DRAFT
Minutes from
New York State Areas of Concern (AOC)

Workshop 1
Tuesday, September 9, 2008 8:30am – 4:00 pm
Ecology and Environment, Inc. Training Area
368 Pleasant View Drive, Lancaster NY

List of Attendees:

    Ryan Archer, Bird Studies Canada (BSC)
    Barbara Belasco. United States Environmental Protection Agency (USEPA)
    Mike Basile, (USEPA)
    Lori Boughton, Pennsylvania Department of Environmental Protection (PADEP)
    Joanna Craigmile, Ecology and Environment (E & E)
    Victor DiGiacomo, Niagara County Soil and Water Conservation District/Eighteenmile
Creek RAP
    Matt Doss, Great Lakes Commission
    Mark Elster, USEPA
    Kris Erickson, E & E
    Mark Filipski, New York State Department of Environmental Conservation (NYSDEC)
    Tony Friona, US Army Corps of Engineers (USACE)
    Paul Fuhrmann, E & E
    Marcia Galloway, E & E
    Jim Grazio, PADEP
    Jill Jedlicka, Buffalo Niagara Riverkeeper (BNR)
    Stephen Litwhiler, NYSDEC
    Charlie Knauf, Rochester Embayment AOC
    Fred Luckey, USEPA
    Paul McKeown, NYSDEC
    Richard Rink, NYSDEC
    Michael Rutter, Penn State, Erie
    David Schulenberg, USACE
    Mike Shaw, USEPA
    Vicki Thomas, USEPA
    Robert Townsend, NYSDEC
    Deepali Weyand, E & E
    Hazel Wheeler, BSC
    Mike Wilkinson, NYSDEC
    Katherine Winkler, BNR
    Margaret Wooster, BNR
    Ray Yacuzzo, NYSDEC
    Don Zelazny, NYSDEC

The following provides a summary of the presentations, discussions, and issue items that were discussed over the course of Workshop 1.

Welcome and Introductions (E & E)

The meeting convened at 9:00 am. Nancy Aungst, Vice President of Ecology and Environment, welcomed the attendees. Deepali Weyand, Ecology and Environment introduced herself as facilitator of the meeting. Introductions by all attendees followed.

Deepali gave a brief presentation of the agenda, indicating that there would be three presentations over the course of the day, with the focus of providing ample opportunity for open discussion. She indicated that the purpose of the meeting was to discuss the status of Beneficial Use Impairment (BUI) delisting criteria and associated issues. The deadline for completing the draft BUI criteria is by the end of the calendar year (12/31/08). NYS RAPs were contacted prior to the meeting to discuss the Workshop and provide their views on what issues were most problematic relative to BUI delisting criteria development. They identified the following BUIs and the related criteria as being the most problematic:

- Degradation of Fish and Wildlife Populations,
- Loss of Fish and Wildlife Habitat,
- Fish Tumors and Other Deformities,
- Bird and Animal Deformities and Reproductive Problems, and
- Tainting of Fish and Wildlife Flavor.

Deepali noted that development of delisting criteria and these BUIs would be the day's focus. Prior to the meeting, RAP coordinators were asked to submit questions. The questions were categorized and presented on a large display board during the Workshop and also in a handout. Those questions formulated the basis of subject matter for the meeting. Questions that were 'out of scope' for this workshop were "parked" for discussed at a future workshop.

Other materials provided to participants included:
- Setting Statewide Criteria—Considerations for Ohio;
- Lessons Learned from Michigan Department of Environmental Quality (MDEQ) Delisting Criteria;
- an example flow chart from Massena AOC developed by E & E to chart progress toward delisting; and
- a matrix/table comparing the most current delisting criteria (whether finalized or proposed) for Niagara River, Buffalo River, St. Lawrence at Massena, Rochester Embayment, Eighteenmile Creek, State of Ohio and State of Michigan statewide criteria, and criteria for Niagara River in Ontario, Canada.

EPA's AOC Program (Mark Elster, GLNPO)

Mark Elster, Senior Program Analyst with EPA's Great Lakes National Program Office (GLNPO) gave a presentation on USEPA's AOC Program. A summary of his presentation and associated discussions are as follows:

The RAP program was developed as a planning tool to restore AOCs to the condition of other tributaries to the Great Lakes watershed (non-AOC sites). Public involvement is a key component of the process. The overall goal has never been, or ever will be, to return AOCs to pre-settlement conditions, but to restore beneficial uses to conditions similar to non-AOC sites and to be consistent with locally defined goals. However, RACs need to realize that not all BUIs can be restored. Mark summarized GLNPO's systematic approach, which involves assigning a federal RAP liaison for each AOC with goals to accelerate the setting of delisting targets and eventually the formal delisting of the AOCs.

