

OSWEGO RIVER

REMEDIAL ACTION PLAN

STAGE 3 - DELISTING



January 2006
Final Draft

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The Oswego River Remedial Action Plan Stage 3 - Delisting document was prepared by the New York State Department of Environmental Conservation in cooperation with the Oswego River Remedial Advisory Committee. Members of the committee are listed in Appendix A. The development of this Stage 3 document has involved many government agencies, professionals, peers, and the public in review. All substantive comments have been incorporated into this final publication. For information or copies contact Robert Townsend, NYSDEC, Division of Water, Bureau of Water Assessment and Management, 625 Broadway, Albany, New York, 12233-3502, phone (518) 402-8284. Also see the NYSDEC website at: <http://www.dec.state.ny.us/website/dow/oswdlist.html>

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I. EXECUTIVE SUMMARY

The New York State Department of Environmental Conservation (NYSDEC) initiated public input into the development of the Oswego River Remedial Action Plan (RAP) in 1987 with the establishment of an advisory committee. The 1990 Stage 1 RAP identified use impairments and their causes and sources. The main impairments for the RAP Area of Concern (AOC) involved fish consumption restrictions, fish habitat, fish populations, and reported eutrophic conditions associated with non-AOC sources. Lake Ontario exerts a distinct influence on the AOC and has a close relationship. For example, the consumption restrictions are lakewide for Lake Ontario (not AOC specific) and apply to migratory fish entering the Oswego River and Harbor area.

Remedial actions to restore beneficial uses were originally identified in the 1991 Stage 2 RAP report. A comprehensive RAP Update was published in 1996 and includes results of: a fish pathology study, Oswego River and harbor water quality and sediment investigations, remedial activity progress, and delisting criteria. The 1998 RAP Workshop accomplished its objective to obtain an improved understanding of the remedial activities and study results and to identify the next steps and actions to define the restoration and protection of the Oswego River AOC. The importance and close relationships of addressing the fish consumption restrictions and fish habitat/population impairments as part of larger management plans operating external, however influencing the AOC, were recognized.

The workshop proceedings, including comments and recommendations, were published along with a RAP Update in 1999. Summary results of that workshop as well as the subsequent remedial measures and studies that address the use impairment indicators are contained herein. This information establishes the basis of the supporting data and rationale for the resolution of the indicators, preparation of this Stage 3 document, and the delisting of the Oswego River AOC.

Over the years, the Remedial Advisory Committee (RAC) conducted monthly, and later quarterly, meetings on RAP implementation. The committee has consisted of a diverse and multi-stakeholder representation with the task of identifying needed studies and remedial actions, seeking implementation, and then affecting these activities in the watershed and AOC. Reporting on progress, and communicating this information to the public has been an objective of the committee. Recent efforts focused on defining the endpoints to address the use impairments and realizing that significant reductions in pollutant sources have been achieved.

This Stage 3 document verifies that the RAP Process has accomplished its goal to the maximum extent practicable and that the ultimate resolution of the fish consumption, habitat and population concerns are to be addressed by specific larger management plan activities covering the AOC. Fulfilling the endpoints for these beneficial uses is to be addressed respectively by the ongoing Lake Ontario Lakewide Management Plan (LaMP) and the Federal Energy Regulatory Commission (FERC) Oswego River power dam licensing requirements. At the same time, the RAP has provided the data to show that the water quality is not impaired in the AOC, that local beneficial uses are not impaired, and that the RAP and EPA delisting criteria have been achieved.

The Great Lakes RAP program was formalized by the International Joint Commission (IJC) in the 1987 amendments to the United States-Canada Great Lakes Water Quality Agreement. The Agreement calls for the federal governments, in cooperation with states and provinces, to assure that RAPs incorporate a systematic and comprehensive ecosystem approach towards restoring beneficial uses, and to assure that the public is consulted in the process. The Oswego River RAP accomplishes the principles of the Agreement and Annex 2, addresses the restoration of beneficial uses, and substantiates that inclusive responsible management plan activities will resolve the larger issues of the Oswego River RAP that cannot otherwise be fulfilled within the scope of Oswego RAP process. The rigorous approach applied by the RAC and NYSDEC corroborates the quality environment of the Oswego River and harbor area and ensuing delisting conclusion.

II. INTRODUCTION

The purpose of the Oswego River Remedial Action Plan Stage 3 Delisting document is to provide supporting data and rationale that resolves the use impairment indicators and to confirm that desired beneficial uses have been achieved by the RAP in accordance with guidance and criteria. Stakeholder concerns that go beyond the RAP scope are documented as part of the resolution strategy in other inclusive responsible management plan activities (e.g. Lake Ontario Lakewide Management Plan). Potential upstream and Lake Ontario influences are examples of such concerns. Over the years, Oswego River RAP activities have accomplished the identification, development, implementation, and tracking of remedial strategies and priorities. Now, the Stage 3 Delisting document builds on the previous RAP reports and establishes the specifics to resolve the use impairment indicators. Locally derived endpoints are defined as either having been achieved or being addressed by existing “umbrella” program activities operating in support of the RAP process but on a larger regional geographic area than just the Oswego River Area of Concern.

Significant environmental improvements and high water quality achievements for the Oswego River are documented. Delisting criteria and related concerns are addressed in each of the use impairment indicator resolution strategies. With the indicators and impairments addressed, and the remaining concerns under the purview of identified responsible parties, the RAP has accomplished its goal and therefore the delisting of the AOC is appropriate. Through remedial action and studies we now know that this area, the lower Oswego River and harbor, is no longer an Area of Concern contributing to Great Lake’s use impairments and that the supporting data and rationale for delisting provide for the resolution of the Oswego RAP. In a sense, the Oswego River Remedial Advisory Committee and the RAP have accomplished, to the maximum extent practicable, all they can within the AOC. The causes, sources, and impairments are all addressed and comprehensive ongoing environmental program oversight provides continuing enhancement and protection to the beneficial uses of the Oswego River and harbor area.

A. Background:

The International Joint Commission (IJC) identified 43 Areas of Concern (AOCs) in the Great Lakes drainage basin where pollutants had or possibly are impairing beneficial uses of a waterbody. The Oswego River on the southern shore of Lake Ontario was identified as one of these Areas of Concern because: 1) past industrial and municipal discharges had contributed contamination to the river and sediments, and 2) these pollutants from the river's drainage basin had traveled through the river and harbor to Lake Ontario, adding to that lake's environmental problems.

The 1987 amendments to the United States/Canada Great Lakes Water Quality Agreement (GLWQA) calls for Remedial Action Plans (RAPs) to be developed by the respective governments and for them to make recommendations to correct use impairments in the AOCs. Annex 2 of the GLWQA specifies requirements for developing RAPs. The Annex also provides a list of fourteen indicators of use impairment that serve as a guide for analyzing the pollution problems in each AOC. If any one of the indicators was found to exist or if other related use impairments were identified in the AOC, the causes and sources were to be listed and remedial actions developed and implemented to assure restoration and protection of beneficial uses.

In 1987, as a first step in preparing the Oswego RAP, the New York State Department of Environmental Conservation (NYSDEC) formed a Citizens' Advisory Committee (CAC) that included residents of the Oswego River Basin, industry representatives, outdoor sports enthusiasts, research scientists, environmentalists, and local government persons. They completed their task to define the use impairments and to identify causes and remedial actions for the RAP. NYSDEC staff and the subsequently formed Remedial Advisory Committee (RAC) have continued these efforts in the implementation of the Oswego River RAP. Specific "indicator endpoints" were more recently developed by the RAC (Appendix C- Table 4). These endpoints are in addition to the delisting criteria (Table 5) and details developed previously for the Oswego RAP and delineated in Appendices E and F.

The RAP embodies an aquatic ecosystem approach to restore and to protect the biota and water quality in the Area of Concern. The underlying goal of the RAP has been the restoration and protection of the beneficial uses in the Oswego River Area of Concern to the overall improvement of environmental conditions in the river and in the Great Lakes system. The basis for resolving the impairments in the Area of Concern are: remedial actions implemented in the watershed and AOC, investigation and study results, documentation of the supporting data, and the identification of responsible parties to address ongoing concerns beyond the scope of the RAP process.

B. Location:

The Oswego River and the harbor to Lake Ontario are valuable natural resources for industry, commerce, and recreation in central New York State. The lower Oswego River and harbor area can be characterized as a multiple-use resource consisting of manufacturing and commercial storage facilities, canal navigation locks and charter docks, a marina, restaurants, and services for recreational harbor users and tourists. Tourism and commercial activity generated by the sport fishery are important to the area's economy.

The average water flow into the Oswego Harbor from the Oswego River is 4.2 billion gallons per day. This includes runoff from more than three million acres of urban, rural, and agricultural land. **Figure 1 - The Oswego River Watershed** illustrates the drainage basin with its tributaries that drain a 5,100 square mile watershed, the second largest in New York State. The waters of the Oswego River include the drainage from the hills above the Finger Lakes and treated discharge from sewage treatment plants and industries as far from Oswego as Canandaigua and Ithaca. A dominant urban core (Syracuse and its suburbs) is within the basin, as are eight smaller cities and dozens of villages. There are extensive areas of farmland and forest, and scattered shoreline development.

