on the KK River.
2. Continue to support green infrastructure projects or other projects that will help reduce toxic substance inputs associated with nonpoint source pollution into the KK River.
3. Additional sediment assessment and remediation of contaminated sites and, such as the Solvay Coke Superfund Alternative Site, should occur in order for this impairment to be removed.

7. EUTROPHICATION OR UNDESIRABLE ALGAE

Goal: Water quality has improved sufficient to meet state water quality standards.

Stakeholder comments about the goal: Most of the stakeholders agreed with the goal, including the group that looked at social uses for the AOC. They had the following questions and comments related to this goal:

A. Is water quality in any harbor area (especially the KK segment) ever going to meet state standards?

B. What are the variations among the Great Lakes states of standards for water quality?

C. Data sets on the rivers: H2Oinfo.com

D. The data was presented in a confusing way (some standards you want to be high and others low).

E. Are we interested in delisting or restoration?

Response to the stakeholders' comments about the goal: Respective responses to each of the concerns above follow.

A. This is a valid question, and one that is hard to answer. Right now, the KK River has a variance standard for dissolved oxygen. By virtue of the fact that a variance standard has been established for this river, the river is not meeting water quality standards for fish and aquatic life, which is one of its designated uses. What we had hoped was apparent in the data that were presented was that since the late '70s, dissolved oxygen (DO) has improved in that the river used to, at times, have no dissolved oxygen. Although more recent data weren't included in the table, the data from the late '90s and early 2000s shows that the lowest DO levels are much closer to the fish and aquatic life DO standard, which is 5 mg/L, than what they used to be, and are already regularly above the 2 mg/L variance standard for the KK River. For the next set of meetings, we will try to gather more recent data where it is available.

B. While it might be interesting to see how WI standards compare to those of other Great Lakes states, they would not influence the goals or targets in Wisconsin. DNR is not able to set a target (the more quantitative part of the goal) that is more stringent than what the state standard is.

C. As mentioned earlier with the third BUI, outside data sets are not always easy to include in analyses since data used by DNR must meet basic quality assurance and quality control measures. DNR does have its own database for water quality, and this is the data that is used in other programs, like the state impaired waters program, which is the implementation of the Clean Water Act.

D. In terms of the data presentation (see data table in Appendix B), the goal was to use color to signal where improvements had been made across time. For example, the historic conditions (third column) for toxic substances in sediments went from being severe to slight (as shown in the fifth column). For future meetings, we will try to make sure that this

is clearer, but we also encourage questions so that we can provide clarification and improve efficiency where ever possible.

E. For the purposes of the AOC program, we are interested in removing impairments where we can in order to celebrate success, and our ultimate goal is delisting of the AOC. However, we are also interested in seeing genuine improvement in a quantitative and scientifically defensible fashion. By demonstrating success with BUI removal, the partners working to improve our watersheds will be strongly positioned to seek funding for additional AOC delisting projects, as well as funding from a variety of non-AOC-related sources for watershed restoration projects.

2008

Target: Delisting of this BUI can occur when:

1. Total phosphorus (TP) concentrations within the AOC rivers do not exceed 0.05 mg/L OR in-river TP concentrations meet Wisconsin criteria when promulgated.
2. TP concentrations in the inner and outer harbor areas do not exceed 0.02 mg/L OR TP concentrations meet WI criteria when promulgated.
3. TP concentrations in near shore waters do not exceed 0.02 mg/L OR TP concentrations meet WI criteria when promulgated.
4. There are no exceedances of the minimum dissolved oxygen (DO) concentrations established in Chapter NR 102, due to excessive sediment deposition or algae growth.
5. Chlorophyll-a concentrations within the AOC lake and impoundment areas do not exceed 4.0 µg/L.
6. No water bodies within the AOC are included on the list of impaired waters due to nutrients or excessive algal growths in the most recent WI Impaired Waters list.
7. There are no beach closures in the AOC due to excessive nuisance algae growth.