Mark discussed the process of setting delisting targets. RAPs can only address those BUIs that are caused by local sources and an AOC is only eligible to be formally delisted when restoration targets are met and are supported by sufficient monitoring data.

Delisting targets should be locally generated and are expected to differ between AOCs based on local conditions.

Although local differences may be necessary, delisting targets must be consistent with federal and state regulations and objectives. EPA realizes that some beneficial uses cannot be fully restored and only partial restoration may be possible.

Tools available to AOCs to demonstrate progress short of delisting include restoring individual BUIs, using the "Recovery Stage" concept as an interim step between implementation of actions and formal delisting, and restoring sub-watersheds of the AOC.

Michigan and Ohio statewide delisting criteria were suggested as resources for delisting guidance. Major successes thus far in the program are Oswego River in New York, which was the first AOC in the United States to formally delist, and Presque Isle Bay, Pennsylvania, which is in recovery stage.

Mark then answered the general delisting criteria questions (developed prior to the meeting by AOC leads) from GLNPO perspective. In summary:

Q: **Who makes the final decision about delisting criteria?**

A: State and local officials make the final decision about delisting targets for an AOC; however, EPA needs to be able to stand behind each AOC's criteria and should be involved early in the process.

Q: **How and when can delisting criteria be changed once definitions have been developed?**

A: Even though there is an end-of-the-year deadline to develop delisting criteria, those criteria can be refined after the fact as needed.

Q: **How stringent do delisting criteria have to be?**

A: Delisting targets should focus on what is achievable; EPA realizes that AOCs are not going to be restored to pre-development conditions.

Q: **How clean does an AOC have to be in order to be de-listed?**

A: When all beneficial uses have been restored and monitoring has shown that the restoration targets have been maintained, the RAP Implementation Group can initiate the process of formally delisting the AOC, in coordination with USEPA.

Q: **When using control or reference sites to determine the status of an AOC, what is an acceptable definition of "similar" when the AOC has to be "similar" to a reference site to be de-listed?**

A: When setting reference sites for delisting criteria there is no set methodology for choosing such a site. Individuals with local knowledge should be able to assist RACs when determining reference sites. GLNPO has expertise on sediment related issues.

Q: **What does Area of Recovery mean and how does an AOC reach that?**

A: During post implementation period, the AOC ecosystem is responding to actions taken. A decision to designate an AOC as being in recovery stage should be site-specific and flexible enough to respond to new needs based on monitoring data. In each of these instances, the question arises as to how to report that no further active intervention is needed, and that a period of recovery is required to fully achieve the delisting targets.

Q: **Can we standardize delisting criteria across the New York State AOCs?**

A: YES – Michigan and Ohio have done this. EPA strongly encourages exploring this option in New York. Delisting criteria could be standardized across New York State, as has been done in Michigan and Ohio, although Mark acknowledged that it may be too late in the NYS process to implement statewide BUI criteria.

Q: **Can we develop one set of delisting criteria for fish tumors and other deformities for New York State AOCs?**

A: YES – EPA strongly encourages exploring this option in New York if the science supports it.

The next steps of EPA's AOC program are to develop all US BUI delisting targets by the end of the year. The Great Lakes Regional Collaboration set the goal of delisting three AOCs by the end of 2008 and eight altogether by 2010. GLNPO believes that having eight sites delisted by 2010 is an achievable goal.

Mark provided some information on funding sources, in particular the Great Lakes Legacy Act, which is a source of funding for cleaning up contaminated sediments in AOCs. He noted that three Legacy Act projects are currently underway in New York at Buffalo River, Eighteenmile Creek and Rochester Embayment.

Mark concluded with some take home points including:
- Funding for remedial actions and monitoring is often outside the control of the AOC program; funding will need to come from elsewhere for many projects;
- Make delisting targets realistic;
- Sustain public involvement and local engagement in the process of delisting;
- Stay focused on the BUIs, not every environmental problem can be addressed by the RAP;
- Focus on delisting as the end product of the program, as showing significant progress will attract additional funding.