The health of the entire river system is vital to the more than 1.2 million people who live in the drainage basin. A variety of industries use the Oswego River basin's water for processing, cooling, and discharging treated wastewater. The waters of the river also provide habitat for a variety of fish and waterfowl. The Oswego River is second in size only to the Niagara River as a tributary to Lake Ontario; however, the Niagara delivers approximately twenty times the flow to Lake Ontario. Pollutants carried by the Oswego River also can affect the health of Lake Ontario's ecosystem.

The Oswego River watershed includes the Oswego-Oneida-Seneca three rivers system. Within this very large watershed, significant environmental cleanup and protection activities have been accomplished over the years. The result of widespread remedial measures and protection activities in the watershed has been to mitigate and/or eliminate sources of pollution entering or leaving the Oswego River AOC boundaries that can contribute to or cause local impairments.

Even though the Great Lakes RAPs are to focus to address local Area of Concern sources, the Oswego River RAP has many times expanded its purview to accomplish a watershed approach in resolving potential sources and causes of impairments. With AOC causes addressed, the identification of upstream and regional Lake Ontario responsible parties and remedial measures affirms the delisting of the Oswego River AOC.

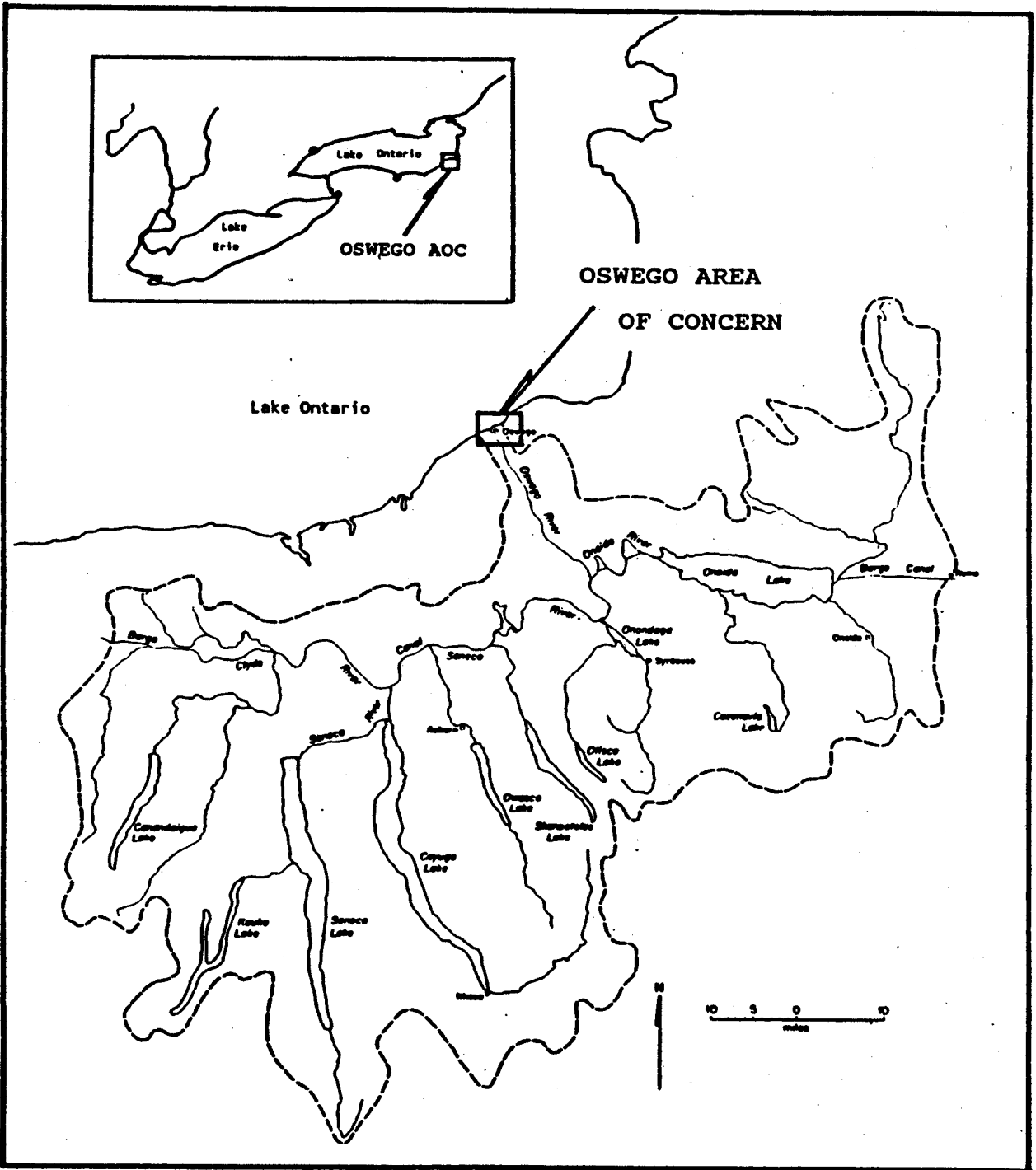


Figure 1 - The Oswego River Watershed

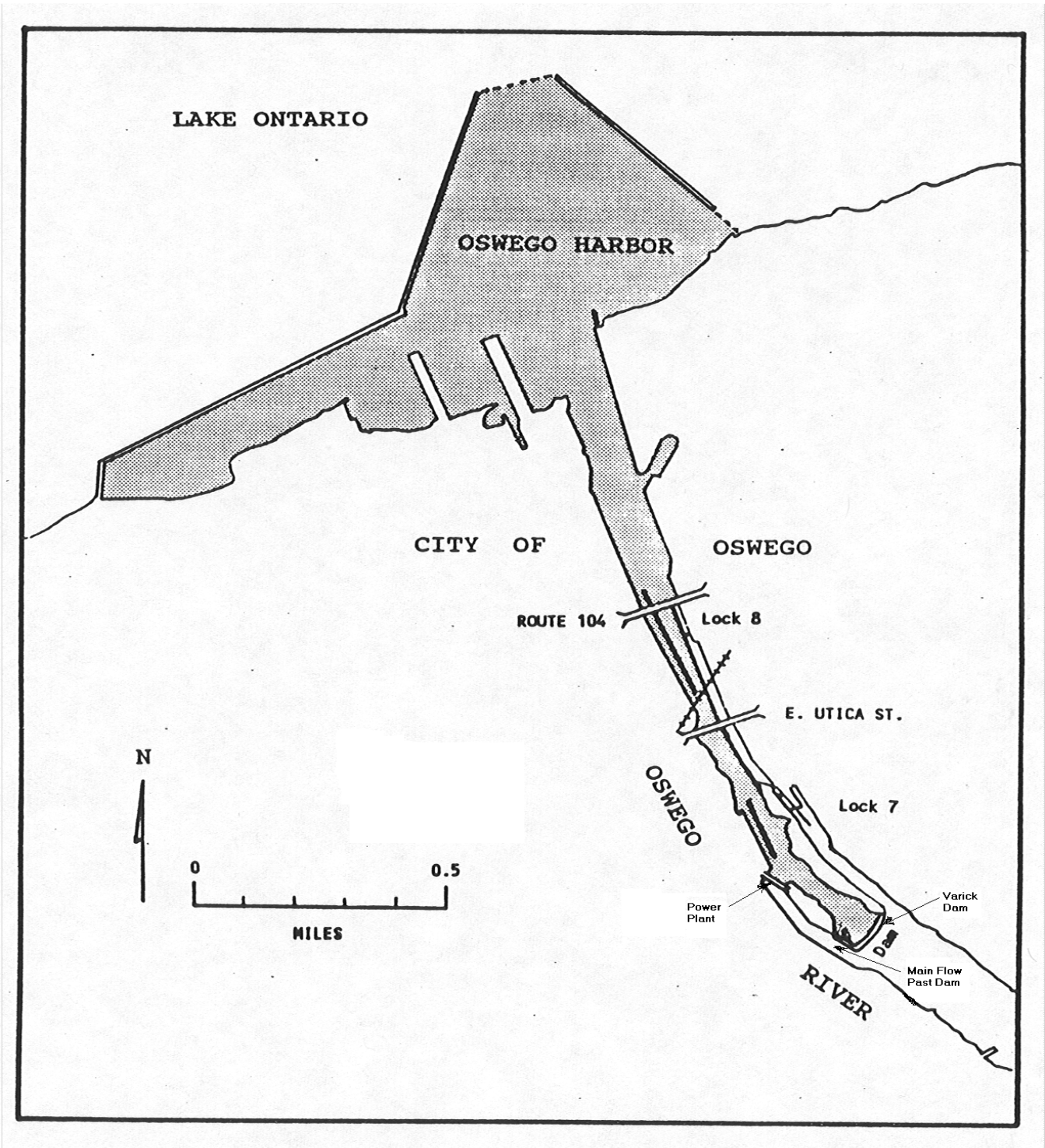


Figure 2 - The Oswego River Area of Concern

The focus of the Oswego River Remedial Action Plan is to resolve the use impairments within the Area of Concern which includes the harbor area and lower Oswego River below the Varick dam. **Figure 2 - The Oswego River Area of Concern** illustrates this area. The Oswego River RAP has identified inputs of pollutants from the Oswego River and its tributaries upstream of the AOC which contributed, or potentially contributed, to impairments in the AOC. Sources and impacts have been addressed. Certain use impairments have been reassessed as not caused by in-place AOC conditions, are related to upstream or downstream influences, and are therefore more appropriately addressed by other management plan activities [e.g. fish advisory addressed the Lake Ontario Lakewide Management Plan (LaMP)]. The LaMP process has also been developed under the Great Lakes Water Quality Agreement and, similar to the RAP process, embraces the fundamental principles of incorporating an ecosystem approach and involving the public in the restoration process. Likewise, watershed issues are to be addressed more appropriately within the framework of ongoing watershed environmental programs.