Stakeholder comments about the target: The social uses group at the meeting had the following comments:

A. Nonpoint source pollution should be the main focus as it has expanded a lot with recent urbanization.

B. Only including phosphorous for nutrients may not be sufficient. Since nutrients interact, maybe we should include nitrogen in this analysis.

C. Do the standards in PR 37 and TR 39 need to be incorporated into state standards?

D. This group indicated that total phosphorus levels were still too high on the KK River.

Response to the stakeholders' comments about the target: Across the board, there seemed to be consensus by many that water quality had improved, but that there was still a ways to go in terms of addressing phosphorus levels, in particular.

A. Nonpoint source pollution continues to be an obstacle toward achieving water quality criteria. Addressing nonpoint source pollution and examining the role of non-contact cooling water should be a priority on the KK.

B. In this part of the state, phosphorus tends to be more of a limiting nutrient than nitrogen. More information on this can be found below under the Additional Resources section of this BUI.

C. With regard to incorporating SEWRPC's recommended planning standards for phosphorus into the state standards, it should be noted that the state criteria for total phosphorus are more stringent than the SEWRPC recommended planning standard.

D. Although improvements have been made towards reducing total phosphorus (TP), levels do regularly exceed the proposed state standard for TP on the KK River and several other tributaries to the Estuary. The Milwaukee Metropolitan Sewerage District has secured funding to conduct a total maximum daily loading study in order to determine what might be done in order to reach the standard.

Recommendations, Priorities, and Follow-Up Actions:

1. Information about the Total Maximum Daily Load study that is being done for total suspended solids, phosphorous, and bacteria should be included in the data summary for the next meeting.
2. Addressing nonpoint source pollution is a priority issue for continuing to make progress on the KK River. Green infrastructure projects and implementation of other stormwater best management practice projects should be a priority to address this impairment, as well as several other impairments that unequivocally still exist on the KK River segment of the AOC.

Additional Resources:

D.M. Robertson, D.J. Graczyk, P.J. Garrison, L. Wang, G. LaLiberte, R. Bannerman. "Nutrient concentrations and their relations to the biotic integrity of wadeable streams in Wisconsin." U.S. Geological Survey Professional Paper 1722. http://pubs.usgs.gov/pp/pp1722/#N10034.

D. M. Robertson, B.M. Weigel, D.J. Graczyk. "Nutrient concentrations and their relations to the biotic integrity of nonwadeable rivers in Wisconsin." U.S. Geological Survey Professional Paper 1754. http://pubs.usgs.gov/pp/1754/.

8. BEACH CLOSINGS AND BODY CONTACT RESTRICTIONS

Goal: Water quality has improved sufficient to meet state full body contact standards.

Stakeholder comments about the goal: The social uses group did not state whether or not they agreed with the goal.

A comment received from an individual indicated that this goal was not sufficient because water quality on the KK should be the same as a trout stream or inland lake with 200-feet riparian setbacks required.

Response to the stakeholders' comments about the goal: Although 200-feet setbacks in the riparian corridor might help improve water quality, this cannot be a requirement since this is not in accordance with provisions of state law. It is advised that where feasible, buffer strips could be implemented to improve water quality.

2008

Target: This BUI will be considered restored when:

1. All known sources of bacterial contamination to the AOC and tributary watersheds have been identified and, if feasible, have been controlled or treated to reduce possible exposures; and
2. No sanitary sewer overflows or un-permitted combined sewer overflows have occurred within the AOC during the previous five year period as a result of a less than 25-year precipitation event or snow/ice melt conditions; and
3. All municipalities within the AOC have adopted and are implementing storm water reduction programs including an illicit discharge elimination program; and
4. No water bodies within the AOC are included on the list of impaired waters due to contamination with pathogens or chemicals having a public health concern (i.e. carcinogenic, mutagenic) in the most recent Wisconsin Impaired Waters list which is submitted to U.S. EPA every two years; and
5. No local or state contact advisories related to the presence of a chemical contaminant have been issued within the AOC during the previous five years.