> Mark emphasized that delisting criteria should be sensitive to local issues and conditions and therefore may be somewhat different between AOCs, and that any indices cited in criteria will need to be measurable in order to support the claim of reaching recovery or delisting. AOCs need to communicate with their federal RAP lead when setting delisting criteria.

Lakewide Management Plans and RAPs (Fred Luckey, EPA Region 2)

Fred Luckey, EPA Region 2, discussed the role of Lake Management Plans (LaMPs) and their interaction with RAPs to achieve AOC delisting. A summary of his presentation and associated discussions are as follows:

The LaMPs and AOCs have shared priorities, most notably, issues related to contaminants with bioaccumulation potential and fish and wildlife issues. In 2001 and 2002 the Lake Ontario LaMP relied on RAPs to determine lake-wide impairments; however, since then the LaMP is now informing RAPs on the state of Lake Ontario, which can assist them in determining which BUIs in their AOC are a result of AOC problems versus what is identified as a lake-wide problem. Lake Ontario LaMP is developing a monitoring plan and wants to include the RAPs in the process as each are unique in their sources and issues in relation to the Lake.

Fred indicated that LaMPs and RAPs have shared priorities in monitoring and taking action, for example Rochester Embayment RAP worked with the Lake Ontario LaMP to conduct contaminant trackdown studies in storm sewers. The Lake Ontario LaMP has also supported contaminant source trackdown efforts at Eighteenmile Creek, which helped get state funding for sewage treatment plants. In brief, there is no defined relationship between AOCs and LaMPs, but each RAP can interact with its LaMP on projects.

Discussion: Some of the local AOC leads discussed that there is a need for a closer relationship between RAPs and LaMPs. When considering all of Lake Ontario, the larger problem becomes the relationship between sources and loads. While Eighteenmile Creek has the highest contaminant levels, the Black River actually is the source of the highest loads to the Lake. The relationship of Buffalo River and Niagara River to LaMPs was discussed. Buffalo River is part of the Lake Erie LaMP; however, the river flows are directed to the Niagara River. The Niagara River falls under the purview of the Lake Ontario LaMP, but its relationship to the Lakes is more complex as it acts as a conduit, including pollutants, from Lake Erie to Lake Ontario. This dynamic increases the complexity for determining the sources of the problems that Niagara River may contribute to Lake Ontario.

Delisting Criteria Status and Discussion
Each AOC RAP coordinator provided information regarding current conditions and issues, and their progress in developing their delisting criteria.

Victor DiGiacomo, Niagara County Soil and Water Conservation District, Eighteenmile Creek AOC RAP Coordinator
Eighteenmile Creek AOC is located in Niagara County. The AOC is the area from Olcott Harbor at the mouth of the Creek upstream to just downstream of the Burt Dam. The upper watershed upstream of the AOC is the area that is considered the source of impact to the AOC. The history of pollution in Eighteenmile Creek is tied to municipal and industrial sources in the upper watershed, in particular, the Lockport area. Eighteenmile Creek currently has three BUIs that are consistently "impaired": restrictions on fish and wildlife consumption, degradation of benthos and restriction on dredging activities. Three additional BUIs are currently classified as "unknown" or "likely": degradation of fish and wildlife populations (likely), fish tumors or other deformities (unknown) and bird or animal deformities/reproductive problems (unknown). The latter three were investigated in a 2007 study, which will support the development of the delisting criteria prior to the end of the year.

Victor discussed several milestones and achievements at Eighteenmile Creek, including a Legacy Act contract signed with USEPA to look for pesticides, PCBs and metals in the sediment; NYSDEC classification of the creek as a hazardous waste site; awarding of additional funds for projects to protect water quality and promote watershed awareness; and the completion of the Eighteenmile Creek *State of the Basin Report* by USACE and E & E.

<u>Charlie Knauf, Monroe County Health Department, Rochester Embayment AOC lead</u>
The Rochester Embayment AOC comprises the Monroe County shoreline between Bogus Point and Nine mile Point, the northern boundary is a straight line between these two points. The AOC also includes the Genesee River from the mouth 6 miles upstream to the Lower Falls. The sources of contamination in the watershed from the City of Rochester ranged from large coal gasification plants, the plating industry, and Kodak, which at one time was the largest discharger to Lake Ontario. The City became industrialized very rapidly and at one point had 43 combined sewer discharge points.