C. The Remedial Action Plan (RAP) Goal:

The Goal of the Oswego River Remedial Action Plan, as originally established by the Citizens' Advisory Committee (CAC) and the New York State Department of Environmental Conservation (NYSDEC) is three-fold:

- To achieve the purposes of the Great Lakes Water Quality Agreement within the Oswego Area of Concern;
- To restore the water quality of the AOC so that it is capable of supporting swimming and an edible, diverse, and self-sustaining fishery; and,
- To (contribute to*) the elimination of adverse impacts to Lake Ontario arising from the Oswego-Oneida-Seneca Rivers basin. (* added to focus on the AOC)

The implementation of ongoing New York State and federal environmental programs that serve to directly achieve this RAP goal include: activities under the State Pollutant Discharge Elimination System (SPDES), New York's Water Quality Classifications and Standards, state and federal Hazardous Waste Remediation Programs, the state Spill Control program, the New York Coastal Management Program, nonpoint source pollution management, multi-media and pollution prevention actions, and activities under the federal Clean Water and Clean Air Acts.

In order to better define and fulfill this multi-faceted goal statement for the Oswego River RAP, the Remedial Advisory Committee (RAC) and NYSDEC needed to define endpoints for the beneficial uses that describe the desired water quality, desired Area of Concern conditions, and desired beneficial uses. The RAC more recently developed and adopted a strategy and endpoints which are delineated in the narrative and table in Appendices B and C respectively. This strategy and endpoints essentially build on and support the earlier developed delisting criteria for the RAP contained in Appendices E and F. Together this information guides the resolution and delisting of each of the use impairment indicators described in detail in Section III of this delisting document.

D. The Remedial Action Plan (RAP) Process:

The RAP process has accomplished and influenced significant work since an advisory committee formed in 1987. The RAP has embodied an aquatic ecosystem approach to restore and to protect the biota and water quality in the Area of Concern. Implementation of remedial activities, as described in Appendix K that address beneficial uses and protect against threats to human health and the environment, have contributed to the overall improvement of environmental conditions in the Oswego River and to the benefit of Lake Ontario. The Remedial Advisory Committee has applied the ecosystem approach in gathering, understanding, and sharing the knowledge of the Oswego River and harbor area in resolving the use impairment indicators in a most comprehensive manner as detailed herein. Examples of how the committee and NYSDEC influenced and reported on activities while conducting public involvement and the ecosystem approach are further delineated in the Responsiveness Summary to comment #1 in Appendix G.

A Remedial Action Plan is a sequence of steps or a phased process that defines environmental problems and their causes, identifies sources of pollution or disturbances, makes recommendations and implements commitments for remedial measures, and then describes a post-remedial monitoring system to assure protection and document success. Development of a Remedial Action Plan is a three stage process. Each stage has involved the International Joint Commission (IJC) for consultation on content, review comments, and recommendations. IJC reviews of Stage 1 (problem definition), Stage 2 (remedial strategy plans), and finally the Stage 3 (delisting) for the Oswego RAP are complete. An evaluation and strategy response to the Stage 1 and Stage 2 IJC comments is contained in the 1996 Update document. IJC's Letter of Support for the delisting the Oswego River AOC was sent to USEPA Region 2 on June 7, 2005.

The Stage 3 document addresses a consultation process (by the lead agencies, local representatives, and the public) as described herein in Table 3 in Section IV.B entitled Delisting Steps. Broad consultation involving USEPA and IJC, as well as public and peer group review, has been a key part of the preparation for the final Stage 3 document. A responsiveness summary addressing comments has been developed as Appendix G. All substantive changes have been made to the document. With these items addressed, this final Stage 3 RAP document has been prepared to complete the consultation with USEPA, IJC, and stakeholders. Finally, a USEPA statement letter of delisting to the federal Department of State (DOS) is planned, upon which the USDOS is to act on formal delisting.

Highlights of the three stages of the Oswego RAP are described below:

- **Stage 1** - Stage 1 of the Oswego RAP described the environmental problems and the use impairments of the Area of Concern, the pollutants causing the impairments, and the sources of those pollutants. The Stage 1 document was completed in February 1990 by NYSDEC and the Citizens Advisory Committee (CAC). It identified the key AOC use impairment indicators as involving fish consumption restrictions, degradation of fish habitat / population, and eutrophication / algae. (A comprehensive summary of the Stage 1 and Stage 2 RAP is contained in the Oswego RAP 1996 Update.)

- **Stage 2** - Stage 2 in the RAP process described ongoing remedial activities and strategy plans, prioritized investigations, recommended remedial actions, made specific remedial commitments, and described methods for monitoring remedial progress in the AOC. The Stage 2 RAP was completed in June, 1991. Remedial strategies were then further developed and detailed, and kept current, in periodic RAP Update documents. The remedial strategies incorporated an ecosystem approach and addressed the goal to restore the water quality within the Oswego Harbor/River and to prevent adverse impacts to Lake Ontario from pollutants carried by the Oswego River.

Following the completion of the Stage 2 RAP, a Remedial Advisory Committee (RAC) was formed to assist NYSDEC in the RAP implementation process. Much like its predecessor (the CAC), the RAC is representative of concerned groups and individuals within the community that have an interest in the Oswego River Area of Concern. In addition to RAC members, government agencies at the local, state, and federal levels have been informed and involved in RAP remedial activities.

- **Stage 3** - This Stage 3 Delisting document for the Oswego RAP was prepared because significant progress has been achieved in documenting the resolution of the use impairment indicators. Conducting extensive investigations, studies, and ongoing monitoring activities as well as implementing required remedial measures have all been active elements of the strategy to achieve the RAP Stage 3 goal of restoring and protecting beneficial uses. As remedial activities have been implemented, restoration of beneficial uses has occurred, and a success story has emerged on which the Stage 3 document is based. The Indicator Status Resolution Table and narrative summaries describing the resolution of each of the fourteen IJC indicators are presented in Sections III.A and III.B respectively.

This Stage 3 document provides the data to show that the water quality in the AOC is not impaired and that use impairments are addressed. The RAP Process can identify, however it cannot alone provide, the solution to the issues of fish consumption, habitat and population loss. Consistent with the AOC delisting principles and guidance, the resolution of these impairment indicators is part of larger management plans. The goal of the RAP has therefore been achieved to the maximum extent practicable and the final resolution strategy and activities to address fish consumption, habitat and population loss is now part of these larger plans. Within the Oswego River Area of Concern, achieving the endpoints for these fish impairments is being addressed respectively by the Lake Ontario Lakewide Management Plan (LaMP) and the provisions of the Federal Energy Regulatory Commission (FERC) power dam license for the Oswego River and Varick power dam.

Likewise, the resolution of the concern and the control of watershed nutrient input in the Oswego River drainage basin regarding the creation of eutrophic / algae conditions is based on the continuation and improvement of in-place measures to limit all watershed sources. With beneficial uses not impaired in the AOC, nuisance and aesthetic characteristics are

balanced with aquatic life development. Assessment determines that the Oswego River RAP accomplishes the principles of the Agreement, addresses restoration of beneficial uses, and substantiates that inclusive management plan activities resolve the remaining concerns of the Oswego River RAP that cannot otherwise be fulfilled within the Oswego RAP process.

Overall, many persons have contributed to the Oswego River RAP process through the years. These persons are acknowledged following the member listing in Appendix A. This Stage 3 document is posted on NYSDEC external website at: <http://www.dec.state.ny.us/website/dow/oswdlist.html> with an introduction entitled *Dramatic Pollution Cleanup Takes Oswego Harbor Off Remediation "To Do" List*. In addition, USEPA posts summary information on AOCs including the Oswego River RAP at the website: www.epa.gov/glnpo/aoc/.