Stakeholder comments about the target: The social uses group did have some questions and comments regarding this impairment. They are:

- ✓ Is the variance standard for fecal coliform bacteria?
- ✓ Add testing for storm water outfalls as sources for fecal bacteria
- ✓ Source analysis (human or animal) of the bacteria would be helpful to determine whether the problem is something that can be linked more directly to humans and failing infrastructure rather than caused by wildlife
- ✓ Should there be signs posted if full body contact isn't advisable (even if the site isn't a beach area) to protect human health?

Response to the stakeholders' comments about the target: Responses to the issues cited above are addressed below.

The variance standard that was indicated on the data table was for fecal coliform on the KK River. As is the case for dissolved oxygen, the fact that a variance standard has been established for this river, the river is not meeting water quality standards for recreational uses (i.e., body contact), which is one of its designated uses.

With regard to the second and third items, source analysis for fecal coliform is helpful in determining what the source of the bacteria is. Such information also provides guidance about whether or not the problem is something that poses a more serious risk to human health, and also whether there is something that can be done to eliminate the source. To this end, DNR has provided $10,500, with a $3,000 contribution from Milwaukee Riverkeeper, in 2011 for bacterial source identification of stormwater outfalls in the AOC (specifically, in the Menomonee and Kinnickinnic Rivers). This is important information, and once results come back from the 2011 analysis this data should help in identifying "find and fix" opportunities. Source analysis testing ("find") helps in the efficient allocation of municipalities financial resources by identifying whether the bacteria is attributable to human waste, and if it is, additional diagnostic testing (dye or smoke testing) can be used and infrastructure can be repaired ("fix").

Since riverine environments are generally more transient than lakes where the water doesn't flow as fast through the system, it probably is not feasible to have signs since conditions could change fairly rapidly on the river. Additionally, it is currently not possible to do real-time bacteria testing. Typically test results to determine if bacteria are present at unsafe levels take 24 hours to receive, and then advisories are issued after the results are received. These limitations mean that posting signs would probably not provide people with truly accurate information about whether or not bacteria in the river pose a health risk.

Recommendations, Priorities, and Follow-Up Actions:

1. Bacterial source data results will be analyzed to determine which areas should be priority for "find and fix" actions.
2. DNR recommends financial support for targeted "find and fix" actions and green infrastructure to address bacteria loading issues. Although sewer overflow events have decreased, aging and failing infrastrucure presents a substantial obstacle to making progress towards removing this impairment. While other water quality parameters have improved over the last decade or two, bacterial loads have increased, presenting a substantial obstacle towards removing this BUI.
3. The TMDL for the KK River should also help provide some insight into what the primary sources of bacterial loading are. Those results of the TMDL modeling are expected in 2013.

9. DEGRADATION OF AESTHETICS

Goal: Improved aesthetics
- Trash and debris inputs controlled
- Limited number of road crossings.

Stakeholder comments about the goal: The social uses group commented that this BUI should also consider the appearance and smell of water. They also stated that there were concerns about the fact that the flow of the river in the estuary portions was hard to measure since it can change.

Another stakeholder commented that visual surveys should be used to assess this impairment.

Yet another stakeholder commented that the goal should be to make the AOC as attractive as the best harbor in Lake Michigan.

Response to the stakeholders' comments about the goal: Appearance and smell of the water are things to consider for this particular impairment, but finding an appropriate baseline for these may make them difficult to use as metrics. The second statement about the river flow seems to be implicating an effect called the seiche, which is when water levels on either side of a large lake can change because of differentials in atmospheric pressure. This change can be observed in the Milwaukee Estuary and the lower portions of its tributaries. The connection between the seiche and this particular impairment was not clear.

Visual surveys are being tested in other AOCs in Wisconsin, in particular the Green Bay/Lower Fox River AOC. Results from this should be available within the year and may provide additional insight into addressing this impairment.