The process of developing delisting criteria began in the early 1990s with the development of the Stage I RAP, which was followed by the Stage II RAP in 1997, with 1999 and 2002 addendums. Through that process, 12 of the 14 BUIs were listed as "impaired"; however, a number of the impacts that were identified in the Stage I RAP have since been mitigated. Rochester is in the process of developing delisting criteria now for tainting fish and wildlife flavor and fish tumors and other deformities with assistance from E & E, which are currently listed as "unknown". Fish and wildlife habitat and beach closures delisting criteria are currently under revision. Five BUIs have also been identified whose sources are likely lakewide and not from the AOC, for example, added costs to agriculture or industry was included as an impairment based on the zebra mussel population, which is widely known as a lakewide problem at this time. The goal of the Rochester Embayment AOC is to be delisted between 2010 and 2015.

<u>Mark Filipski, NYSDEC (Reporting on Niagara River AOC)</u>
Niagara's Stage I RAP was developed in 1994 at that time five BUIs were listed as "impaired": restrictions on fish and wildlife consumption, fish tumors and other deformities, degradation of benthos, restrictions on dredging activities, and loss of fish and wildlife habitat; and two BUIs were listed as "likely impaired": degradation of fish and wildlife populations and bird and animal deformities or reproductive problems. The Niagara River RAC was recently re-established and had their first meeting this past June and has now developed revised criteria for all 14 BUIs. The intention is to adopt the revised criteria by the end of the month. They will be spending more time developing goals for delisting fish and wildlife habitat and degradation of fish and wildlife populations with assistance from Buffalo Niagara Riverkeeper.

<u>Steve Litwhiler, NYSDEC (Reporting on Massena AOC)</u>
Massena's impairments are primarily attributed to three historic industries: two aluminum manufacturers and an engine block manufacturing plant. The Stage I and Stage II RAPs were developed in the early 1990s. Since then, close to a billion dollars has been spent on remediation. There are still some areas with contaminated sediments. For the past 12 years the RAC has been reporting on the progress of cleanups and they are now in the process of gathering available information to determine if BUIs are ready to be delisted. The BUI of most concern is restrictions on fish and wildlife consumption. There are four species with consumption advisories in the Massena AOC and it will be a long time before these will be lifted; making delisting AOC difficult.

Bob Townsend has been working closely with both the Niagara and Massena RACs and the Oswego RAC prior to delisting. They are approaching the point where substantive progress has been made. Oswego was able to delist because they had an existing framework of community organizations that incorporate programs to maintain the former AOC a non-AOC. This is harder to do in some areas than others based on the amount of existing resources/organizations that can take over the responsibility of the RAC.

Discussion.

Criteria need to be set as achievable goals and should be practical and achievable, and the RACs need to get as close as they can to those goals. Bob Townsend noted that delisting prematurely is not acceptable, an AOC should not delist unless they are sure that a particular BUI will recover. If it is impossible to meet the criteria exactly, the AOC should get as close as it can and declare themselves an area of recovery.

The availability of students at UB to address Great Lakes and AOC issues was discussed. UB has an interdisciplinary program for PhD students to work on ecosystem restoration in concert with social science, economics, biology and other disciplines as long as the program matches the student's interest. The types of projects they are available to work on are unlimited. Dr. Alan Rabideau is the contact of the program and Maureen Meyer developed the program for UB (now with Buffalo Niagara Riverkeeper). Buffalo River is currently having a PhD candidate work on combined sewer overflow issues.

Jill Jedlicka, Buffalo Niagara Riverkeeper, Buffalo River AOC lead
Buffalo River has seven "impaired" BUIs and three likely impaired uses. BUIs include restrictions on fish and wildlife consumption, degradation of fish and wildlife populations (fish), fish tumors or other deformities, degradation of benthos, restrictions on dredging activities, degradation of aesthetics, and loss of fish and wildlife habitat. "Likely impaired" BUIs are tainting of fish and wildlife flavor, degradation of fish and wildlife populations (wildlife), and bird and animal deformities and reproductive problems. Two BUIs are "unknown" which the RAC will revisit this year: eutrophication or undesirable algae and degradation of phytoplankton and zooplankton populations. In the Buffalo River, contaminated sediments are the largest source of contamination; CSOs are also a source. Proposed modifications to the delisting criteria are expected to be finalized at the September 16 RAC meeting. The process of developing delisting criteria has been locally driven. Problems encountered in the delisting process have arisen from the fact that the RAC has not had the capacity to do new testing, but there is a lot of older existing data that will need to be evaluated to determine the potential for delisting, and the RAC has not come to agreement on what the Buffalo River should be restored to. A summary of successes include: sediment work, a habitat inventory and assessment, the high level of public awareness and involvement, and secured grants for complementary work (e.g., brownfields and development of a greenway). Goals have also been set through 2010. Additionally, Buffalo River hopes to have a large scale remediation underway by 2010.