E. Delisting Document Synopsis - Stage 3:

In the 1990 Stage 1 RAP publication, specific descriptions addressing the use impairment definitions are presented in detail. A summary of the status of the Stage 1 use impairment indicators, their causes, and the sources of contamination is provided in RAP Update reports. The 1991 Stage 2 RAP publication presents an evaluation and determination of initial remedial activities, environmental control programs, recommendations and commitments. The subsequent RAP Update documents in 1996 and 1999 report on RAP implementation, showing the status of ongoing and planned remedial activities and strategies. In the 1999 Update, Table 4 best summarizes this remedial information.

In this Stage 3 document, a comprehensive summary of the environmental programs providing remedial activity updates affecting the AOC is provided in Appendix K. Section II of this Stage 3 document, summarizes the AOC location, RAP goals, and the RAP Process. The newly developed **Table 1** addresses the IJC Water Quality Agreement Annex 2 requirements. A description of the surveillance and monitoring processes used to evaluate beneficial uses is included. In Section III, the resolution for each of the fourteen IJC Use Impairment Indicators is provided. Each indicator has an introductory narrative followed by topic statements addressing the resolution, supporting data, and rationale for delisting. **Table 2** summarize the resolution of the indicators and includes key information on the definition of impairment endpoints as developed by the advisory committee, original indicator status, revised indicator status, responsible parties, and the supporting data and rationale for each indicator.

Section IV of this Stage 3 document describes the delisting principles and guidance applied to the Oswego RAP, lists the next step activities to accomplish the Stage 3 delisting (**Table 3**), and identifies post-delisting responsibilities. Achieving these next steps completes the formal delisting process. The responsible parties with their activities and commitments are identified to address post-delisting concerns. A continuation of stakeholder input is assured through the identified responsible parties and their existing framework programs and initiatives.

The Appendices contain a listing of the members of the Remedial Advisory Committee, the delisting strategy and endpoints developed by the committee, details of delisting criteria guidance, and updates on remedial activities. The “Use Impairment Indicator Strategy Management Forms” have been completed to show the specific strategies. Descriptions of the Marsh Monitoring Program (MMP) methods/results and the Watershed Restoration and Protection Action Strategies (WRAPS) programs are included. Lists of references and acronyms are provided. A responsiveness summary (Appendix G), description of the power dam license provisions (Appendix J), and copies of the handout slides from a Power Point presentation delisting summary (Appendix P) completes the Stage 3 delisting document. The later parts of the Appendices (K through P) are in a separate document.

F. Addressing IJC Delisting Requirements - Table 1:

The Great Lakes Water Quality Agreement, Annex 2, as amended in 1987 by the United States and Canada through the International Joint Commission, requires that RAPs include:

- ❶ a process for evaluating remedial measure implementation and effectiveness, and
- ❷ a description of surveillance and monitoring processes to track the effectiveness of remedial measures and the eventual confirmation of the restoration of uses.

Table 1 addresses these Great Lakes Water Quality Agreement requirements by summarizing the remedial measures and monitoring processes conducted and ongoing to accomplish the conditions that assure restoration and protection of the AOC. The processes are summarized in Table 1 and described in detail for each of the fourteen IJC indicators on in detail in Section III pages 16 to 72.

Details on remedial measures, supporting data, and resolution statements for each indicator confirm that any AOC causes are addressed and that delisting criteria are achieved. Further, responsible parties and ongoing programs and initiatives are identified to address (non-AOC) watershed and Lake Ontario concerns expressed under the RAP process.

Table 1 is presented on the following three pages containing three key columns of information for each of the indicators. The first column describes ❶ a process for evaluating remedial measure implementation and effectiveness. The second column describes ❷ the surveillance and monitoring processes to track the effectiveness of remedial measures. The last column contains the resolution statement for the indicator summarizing the supporting data and rationale for delisting.

In the surveillance and monitoring processes column ❷, there are numbers in brackets in the lower right corner. These numbers are keyed to identify actual studies referenced at the end of the third page of the table. Specifics from these studies are cited in the details presented in Section III of this Stage 3 document addressing each of the beneficial use indicators.

Table 1 - Addressing IJC Stage 3 Requirements

The Great Lakes Water Quality Agreement, Annex 2, Sections 4.(a)(vii) and (viii) requires RAPs for AOCs to include:

- ① a process for evaluating remedial measure implementation and effectiveness,
- ② a description of surveillance and monitoring processes to track the effectiveness of remedial measures and the eventual confirmation of uses

IJC Use Impairment Indicator	① Remedial Measures Evaluation	② Surveillance and Monitoring Processes	Resolution Status
1.Fish & Wildlife* Consumption Restrictions	Fish monitoring data are collected and consumption advisories are assessed and established by New York State Agencies and reported under the Lake Ontario LaMP.	Annual young-of-year fish samples and routine fish flesh data provide the basis for chemical evaluation and risk assessment for health advisories. [1]	Lake Ontario LaMP to address. Fish consumption advisories are not specific to the AOC, but are Lake Ontario lakewide or upstream (out of AOC) advisories.
2.Degradation of Fish & Wildlife* Populations	The beneficial use is linked to the larger Lake Ontario and constructed power dam operation. The FERC power dam license provisions address dam impacts; the LaMP addresses lake impacts.	Fish population is dependent on links to Lake Ontario and the presence of the power dam. The FERC license assures good operation and strictly limits impact on the fish community. [2]	FERC power dam license requires run-of-river flow to resolve fish access and any AOC impact or cause. With restored conditions, the fish pop. is dependent on Lake Ontario, otherwise beyond RAP scope.
3.Loss of Fish & Wildlife* Habitat	Historic fish habitat impact to spawning area below the dam is remedied by FERC license and “run-of-river” flow provisions providing fish access and assuring restored conditions.	Dam impact on fish habitat to be fully addressed and restored by FERC license requirements (Appendix J). No local sources. Not a contamination issue. Wildlife habitat not impaired. [2]	FERC license restores habitat by required river flow during spawning. With restored flow/ fish access/ and conditions, fish community is dependent on Lake Ontario, otherwise beyond RAP scope.
4.Eutrophication or Undesirable Algae	Water quality standards achieved; Beneficial use goals met and maintained; No persistent water quality problem due to cultural eutrophication.	Water quality survey results do not indicate eutrophic conditions; No undesirable weeds or algae present (See Aesthetics indicator for weeds nuisance) [3]	Not Impaired - (seasonal algae observed in lock area is not a natural part of the AOC environment; weeds constitute a managed nuisance condition)

Table 1 - Addressing IJC Stage 3 Requirements - continued

IJC Use Impairment Indicator	① Remedial Measures Evaluation	② Surveillance and Monitoring Processes	Resolution Status
5.Degradation of Benthos	Water quality standards achieved; Beneficial use goals met and maintained; No benthos impairment.	Benthic community structure study shows integrity substantially similar to reference communities [4]	Not Impaired - (monitoring data supports)
6.Fish Tumors or Other Deformities	Study shows no abnormal incidence of tumors or deformities observed.	Fish Pathology Study indicates no impairment; AOC equal to or better than reference populations [5]	Not Impaired - (monitoring data supports)
7.Bird or Animal Deformities or Reproductive Problems	Marsh Monitoring Program (MMP) shows no impact; healthy presence of amphibians and birds	Comparative evaluation of deformities and reproductive problems in reference populations indicate no abnormal incidence [6]	Not Impaired - (monitoring data supports)
8.Degradation of Aesthetics	Oswego Harbor Survey shows not impaired. Best uses maintained and intact.	No floatable materials or odors evident; Weed control addressed to non-nuisance level by weed harvesting [3]	Not Impaired - (monitoring data supports)
9.Degradation of Plankton Populations	Harbor Survey shows no impairment. Overall, plankton are healthy and characteristic of riverine environment.	Comparative evaluation of plankton populations to reference populations indicates substantially similar. [3]	Not Impaired - (monitoring data supports)
10.Restrictions on Dredging Activities	Harbor Survey and recent Sediment Study show no impairment; No US Army Corps of Engineers restrictions on dredging.	Navigational dredging approved and Water Quality Certification issued; includes Lake Ontario placement of dredged materials. [3] and [7]	Not Impaired - (monitoring data supports; upstream sediments are not a cause or source of AOC impairment)

Table 1 - Addressing IJC Stage 3 Requirements - continued

IJC Use Impairment Indicator	① Remedial Measures Evaluation	② Surveillance and Monitoring Processes	Resolution Status
11. Beach Closings	Water Quality Survey results support status for recreational water use in the AOC although no beaches present.	There are no public beaches in the AOC; Secondary contact is safe and not restricted; boating and fishing uses are supported.	Not Impaired - (not applicable to AOC)
12. Tainting of Fish and Wildlife Flavor	Fish study and community observation confirms no impairment of AOC beneficial use.	Fish Pathology Study supports no evidence of fish tainting; no other abnormality observed.	Not Impaired - (no tainting present)
13. Drinking Water Restrictions, Taste and Odor Problems	No drinking water source in the AOC; studies support other beneficial water uses.	Oswego Harbor Survey and RIBS studies identify no water restrictions, taste, or odor problems [3] and [4]	Not Impaired - (no drinking water source)
14. Added Costs to Agriculture or Industry	Water quality standards achieved; Beneficial use goals met and maintained.	AOC water quality studies identify no abnormal costs to agriculture or industry.	Not Impaired