While making the AOC the most attractive harbor on Lake Michigan may be desirable, it is a very high bar, and beyond the scope of the AOC program. This goal may be more appropriate for local long-range development plans.

2008
Target: This delisting target is consistent with Chapter NR 102, Water Quality Standards for Surface Waters. Delisting shall occur when monitoring data within the AOC and/or surveys for any five-year period indicates that water bodies in the AOC do not exhibit unacceptable levels of the following properties in quantities that interfere with the Water Quality Standards for Surface Waters:

1. Substances that will cause objectionable deposits on the shore or in the bed of a body of water shall not be present in such amounts as to interfere with public rights in waters of the state.
2. Floating or submerged debris, oil, scum, or other material shall not be present in such amounts as to interfere with public rights in waters of the state.
3. Materials producing color, odor, taste, or unsightliness shall not be present in such amounts as to interfere with public rights in waters of the state.
4. The following target will also be met to determine when restoration has occurred:
    - Corrective action plans are in-place and being implemented for all known sources of materials contributing to the degradation of aesthetics within the AOC.

Stakeholder comments about the target: The social uses group submitted no comments in relation to the target.

There were no specific comments submitted by anyone about the target for this impairment, but the comment reviewer was left with the impression that many stakeholders thought that continued progress needed to be made for the KK with regard to this impairment.

Response to the stakeholders' comments about the target: An important next step is to determine if measurable progress has been made toward reducing the inputs of trash into the waters of the KK. DNR plans to try to gather information to see if records kept by MMSD, who operates the trash skimmer in the Estuary, indicate that the amount of trash removed has decreased over time. Milwaukee Riverkeeper also does an annual river clean up in the spring of each year, and there may be information kept about the amount of trash collected from each of the rivers. Both of these would help in determining whether the primary reason behind listing this impairment, i.e., trash, has been reduced since the time that the area was first designated as an AOC.

Recommendations, Priorities, and Follow-Up Actions:

1. Work with MMSD, Milwaukee Riverkeeper, and other organizations to determine if trends in the amounts of trash can be ascertained.
2. If trends can be surmised, then those data should be summarized and presented to the group.
3. DNR will work with partners on revising the goal statement as well as work on the targets in order to make them address concerns that both the DNR and the stakeholders currently have with both.
4. The AOC Coordinator will check on the outcomes of the Lower Green Bay & Lower Fox River aesthetics monitoring project to determine if the approach could be adapted for the Milwaukee Estuary AOC.

10. DEGRADATION OF PHYTOPLANKTON AND ZOOPLANKTON POPULATIONS

Goal: Improved phytoplankton and zooplankton populations.

Stakeholder comments about the goal: The fish and wildlife group at the meeting agreed with the proposed goal.

One individual stated that he/she did not agree with the proposed goal and stated the goal should be to provide conditions that allow healthy reproduction of aquatic species.

Response to the stakeholders' comments about the goal: Generally, most agreed with the goal.

In the case of the one objection that was received, there is a close linkage between populations and reproduction. Given the fact that this impairment applies primarily to the estuary portion of the AOC, and given the physical limitations in the estuary that are necessary to support the shipping industry (sheet piling, dredging, etc.), it may not be feasible to see extremely healthy and diverse populations of these particular organisms.

2008
Target: A stepped approach is needed for delisting for this impairment:

1. The first step toward delisting will be to establish a baseline condition for the estuary to evaluate the extent of this impairment. Phytoplankton and zooplankton community surveys should be conducted and compared to a non-impacted or minimally impacted reference site to set the baseline condition. If the community structure is statistically different than the reference conditions, this BUI should be considered impaired.
2. Identify the factors leading to this impairment.
    a) Ambient water chemistry sampling should be conducted to determine if nutrient enrichment is the main contributor.
    b) If nutrients are the main contributor, sources causing nutrient enrichment to the outer harbor and nearshore waters are identified and controlled. If nutrient enrichment is not considered the cause of the impairment, conduct bioassays to determine if ambient water toxicity is causing impairment.