Break

Session 1- Degradation of Fish and Wildlife Populations and Loss of Fish and Wildlife Habitat (Group Discussion)

<u>Ryan Archer and Hazel Wheeler, Bird Studies Canada</u>
These two staff members with Bird Studies Canada (BSC) presented the organization's involvement with AOCs in developing delisting criteria. BSC is most notably known for their Marsh Monitoring Program (MMP), which is a volunteer driven habitat and wetland quality monitoring program.

> Through BSC's involvement with different AOCs with the MMP, they have developed a new project to enhance the way they contribute information to AOCs by providing delisting guidance. Many AOCs lack monitoring strategies to track BUI status and recovery, monitoring approaches are often not standardized among AOCs when they could be, and RACs may not be aware of other information sources available to them.

As a result, BSC received a two year grant from the National Fish and Wildlife Foundation to identify monitoring and assessment procedures tailored to address specific needs and priorities identified by AOC RAPs and targets for BUIs.

> The program is focusing on seven BUIs: degradation of fish and wildlife populations, fish tumors and other deformities, bird and animal deformities or reproductive problems, degradation of benthos, eutrophication of undesirable algae, degradation of aesthetics, and loss of fish and wildlife habitat.

They are working with 12 to 15 RACs in Canada and the United States, including four in New York: Buffalo River, Niagara River, Eighteenmile Creek and Rochester Embayment. Ryan Archer will provide the group with the list of all of the AOCs that the program is working with.

> Ryan explained that the final deliverable is expected to include a master report of monitoring and assessment techniques that could be used to address monitoring needs of each selected BUI across AOCs. The report is expected to be complete at the end of September for New York State AOCs. Within this report, short reports (modules) will be provided with suggested monitoring and assessment techniques that meet the needs of each AOC. These modules will provide: suggested standardized procedures (summaries and information sources); information on existing resources; and guidance in fulfilling BUI delisting criteria.

After providing the report at the end of September, BSC will be looking from input from participating AOCs to further refine their search. Hazel provided examples of what has been found as far as existing and potential monitoring methods for AOCs for the seven criteria.

Discussion. Questions and answers followed which led to further discussion. The following points were clarified/discussed:

- Contents of the reports will list and evaluate various methods and their effectiveness and applicability in terms of giving preference to those methods that have been studied in the past. The report will use weight-of-evidence to make recommendations.
- Participating AOCs were determined based on interest of the RAP coordinators.
- BSC is willing to go to RAP meetings to discuss their findings.
- Relative to fish and wildlife populations and habitat BUIs, it was discussed that in some places it may be better to set delisting criteria based on the presence/absence of a particular species, while in other areas the actual contaminant levels in a species may be the best delisting criteria for determining impact. The use of a quantitative field measure such as the Quantitative Habitat Evaluation Index (QHEI) that is used in Ohio was discussed. Some participants would like to see this type of index developed for New York. It was stated that from a practical point of view, it is best to use a criteria that can be monitored, which is why a standardized index is appealing.
- The use of volunteer gathered data for delisting was discussed. EPA has information about setting up Quality Assurance Programs (QAPs) for volunteer monitoring programs on their website.

Lunch

In order to re-engage attendees and to support the focus for the afternoon, Deepali asked each of the AOC leads to briefly talk about what they are expecting to get out of the Workshop sessions.

Buffalo River: generally, looking to see what other AOCs are doing and what their progress and goals are, specifically, they are looking for more oversight or input from DEC and/or EPA. While Buffalo River is trying to develop goals for restoration of fish species, they are not 100 percent clear if they are meeting the overall goals of the agencies.

Eighteenmile Creek: Victor DiGiacomo indicated that given that three BUI delisting criteria are on hold that he was hoping to gain information that will support the drafting of his proposed criteria and perhaps improve what they have already developed for the other BUIs.

Rochester Embayment: Charlie Knauf stated that he was hoping for more knowledge on how to address BUIs with "unknown" status.

Niagara and Massena: Bob Townsend said that they hoped to get a better understanding of criteria based on the perspective from the other AOCs.

> It was agreed upon by all RAP coordinators that delisting criteria would be accepted before the end of year deadline, and that the process is an evolving one; thus, criteria may be subject to change.