- [1] = NYSDOH 2005-2006 Health Advisories; NYSDEC Annual Young-of-Year Fish data report
- [2] = Monitoring addressed as part of larger management plans (i.e. Lake Ontario LaMP; FERC license)
- [3] = NYSDEC, 1994, Oswego Harbor Survey
- [4] = NYSDEC, 1999, Rotating Intensive Basin Studies (RIBS) and Water Quality trend studies
- [5] = Jan Spitsbergen, 1995, Fish Pathology Study
- [6] = Environment Canada, Birds Study Canada, and EPA, 1999, Marsh Monitoring Program.
- [7] = NYSDEC, 1997, Oswego River Sediment Study
- * = Use Impairments for the Oswego River AOC involves only fish (i.e. no wildlife impact identified)

G. Surveillance and Monitoring Processes:

The New York State Department of Environmental Conservation maintains routine and special monitoring activities as part of implementing “core” Environmental Quality Programs in the areas of Water, Air Resources, Solid and Hazardous Waste, Remediation, Spills, and Multi-Media Pollution Prevention. Point and nonpoint sources of pollution are addressed. Inspection and sampling activities are included and are backed up by strong law enforcement.

In the Division of Water, the Rotating Intensive Basin Survey (RIBS) program, as well as special purpose monitoring, provides data and documents trends over a wide range: 1) ambient water quality including conventional and toxic parameters, 2) biological sampling including macroinvertebrate community assessments, toxicity testing, and some fish tissue analysis, and 3) bottom sediment analysis. Under RIBS for the Oswego River AOC, results of water quality and macroinvertebrate tissue analyses indicate predominately non-detects with no action level exceedences. Toxicity testing exhibits no significant mortality or reproductive impairment. In the RIBS study, the benthic community indicates only a slight impact upstream of the AOC, and in a focused study no impact in the AOC. A description of the RIBS program activities is location in Section III.B.5 (re: benthos indicator) herein. Water quality and sediment studies related to toxics are reported in Section III.B.10 (re: dredging indicator). Aquatic plants, algae, and nutrients are addressed in Section III.B.4 (re: eutrophication).

The point source discharge permitting, inspection, and monitoring program provides a regulatory presence to assure the protection of receiving waters. Significant corrective actions of combined sewer overflows and storm water discharges have been implemented and additional phases of the work are being addressed. The implementation of Best Management Practices (BMPs) in the watershed, including new regulations on animal feeding operations, agricultural nutrient and pesticides application requirements, and erosion controls, all serve to reduce and limit nonpoint source pollution. County Soil and Water Conservation Districts and Water Quality Coordinating Committees, in Oswego and upstream counties, act on environmental projects and assure protective oversight of the Oswego River receiving waters. Hazardous waste site remediation removes the discharge of related non-point source toxic pollutants. Pollution prevention activities accomplish the use of non-polluting materials in manufacturing and the mitigation or ending of the use of certain toxic pollutants of concern by industry. Details of remedial activities are reported on in nine major environmental program areas outlined in Appendix K. References are listed in Appendix H.

Bird and reptile studies conducted around Lake Ontario by concerned citizens have helped to document healthy communities in and surrounding many areas including Oswego (re: Canadian Bird Studies and the Marsh Monitoring Program). Methods and results of these bird and reptile studies are presented in Section III.B.7 (re: bird and animal indicator) and Appendix M. Also in Section III.B, fish consumption advisories are reported under indicator #1; results of progress on the restoration of eagle wildlife in the basin are reported under indicator #2; provisions of the Varick dam license are reported under indicator #3; results of the water quality survey are reported under indicator #4; benthic study results are reported under indicator #5; fish pathology or tumor study results are reported under indicator #6; the aesthetic survey is reported under indicator # 8; plankton data are reported under indicator #9; and sediment studies results are reported under indicator #10. Although four indicators

are not applicable to the Oswego AOC (including beach closings, fish flavor tainting, drinking water restrictions, and added costs to industry or agriculture), the data evaluated to support these conclusions are reported under use impairment indicators #11 through #14. Overall, with the beneficial uses and impairment concerns addressed for the AOC, the described delisting for the Oswego River RAP is therefore a true success story.

III. USE IMPAIRMENT INDICATOR DELISTING

As an introduction to addressing the fourteen indicators for the Oswego RAP, the interrelationship of the harbor to Lake Ontario is worth noting. The Oswego River AOC and Lake Ontario have changed significantly since the Stage 1 document for the Oswego RAP was first released in 1990. Reductions in nutrient loading and the colonization of zebra and quagga mussels have changed nearshore habitat through greater water clarity, which has promoted increased macrophyte growth. Walleye have been steadily expanding and spreading throughout eastern Lake Ontario, including the Oswego Harbor. Emerald shiners and three-spine sticklebacks, relatively uncommon in 1990, are abundant today. Offshore, a restructuring of food webs that appears to be having profound effects on the lakewide fish community structure is underway. Recent research has revealed that reproductive impairments in trout and salmon species are linked to thiamine deficiencies, most likely of dietary origin. The dynamic nature of the Lake Ontario ecosystem indicates the necessity for adaptiveness and flexibility in planning initiatives. As described below, many remedial measures and management activities involving the Oswego River RAP have provided information with results to evaluate, address, resolve, and protect the beneficial uses for the AOC.

Table 2 - Use Impairment Indicator Resolution has been developed to summarize the delisting of the fourteen IJC use impairment indicators. The table columns provide summary information only on impairment endpoints, original indicator status, delisting indicator status, responsible parties, and the supporting data and rationale for resolution of the impairments. Table 2 incorporates input from the Use Impairment Indicator Sub-Committee (of the Oswego River RAP Remedial Advisory Committee) on the definition of desired endpoints that serve to resolve the use impairment indicators. These endpoints summarize a description of the restoration of best uses in order to delist an indicator. The details for the development of the indicator endpoints by the committee are contained in Appendices B and C (re: committee strategy and endpoints Table 4). Further delisting criteria are described in Appendices E and F (re: summary Table 5 and delisting criteria details).

Table 2 shows the original status of the use impairment indicators from the 1990 Stage 1 RAP and the resolved status of each indicator in order to accomplish delisting of the Area of Concern. The resolution of each indicator is corroborated by a summary description of the supporting data and the rationale to document that the beneficial use has been addressed. The resolution for each of the use impairment indicators for the Oswego RAP are described in detail in this Section III in the following fifty pages:

A. Indicator Status Resolution -Table 2:

Over the years, the waters and river bottoms of the Area of Concern have been affected to some degree by industrial and municipal discharges, physical disturbances including dam construction, upstream sources including nonpoint source discharges, and atmospheric deposition. The Stage 1 RAP identified watershed discharges and contaminated sediments (upstream of the AOC) as the major potential sources of contaminants to the AOC and Lake Ontario. Hazardous waste sites and point source discharges identified in the watershed have been and continue to be eliminated and corrected. Sources noted as nonpoint or diffuse sources from the watershed have also been addressed. Causes and sources are identified in the indicator resolution narratives after Table 2 and in tables presented in the 1996 and 1999 Update documents.

The fourteen beneficial use impairment indicators, developed by the International Joint Commission (IJC) in Annex 2 of the Great Lakes Water Quality Agreement of 1987, were evaluated in the Oswego River Stage 1 RAP document. Largely due to their connection to the surrounding watershed and lake, four of the indicators were identified as impaired and five other indicators were identified as possible or unknown and therefore needing additional study. The remaining five indicators were evaluated as not impaired and, after further current review by the Remedial Advisory Committee, remain with this not impaired status. After nearly fourteen years of conducting studies and influencing remedial measures affecting the AOC, its watershed, and the Lake Ontario region, the RAP participants recognize results of an AOC “rebirth”. The local government and community has dramatically rehabilitated the AOC shoreline. The clean up efforts by ongoing management plan activities has restored and now protects the beneficial uses. The Oswego River AOC is no longer on a remediation “to do” list.

Table 2 summarizes a description of the supporting data and rationale for the resolution of each of the use impairment indicators for the Oswego River RAP AOC. Within the Area of Concern, achieving the endpoints for the fish habitat/ populations indicators and the fish consumption indicator is being addressed respectively by the Federal Energy Regulatory Commissions (FERC) power dam relicensing requirements and the Lake Ontario Lakewide Management Plan (LaMP). These inclusive management plan activities address the larger issues of the Oswego River RAP that cannot otherwise be fulfilled within the Oswego RAP process. The remaining indicators have been resolved to a “not impaired” status. For all the indicators, responsible parties are identified for ongoing activities and/or post remedial concerns and responsibilities.