Stakeholder comments about the target: The fish and wildlife group did not agree with the target as proposed. They stated that it might be more prudent to tie this dimension of the aquatic community into the invertebrate- and fisheries-related sampling that is occurring since recent research shows strong relationships between these dimensions.

Another stakeholder commented that conditions should be provided that allow healthy reproduction of aquatic species, and suggested that adding habitat would be one way of achieving this.

Response to the stakeholders' comments about the target: The suggestion is noted, and DNR will look into ways to tie this impairment to other impairments. Examining linkages and relationships builds efficiency into the AOC program.

It should also be noted that there are plans for U.S. Geological Survey to conduct a survey on benthic and planktonic organisms in the AOC. The project is scheduled to occur in the spring of 2012. The project proposal, which has been funded, is available in Appendix D. At any rate, there should be more specific information available soon regarding this particular impairment.

Recommendations, Priorities, and Follow-Up Actions:

1. DNR will share the results of the survey once they are available.
2. DNR will also consider if there is another way to look at this impairment by examining invertebrate and fisheries sampling.

11. LOSS OF FISH AND WILDLIFE HABITAT

Goal: Improvement of fish and wildlife habitat by improving the riparian corridor, removing concrete channels, and restoring wetlands.

Stakeholder comments about the goal: The fish and wildlife group did not agree with the proposed goal. They suggested the goal of improved fish and wildlife habitat.

Response to the stakeholders' comments about the goal: More specific feedback about this goal will be solicited in future meetings.

2008

Target: This BUI will be considered eligible for delisting when the following have occurred:

1. A local fish and wildlife habitat management and restoration/rehabilitation plan has been developed for the entire AOC that:
   a) Defines the causes of all habitat impairments within the AOC;
   b) Establishes site-specific habitat and population targets for fish and wildlife species within the AOC;
   c) Identifies all fish and wildlife habitat restoration programs and activities within the AOC and establishes a mechanism to assure coordination among the programs/activities including identification of lead agencies;
   d) Establishes a timetable, funding mechanism, and lead agency responsible for all fish and wildlife restoration activities within the AOC.
2. The programs and actions necessary to accomplish the recommendations identified in the fish and wildlife plan are implemented, and modified to ensure continual improvement.

Stakeholder comments about the target: The fish and wildlife group also did not agree with the target, which seems to relate to their suggestion for the revised goal. They stated that it wasn't appropriate for the targets for this impairment to be nearly the same as for the degraded fish and wildlife populations impairment. They stated that the target should be more directly tied to physical improvements in water and areas adjacent of the water, not measure of populations. Furthermore, the group asserted, the targets should be more closely tied to improvements in the estuary (i.e., spawning habitat) and upstream of the estuary (i.e., concrete removed, stream re-meandered, floodplain reconnected, wetland established, etc.). Unless the areas upstream of the estuary are improved, there will likely not be any improvements within the estuary itself.

Response to the stakeholders' comments about the target: Along with the stakeholders, DNR does not agree with the 2008 target. It should be noted, however, that there was a mistake in the target that appeared in the meeting handouts and that for the target listed above, the word "habitat" was replaced by the word "populations." This mistake probably accounts for some of the comments that were made by the group. Beyond that though, tying this target more specifically to physical improvements in the estuary is something that the DNR can support. DNR has plans to try to develop some interim benchmarks related to the improvements that the stakeholders suggested in order to have some measurable components of the target. This would also serve as an informal plan of which actions should occur before progress made on the impairment is re-examined.

Recommendations, Priorities, and Follow-Up Actions:

1. DNR will ensure that the mistake in the documents for this last meeting are corrected.

2. DNR will also work with local fisheries experts to try to develop some draft interim benchmarks that could help improve habitat.