Vicky Thomas, EPA

Vicky gave some background on the status of the AOC program. The Office of Management and Budget (OMB) reviewed the program a few years ago, scoring the program based on the goals and actions versus spending. The program passed the review with the caveat that it needs to exhibit greater progress toward delisting AOCs.

> GLNPO is focused on achieving greater progress by demonstrating incremental progress over time by delisting BUIs and eventually AOCs. Federal programs that cannot show that they are meeting goals are likely to receive less funding. All states and AOCs are dealing with this challenge, so all AOCs need to be ambitious in reaching the goal of delisting, but at the same time, must set goals that are feasible.

Vicky went on to remind everyone that the US Areas of Concern Program Annual Meeting and Conference in Ann Arbor on September 24 and 25 will provide participants with all BUI delisting targets as they stand now and the comprehensive list will be posted online. In coming years it will be more important to show progress in the form of delisting and meeting these targets. Achieving smaller goals up front will ensure funding to support the larger challenges/more difficult BUIs. There is funding available for one member of each AOC to attend the Ann Arbor meeting. The Chair of each RAC has been contacted about sending a representative.

> The delisting target deadline of the end of the year was developed by the Regional Collaboration in 2005 as a result of OMBs request that targets be set. Vicky reiterated the importance of the AOCs obtaining EPA approval of the delisting criteria early in the process. There are currently 221 BUIs across all AOCs that are in need of delisting. She went on to note that the "unknown" status of impairments is hard to justify considering how long the program has been active; therefore, the goal for setting delisting criteria was made to speed up the process of making status determinations.

Session 2- Fish Tumors and Other Deformities and Bird/Animal Deformities and Reproductive Problems (PADEP guest speakers and Group Discussion)

Jim Grazio, PADEP

Jim gave a presentation on Presque Isle Bay's fish tumors and other deformities BUI and studies in Pennsylvania to determine whether the BUI should be delisted. The summary of his presentation and discussions are provided below:

> Presque Isle Bay AOC was the last AOC to be designated, is the only AOC in Pennsylvania, and was the only AOC to be designated based on citizen petition. A RAP was developed based, with the AOC identifying two BUIs: contaminated sediments and fish tumors and other deformities.

The RAP is currently developing an online searchable database of all of the fish tumor data in the Great Lakes that has been collected to date.

Sediment samples in Presque Isle Bay show moderate levels of PAHs, nickel, cadmium and lead; they have concluded that most of this is from historic sources as newer sediment is generally cleaner. No sediment hot spots were identified and contaminants in sediment were determined not to be bio-available. Bullhead tumor levels in Presque Isle Bay were highest in the 1990s and have decreased over time. The decrease in tumor levels appears to coincide with the completion of combined sewer system remediation and the decommissioning of a coal fired power plant (while the time frames coincide, the two events are not necessarily causative).

Essentially, Jim pointed out that the decrease in fish tumors appears to follow the decline of industry within the region. In 2002 Presque Isle Bay AOC was designated an AOC in recovery stage, which shifted the focus from looking for impairment causes to monitoring.

Workshops were held in Pennsylvania and Ohio in 2003 and 2006 to develop recommendations for the fish tumor and other deformity BUI. The key recommendations that arose from those workshops were: 1) standardize sampling and assessment protocols; 2) use Lake Erie specific reference sites; and 3) a number of technical recommendations (the proceedings from the workshops are available online). Jim can provide the Columbus, Ohio proceedings to anyone who is interested. After these meetings Jim and Sean Rafferty developed the *Field Manual for Assessing Internal and External Anomalies in Brown Bullhead* for assessing the BUI.

The Pennsylvania monitoring program compared Presque Isle Bay brown bullheads to those in inland lakes and three reference sites on Lake Erie in New York, Ontario and Ohio. Brown bullheads were used because they are benthic sensitive and have a limited home range. White suckers are also mentioned in the International Joint Commission's delisting guidelines and are sometimes used in Canada, but in the U.S. brown bullhead are most often targeted.

There is a *presumed causal relationship* between tumor prevalence in brown bullhead and environmental contamination; however, this is not always the case. Experimental research has demonstrated a cause-and-effect relationship between liver tumors in some fish species and contaminants; eight chemicals have been demonstrated to cause liver tumors, most prevalently nitrosamines and PAHs. Nitrosamines are naturally occurring chemicals. *Correlational* research suggests the same relationship exists between brown bullheads and contaminants. External tumors are often used because they are apparent to anglers; however, results are inconsistent in determining whether there is an actual link between external tumors and contamination. Additionally, the correlation between external tumors and liver tumors in fish is low.