In the following summary table and Section B, each of the fourteen IJC use impairment indicators for the Oswego RAP are addressed. The beginning introductory statements are followed by statements on the resolution, then the supporting data, and finally the rationale. Together, these statements establish the basis for the indicator resolution and delisting. The workshop conducted in 1998 contributed significantly to moving the evaluation of the RAP indicators forward to address the resolution of each indicator. Details on the indicator evaluation strategy and indicator endpoints table, as developed by the Remedial Advisory Committee, are contained in Appendices B and C. Together, Table 2 and the following narrative statements for each of the use impairment indicators (listed in the following section under items #1 to #14) provide the description to resolve the use impairment indicators, document that impairments are addressed, and establish the restoration and protection of beneficial uses.

Table 2 - Use Impairment Indicator Resolution
Endpoints, Status, and Responsibilities
 Oswego River Remedial Action Plan

IJC USE IMPAIRMENT INDICATOR	END-POINTS	1990 RAP STATUS	2002 DELISTING STATUS	Responsible Parties	RESOLUTION Supporting Data and Rationale
1. Fish and Wildlife * Consumption Restrictions	Removal of lakewide fish consumption advisory (for humans)	Impaired- (for fish only; due to lakewide fish advisory; not wildlife)	Lakewide Management Plan addresses. (advisory not caused by, or specific to AOC; no AOC source)	NYSDEC; USEPA (and Canada); DFWMR; NYSDOH.	Lakewide fish advisory (not caused by or specific to the AOC). The use impairment is to be addressed in the Lake Ontario LaMP monitoring, trackdown, and corrective actions. (advisory never was specific to AOC)
2. Degradation of Fish and Wildlife * Populations	Populations substantially similar to reference communities	Impaired- (fish only; linked to indicator #3 habitat)	FERC license provisions address. (not due to local sources; wildlife not impaired)	FERC; USFWS; NYSDEC; DFWMR; OCWQCC.	Restoring river flow resolves fish access/ conditions in habitat area below the Varick Dam; resolved by FERC provisions. (AOC fish population ultimately related to dam construction and Lake Ontario fish populations).
3. Loss of Fish and Wildlife * Habitat	No restricted use of fish habitat from flow or contamination	Impaired- (due to periodic dry areas below dam for fish only)	FERC relicense provisions address. (not due to local sources; wildlife not impaired)	FERC; USFWS; NYSDEC; DFWMR OCWQCC; Industry.	Original impact due to physical change from dam construction and operation; (FERC license requires flow and access to spawning area to address fish habitat / population degradation; no further action pending. Compliance, monitoring, and evaluation by parties).
4. Eutrophication or Undesirable Algae	No persistent WQ problem due to cultural eutrophication; WQ stds. met; Beneficial use goal met and maintained.	Impaired- (due to historical nutrient inputs)	Not Impaired- (actions to limit nutrients resolve and protect against further use impairment)	NYSDEC; OCWQCC; OCSWCD; EMC	1994 Oswego Harbor Survey indicates no eutrophication conditions or impairment; no further action pending. See aesthetics indicator for weed control and exotic species concerns. Nutrient input has been limited by point source, CSO, and NPS watershed control activities.

IJC USE IMPAIRMENT INDICATOR	END-POINTS	1990 RAP STATUS	2002 DELISTING STATUS	Responsible Parties	RESOLUTION Supporting Data and Rationale
5.Degradation of Benthos	Community integrity substantially similar to reference communities.	May Exist- (no known cause, low confidence)	Not Impaired- (no significant cause or impact found)	NYSDEC; OCWQCC; OCSWCD; EMC	1997 EPA/DEC Sediment Study results indicate no significant impact; RIBS report documents water quality improvement and no significant benthic impact. Regulatory presence resolves and protects beneficial use.
6.Fish Tumors or Other Deformities	No abnormal high incidence of tumors or deformities.	May Exist- (no known cause, low confidence)	Not Impaired- (study found no significant evidence)	NYSDEC; DFWMR; NYSDOH; USFWS	1995 Fish Pathology Study indicates little impairment; better than controls. (further study to look at reproduction of resident AOC fish not warranted)
7. Bird or Animal Deformities or Reproductive Problems	No abnormal high incidence of deformities or reproductive problems	May Exist- (low level toxics may cause; no evidence; and low confidence)	Not Impaired-	OCWQCC; NYSDEC; DFWMR; NYSDOH	1999 Marsh Monitoring Program (MMP) in the area shows no impact. No significant impairment attributable to reproductive problems. Healthy presence of Amphibians and Birds; Fish addressed above.
8.Degradation of Aesthetics	Floatables and odors absent or min. presence. Weed control and exotic species to non-nuisance levels.	May Not Exist- (low confidence)	Not Impaired- (Nuisance conditions managed)	OCSWCD; OCWQCC; NYSDEC; EMC	From 1994 Oswego Harbor Survey. Study indicates no floatables or odor impairment. Weeds / invasive plants routinely harvested with no significant AOC impact (e.g. in harbor at Wright's Landing). Best uses maintained and intact. Zebra mussels reduce nutrients.
9.Degradation of Plankton Populations	Plankton Populations substantially similar to reference communities.	Unknown- (no known cause)	Not Impaired-	OCWQCC; NYSDEC	1994 Oswego Harbor Survey indicates not impaired. Plankton populations in comparison to references indicate no significant impact. Overall healthy and characteristic of riverine environment.
10. Dredging Restrictions	No Army Corp of Engineers dredge restrict.	Not Impaired- (high confidence)	Not Impaired-	USACE NYSDEC	Maintenance dredging not impaired; Recent dredging permit confirms. Study results support; no further action pending.

IJC USE IMPAIRMENT INDICATOR	END-POINTS	1990 RAP STATUS	2002 DELISTING STATUS	Responsible Parties	RESOLUTION Supporting Data and Rationale
11. Beach Closings	All AOC beaches open to swimming.	Not Impaired- (not AOC applicable)	Not Impaired	NYSDOH; OCWQCC; NYSDEC	No beach in AOC; not applicable and no impairment. Water Quality Survey results support status for secondary-contact recreation in AOC waters.
12. Tainting of Fish and Wildlife Flavor	No evidence of fish and wildlife tainting.	May Not Exist- (low confidence)	Not Impaired	NYSDOH; NYSDEC; USFWS; OCWQCC	1995 Fish Pathology Study by Jan Spitsbergen further supports this status.
13. Drinking Water Restrictions, Taste and Odor Problems	No drinking water restrictions or taste and odor problems.	Not Impaired- (not AOC applicable)	Not Impaired	NYSDOH; NYSDEC; OCWQCC; OCSWCD; EMC	No drinking water source in AOC. Not applicable and no impairment. Water Quality Survey supports good water quality for other best uses.
14. Added Costs to Agriculture or Industry	No abnormal added costs to agriculture or industry.	Not Impaired- (high confidence)	Not Impaired	NYSDEC; OCWQCC	1994 Oswego Harbor Survey supports this status.

Responsible Party Identification Key:

- NYSDEC - New York State Department of Environmental Conservation
- NYSDOH - New York State Department of Health
- USEPA - United States Environmental Protection Agency
- OCSWCD - Oswego County Soil and Water Conservation District
- OCWQCC - Oswego County Water Quality Coordinating Committee
- EMC - Environmental Management Council (Oswego County)
- USACE - United States Army Corps of Engineers
- USFWS - United States Fish and Wildlife Service
- DFWMR - NYSDEC's Division of Fish, Wildlife, and Marine Resources
- FERC - Federal Energy Regulatory Commission
- * - Use Impairments for Oswego RAP involve only fish (i.e. No wildlife impairments identified for the AOC)

B. Indicator Resolution:

A primary use impairment indicator identified is “restrictions on fish consumption”. The fish advisories are specific to the entire Lake Ontario region based on lakewide fish consumption for humans. The advisories relate to the Oswego River AOC in that the harbor and lower river are connected to the lake; however, the advisories are not specific to the AOC and are not due to any identified resident fish or AOC source of contamination. The primary cause contributing to this lakewide impairment is the presence of PCBs in fish flesh. Issues involving Mirex and dioxin also contribute to the lakewide fish impairment advisory. Other important use impairment indicators involving “loss of fish habitat” and “degradation of fish populations” are associated with the physical disturbances on the river involving the construction/ presence of the dam and the maintenance of sufficient river water flow in an area immediately below the Varick dam.

Results of specific Oswego River AOC studies are presented and cited herein. Report documents are also referenced to the Appendices. Studies involving water quality, sediment, and fish pathology provide supporting data for the reassessment of the following indicators: eutrophication or undesirable algae, degradation of benthos, fish tumors or other deformities, degradation of aesthetics, and degradation of plankton populations. The resolution of these indicators is established below. Clearly, PCBs have been a main cause involving use impairments concerns in the Oswego River AOC. Other pollutants causing concern include Mirex, dioxin, and nutrients (phosphorus).

The identified known and potential sources of the causes of the use impairments have included: upstream point and nonpoint sources, inactive hazardous waste sites, contaminated sediments, erosion, atmospheric deposition, Lake Ontario, and water levels below the Varick dam. In the Oswego River watershed, activities are well underway to address the remediation of all hazardous waste sites (including those in the watershed at Onondaga Lake). The FERC relicensing of the Oswego River power dams including the Varick dam just above the AOC embodies the provisions of the completed Settlement Agreement. The provisions of the settlement address several impairments by establishing a modified “run-of-river” flow that contributes to beneficial use restoration and protection.

For each of the fourteen indicators discussed below, an introductory narrative has been developed and is followed by statements on: resolution, supporting data, and rationale.

1. Fish and Wildlife* Consumption Restrictions

A fish consumption advisory was identified in Stage 1 as caused by PCBs, Mirex, and dioxin as part of a Lake Ontario lakewide health advisory (for lakewide sportfish consumption by humans). This advisory is not now nor ever was specific to the AOC. The causes and sources were not identified as in the Area of Concern and were attributed to upstream industrial discharges, inactive hazardous waste sites, contaminated sediments, air deposition, and Lake Ontario. Hence, the advisory addresses migratory fish entering the AOC. [* indicates a wildlife advisory was not identified for the AOC.]

The implementation of municipal and industrial corrective actions regarding point and nonpoint sources of pollutants in upstream communities as well as the corrective actions addressing the combined sewer overflows in the City of Oswego have contributed greatly to the reduction of pollutants entering the environment. Remedial actions associated with Onondaga Lake continue to mitigate the nonpoint source pollution threat to the AOC and Lake Ontario. The expanded implementation of Best Management Practices (BMPs) in the watershed to address fish, aquatic, wildlife, and human health concerns promotes the well being of the ecosystem and beneficial uses in the Area of Concern. The desired endpoint, as identified by the Remedial Advisory Committee (RAC), is the removal of this lakewide fish consumption advisory for fish from Lake Ontario.

When discussing the goals for Lake Ontario and its tributaries one must consider the historic versus the current uses and conditions of the lake and river waters. Some fish species have been lost (e.g. Atlantic Salmon) and there has been a decline in other species (e.g. Sturgeon and Eel). Trend data is very important in assessing environmental health. Some trend data (e.g. pollutant concentrations in fish, and ambient waters) illustrate that the situation is improving. For example, **Figure 3** shows a downtrend in PCB Lake Trout concentrations for the Lake Ontario eastern basin. This is reflective of progress being made under the LaMP process and the related benefit this has on the Lake Ontario fish consumption advisory. Water quality data, presented under indicator #4 for the Oswego River, also indicates improvement. Although the Niagara River delivers over twenty times the flow of the Oswego River to Lake Ontario, the Oswego does have a vast drainage basin area and large flow.

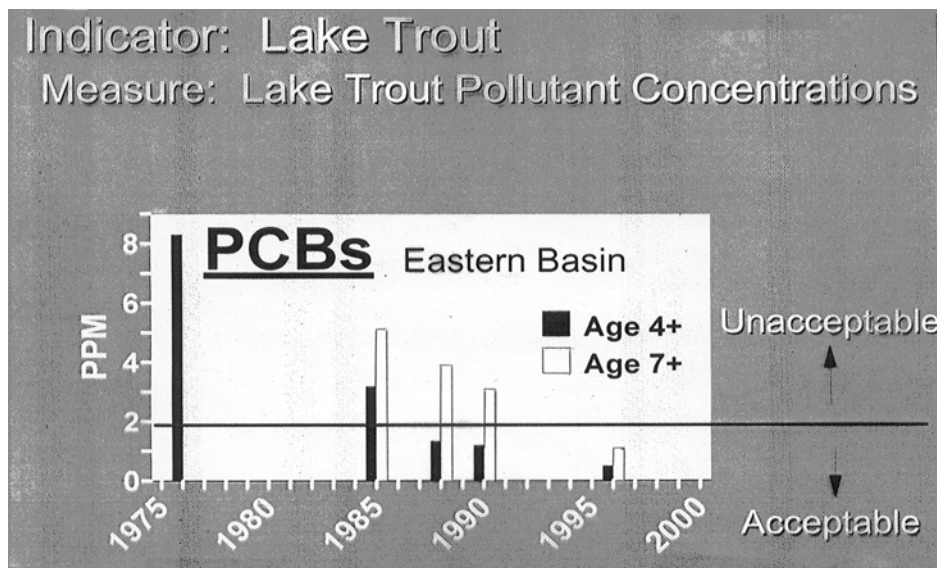


Figure 3 - PCBs in Lake Ontario Lake Trout (Eastern Basin)

Similarly, PCB critical pollutant concentrations in **Figure 4** for young-of-the-year Spottail Shiners at the mouth of the Niagara River in Lake Ontario illustrate a downtrend. Assuming this location represents “a potential worse case”, this is an overall positive reflection on larger management plan activities (such as the LaMP, the Niagara River Toxics Management Plan, and the RAP process) for Lake Ontario and the positive effects that remedial measures are having on the ecosystem. Therefore, the Lake Ontario LaMP is well established as a responsible process to address the fish consumption advisories which includes the lakewide advisories influencing the Oswego River.

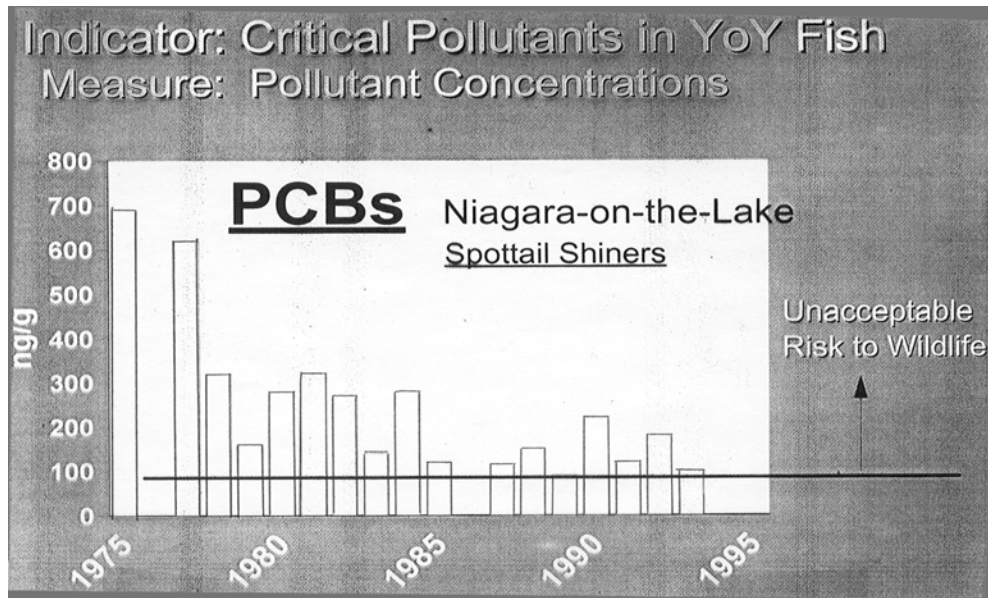


Figure 4 - Lake Ontario PCBs in Young-of-Year Fish

Resolution - The fish consumption advisories, upon which the identification of this use impairment in the Oswego River Area of Concern is based, are in effect as part of a Lake Ontario lakewide fish consumption advisories. The larger Lake Ontario Lakewide Management Plan (LaMP) is the appropriate responsible environmental program to provide the forum and necessary implementation follow-up for the ultimate resolution of the fish consumption restrictions impairment in the Lake which apply to the migratory fish in Oswego River AOC. The fish advisories and sources are not specific to the AOC. Under these circumstances, resolution of the fish consumption restriction use impairment indicator under the Lake Ontario LaMP is consistent with the federal EPA delisting principles and guidance. The final delisting guidance is posted on the USEPA website: www.epa.gov/glnpo/aoc.delist.html). Herein, Section IV.A applies this federal guidance to the Oswego River Area of Concern.

Support Data - Results of periodic examination of chemical residues, principally PCBs, organochlorine pesticides and mercury, in Lake Ontario fish are presented below. These points are cited from the 1998 workshop presentation by NYSDEC fisheries expert Larry Skinner. Bullets #1 and #6 are also cited in the NYSDOH Health Advisories entitled *Chemicals in Sportfish and Game*.

- In 1998, due to reduced concentrations of PCBs and Mirex, the health advisories for Lake Ontario lake trout and coho salmon were changed to permit additional consumption by women over childbearing age and men. The health advice for women of childbearing age and children under 15 years of age remains the same (i.e., eat no fish taken from Lake Ontario and its tributaries to the first impassable barrier). The former and new health advisories for men, and women over childbearing age, are listed below (see Appendix H.60 for the specific 2005-2006 Health Advisories reference and website).