Bullheads in some uncontaminated sites have also been found to have high external tumor rates. The only experimental evidence linking the two is a sediment extraction study by Black in the Buffalo River, but there are still a lot of unknowns based on that study. Much less data are available on other fish species; most external tumors in other species are from known natural causes therefore the use of brown bullhead is more strongly justified given the existing evidence.

The presence of Deformities, Erosions, Lesions and Tumors (DELTs) in brown bullhead does not correlate well with being in an AOC. This metric may be useful for degradation of fish and wildlife populations BUI, but is not necessarily useful for the fish tumor BUI. There is a low incidence of DELTs in Presque Isle Bay. The presence of DELTs is used widely in Ohio, but is not linked well with fish tumors. When addressing the "other deformities" portion of the BUI, barbell deformities correlate with a host of contaminants. The selection of a least impacted reference site was primarily statistically driven and was later discussed by Mike Rutter (see below).

Discussion: there were numerous questions but it was pointed out that IJC should rethink its delisting guidance based on the findings of Presque Isle Bay and other studies. In particular there is no experimental verification of what a preneoplastic tumor is. It was also noted that the removal of suckers from the guidance might also be an appropriate step, and it may be better to just use liver tumors as delisting criteria and not external deformities. What Grazio et. al. have found in their studies is that there are higher levels of fish tumors in Lake Erie compared to inland Pennsylvania lakes.

Mike Rutter, Penn State Erie
Mike presented the statistical approach to determining reference sites and managing brown bullhead tumor data. He discussed the variation that is automatically introduced when trying to compare bullheads utilizing a number of variables (e.g., age, length, weight, gender, non-related wounds) and other individual fish variations that could influence tumor incidence rates. For instance there are data that demonstrate that tumor rates increase with age. His presentation and discussions are summarized below:

Mike described the methodology used at Presque Isle Bay to determine reference sites. Data were collected from five potential reference sites, which were statistically compared to Presque Isle Bay using logistic regression to determine which sites have lower tumor incidence rates. Model selection analysis across sites indicated that age was the best predictor of liver and skin tumors in brown bullhead. Based on this analysis, Long Point Inner Bay was selected as a reference site for Presque Isle Bay. They chose the site with the lowest incidence of tumor rates; although he pointed out that appropriate reference sites for each AOC will be up to each AOC to decide, a different methodology may work better at other AOCs. Additional points made by Mike were that for a logistic regression a large sample size is needed for adequate results. Over time, sampling of different sites may result in a different and better reference site on Lake Erie. If sites are sampled over years, trends of tumor incidence over time can also be examined using the same methodology; however, the best methodology for AOCs may be to do a lot of collection in one year at one site. The statistical level of uncertainty increases if you do sampling

over time. Presque Isle Bay researchers are in the process of developing an online database of bullhead and fish tumor data from the Great Lakes. Different studies have shown variable results. For instance some results indicate that weight is a good predictor for tumors while others suggest that length is a better predictor of tumor incidence. Mike added that even other studies have suggested that gender might be a useful predictor.

Discussion: Lori Boughton (Pennsylvania DEP) was asked whether Presque Isle Bay will delist soon, the reply was that

studies have not provided definitive proof of what causes tumors.

They have had many discussions about when they should delist, but are currently remaining in recovery stage.

The group discussed public involvement in the fish tumor BUI; PADEP participants have had a lot of experience talking about their studies and the BUI in a public forum. They stressed that it is important to make clear to the public that the

AOC will never be able to delist the BUI if they wait to find no incidences of tumors. Also, it is important to clarify that it is not a benefit to remain on the AOC list, that the goal is to ultimately be delisted.

From a RAP management perspective, it was noted that the understanding of this BUI is incomplete and that it may not be a good idea for RACs to spend money on tumor studies when there has been no information to determine causality between environmental conditions and tumors and when the results are difficult to interpret. The complexities and variable results between causality and/or correlation of external and internal tumors were also discussed.

Break

Session 3- Tainting of Fish and Wildlife Flavor (Group Discussion)

This was an open discussion between AOC leads on strategies for establishing delisting criteria for this BUI, as summarized below:

The use of angler surveys as delisting criteria was discussed. Buffalo is considering developing one and Rochester has also discussed the development of a survey. Subsequent discussion suggested that developing an objective survey is critical to the types of responses that would result from issuing such a survey. More specifically, the trick to the survey is to make sure that it is designed in such a way that it does not bias people toward issuing a complaint when they may not really have had one in the first place. Discussion ensued regarding the benefits of a survey versus relying on local and state agencies to determine if they have received any complaints about fish flavor.

It was also noted that natural conditions can also lead to poor fish flavor, for example late summer catches are historically synonymous with bad tasting fish. The use of water

quality data instead of surveys was also discussed, however a legitimate question was raised regarding the scenario of when phenol levels are found to be above standards, but no complaints from the public are ever received.

NYSDEC thinks that using a DEC contact would work as a delisting guideline as the agency routinely receives all kinds of environmental complaints, including those about fish tumors and lesions. If fish flavor became an issue the NYSDEC would likely be the first agency contacted in much of the state.

The conversation concluded with Jill Jedlicka indicating that they are planning on creating an angler questionnaire which they would like other AOCs to review and provide input prior to distribution. Charlie Knauf is leaning toward including a question in an existing survey and also asking agencies to determine if there are fish flavor complaints.

Summary, Action Items, Ideas for Workshop 2

Additional announcements/topics:
- Ryan Archer from BSC expressed BSC's willingness to help AOCs develop a coastal wetland monitoring program.
- Fred Luckey announced that any RAPs that have contaminant analysis needs should work on developing a work plan with EPA.
- Participants were reminded again about the upcoming Ann Arbor conference; there will be several break-out sessions on different BUIs and with much of the discussions continuing the conversations from this workshop.
- Participants discussed the benefit of having a facilitator at the RAC/Oversight Committee meetings to assist in maintaining progress. The consensus of the group was that an outside facilitator such as how E & E has been functioning with the NYS AOCs has kept discussions productive.
- Most of the questions on the list of questions that were developed prior to the meeting were addressed throughout the day. Topics moved to Workshop 2 for discussion include:
  - What kinds of goals can New York State AOCs work cooperatively toward?
  - What AOCs are further ahead in the recovery process, and what kinds of lessons can other AOCs learn from their accomplishments?
  - What is the role of NYSDEC in providing RAP and/or AOC assistance in the future?
- Question 15 (What are the similarities and differences between the Great Lakes Protection Fund's priorities and AOC priorities?) was discussed in some detail. Information regarding projects and funding requests should be developed by the AOCs that provide support for how the projects intend to address objectives of the Great Lakes Protection Fund. That information should be provided to Don Zelazny. AOCs are a priority of the regional collaboration, but each program has a limited amount of funding, so RACs should be determine what AOCs need and identify other funding sources.
- Other issues for Workshop 2 that were not resolved in Workshop 1:
  - Life after delisting
  - Taking the program to the public
  - Funding

- Data synthesis and assessment process
- More detailed discussion on standardized monitoring protocols; how can AOCs use the data on monitoring work that already exist to delist (e.g. the Priority waterbodies list)
- AOC stewardship
- Action Planning: RAPs should provide a list of major planned items and how they plan to accomplish them
- Determine the means to develop a habitat database, similar to the fish tumor database being developed in Pennsylvania.

Closing Discussion and Remarks

The development of delisting criteria reports was discussed.

GLNPO will be reviewing the final delisting criteria and providing final recommendations to AOCs over the weeks to months following the deadline.

The USACE manages the Great Lakes Fisheries and Ecosystem Restoration (GLFER) Program. If a project is proposed in an AOC (as opposed to a Great Lakes tributary that is not listed) it would likely increase the possibility of receiving funding. Anyone can propose a project; Mike Greer is the USACE Buffalo District contact.

AOC leads discussed the formulation of a list of funding resources; the Corps database is a start for habitat project funding opportunities. With the support of the Buffalo District, Eighteenmile Creek has a pollutant generator database that was developed by E & E. An additional feature of the database is a funding source database that has categorized different types of funding sources, project types, etc. that could be built upon to create a list of comprehensive funding sources. The group also talked about looking for mechanisms other than funding to achieve AOC goals, for example, a flowchart was made for Massena that has all of the known existing data in an effort to direct next steps.

Deepali requested that any other ideas or questions regarding Workshop 2 and any other invitees be sent to her. Workshop 2 will likely take place in November or December 2009.

The meeting ended at 4:15 pm. A tour of the Ecology and Environment's corporate headquarters followed.

J. Craigmile, Recorder