<u>Species</u>	<u>Old health advice</u> (pre 1998)	<u>New health advice</u> (1998)
Lake trout	Eat none for all sizes	Over 25", eat none Smaller lake trout, one meal per month
Coho salmon	Over 21", eat none Smaller coho salmon, one meal per month meal	Over 25", one meal per month Smaller coho salmon, one meal per week (statewide advisory)

- Chemical concentrations in salmonids have experienced a decline since monitoring began in the mid-1970's. However, chemical concentrations, particularly PCB, Mirex, dioxins and furans, remain elevated which necessitates retaining health advisories which cause restrictions on fish consumption for humans on a lakewide basis.
- Chemical residue trends in Young-of-Year fish (Oswego River tributary sampling in Lake Ontario) indicate significant declines in PCBs and Mirex from 1984 through 1997. The findings are valuable since they demonstrate a reduction in the accumulation of chemicals from watershed sources. With no identified AOC sources, fish flesh contamination is addressed as a lakewide impairment. (Note: the limited detection of Mirex is in contravention of the Great Lakes Water Quality Agreement objective where Mirex should not be present in detectable quantities.) See Appendix H.31 for Young-of-Year study references.
- Chemical residue concentrations in legal or edible sizes of fish (Oswego River tributary sampling in Lake Ontario) show that concentrations seldom exceed criteria established by the US Food and Drug Administration for fish in commerce; American eels are an exception particularly for total Mirex. Mirex, PCBs, and mercury residues exceed objectives of the Agreement in at least some species of fish and are being addressed on a lakewide basis.

- Results of other fish studies (alewives, catfish, eels) are provided in Appendix K.6.
- Statewide human health advisories also exist for wild waterfowl (eat no Merganser ducks and trim fat on others eating no more than two meals per month). For Snapping Turtles, women of childbearing age and children should avoid eating due to PCBs. Causes and specific wildlife impairments are not identified for Lake Ontario or the Oswego AOC.

Rationale - The workshop conclusion, Remedial Advisory Committee recommendation, and NYSDEC position to continue chemical residue sampling and assessment of fish tissue and to evaluate the impact on fish consumption advisories as related to Lake Ontario and the lower Oswego River and harbor area as part of the Lake Ontario Lakewide Management Plan (LaMP) is consistent with the federal delisting guidance. This is a responsible and appropriate method to address the longer-term full restoration of the beneficial use. Because the advisories are not caused by the RAP Area of Concern (no specific AOC sources) and use impairment is being addressed on a lakewide basis, there is no further action to be taken by the RAP. This fish consumption restriction indicator is therefore to be resolved by means of actions taken on behalf of the Lake Ontario LaMP. The desired endpoint, as identified by the Remedial Advisory Committee, is the removal of the fish consumption advisory under the Lake Ontario Lakewide Management (LaMP) Plan. The assumption of responsibility by the LaMP for the ultimate resolution of this indicator is consistent with the delisting principle and guidance point developed by USEPA stating that RAPs can only address impairments caused by local sources. The advisory is part of lakewide Lake Ontario conditions.

NYSDEC Fisheries' Position Statement on Fish Consumption Advisory - Fish monitoring of Lake Ontario and its tributaries includes the Oswego River flow by sampling young-of-year as well as adult fish flesh. This monitoring and analyses provide a level of protection for the Oswego area and the Lake in the assessment of the presence of toxic contamination in the water column and its effects on the aquatic environment. Studies indicate that fish advisories are not impacted by toxics in the water or sediments of the AOC but are attributable to non-AOC sources. The adult fish sampling include steelhead and salmon. These fish range freely for their lives in Lake Ontario and were originally hatchery spawned.

2. Degradation of Fish and Wildlife* Populations

The identified fish population impairment is predominately linked to and due to the habitat impairment caused by the periodic dry river areas created below the Varick Dam. It is also influenced by the natural conditions in Lake Ontario. The physical disturbance created by the presence and operation of the power dam is the main cause of the impairment identified in the RAP. The fish populations impairment is fully addressed by the remedial measures required in the dam relicensing process described under the habitat use impairment indicator below. The desired endpoint, as identified by the RAC, is to have fish populations substantially similar to that of reference communities. [* indicates no wildlife population or wildlife habitat impairments are identified for the Oswego AOC.]

Resolution - The periodically dry areas below the Varick Dam, on which the identification of this use impairment in the Area of Concern is based, are directly related to the loss of habitat impairment. The requirements of the power dam relicensing (40 year license issued 11/30/04), on behalf of the Federal Regulatory Commission (FERC) with input from the US Fish and Wildlife Service and NYSDEC, has established the long term conditions addressing the use impairment. The degree of the restoration of the fish habitat and populations is directly related to the decision on the maintenance of sufficient river flow during fish spawning season. The provisions established by the FERC license and Settlement Agreement provide for a modified “Run-of-River” requirement that fully satisfies the flow needed for restoration as identified by federal and state fisheries staff personnel in the 1994 Fisheries Enhancement Plan. The FERC license modified run-of-river flow requirement provides the necessary solution and fish access for the resolution of the fish population and habitat impairments. Therefore, the Run-of-River and fish protection and passage provisions under the FERC relicensing process restore and protect, to the maximum extent practicable, the beneficial use to fish populations. Implementation oversight to assure the desired conditions and fish access are in-place is to be provided by FERC, USFWS, NYSDEC, and local agency and environmental interests. Reporting and compliance actions under the FERC license will be noted; however, are not part of the RAP process. A springtime observation is to be conducted.

Support Data - Even though the area below the Varick Dam is limited in size, it has been identified as a critical fish habitat area and linked to the fish population impairment for the Area of Concern. Alternate high quality spawning habitat in the AOC is not known to exist and therefore this area, subject to low flows by dam operation, was identified as a priority. Although changes have occurred at other locations of the lower river and harbor which serve to increase habitat, we cannot state that these locations provide sufficient supplemental habitat to offset this known critical habitat area below the dam. Even though the regulation of the river flow can be viewed as an out-of-AOC source of impairment, this issue is now fully addressed by the license provisions. With fish access provided and since there are no other causes of fish population impairment specific to the AOC, no further action under the RAP is warranted. The FERC requirements establish minimum flow, fish protection, and fish passage provisions to restore fish conditions and access and resolve the use impairment indicator relating to fish populations for the AOC. Regardless of these measures, we should note that existing lakewide conditions and characteristics of the Lake Ontario waters and its ecosystem will continue to have a dominate effect on the AOC and its fish population.

For example, Lake Ontario and the Oswego River AOC have changed significantly since the Stage 1 RAP document was published in 1990. Reductions in nutrient loading and the colonization of zebra and quagga mussels have altered lake nearshore habitat through greater water clarity, which has promoted increased macrophyte growth. Observations indicate that the fish populations of Lake Ontario influence the tributaries. Throughout eastern Lake Ontario, walleye fish have been steadily expanding and spreading which includes the Oswego River area. Some fish species in Lake Ontario that are abundant today (e.g. emerald shiners and three-spine sticklebacks) were relatively uncommon in 1990. In the open lake, a restructuring of food webs is underway that appears to be having profound effects on fish community structure. Interestingly, recent Lake Ontario research has revealed that reproductive impairments in trout and salmon species can be linked to other causes such as thiamine deficiencies, most likely of dietary origin. Also, sea lamprey control and fish passage protection measures in the Lake Ontario region serve to protect fish populations.

Although no wildlife population impairment was identified for the Oswego River AOC, Bald Eagle data developed for the Lake Ontario drainage basin reflects that wildlife populations are ever improving. This Lake Ontario ecosystem indicator, reported in the Lake Ontario Lakewide Management Plan (LaMP) Update 2001 in **Figure 5** below, illustrates an increasing trend in the number of Bald Eagle Nesting Territories (eagle pair plus eaglets). Healthy and increasing populations of such top predator species would indicate the presence of suitable habitat, healthy populations of prey organisms, and low levels of environmental contaminants. The number of eaglets fledged per nest has also been documented as increasing. A nesting territory is documented upstream of the Oswego River AOC. Another example reported by the Derby Hill Bird Observatory Newsletter (Fall 2001) located in Oswego County near the City of Fulton, states that anecdotal records tell of Bald Eagle nesting counts in the 1920's that were as many as 25 nests along the Lake Ontario shoreline (these nests were substantially reduced to near zero in the 1950's). Further, the newsletter reports that 224 separate Bald Eagles sightings were recently counted over a period of time in the Derby Hill area. Although this count includes migratory and nesting eagles, the numbers indicate tremendous recovery of an endangered species!

Additional data supporting healthy wildlife populations and habitat can be derived from the multi-year study results (Marsh Monitoring Program; Appendix M) for marsh birds and amphibians under impairment indicator #7. Together, these indicators further support a healthy ecosystem for the Oswego River area and exhibit progress in New York State and local area government commitment to responsible stewardship through actions taken to restore and protect beneficial uses.

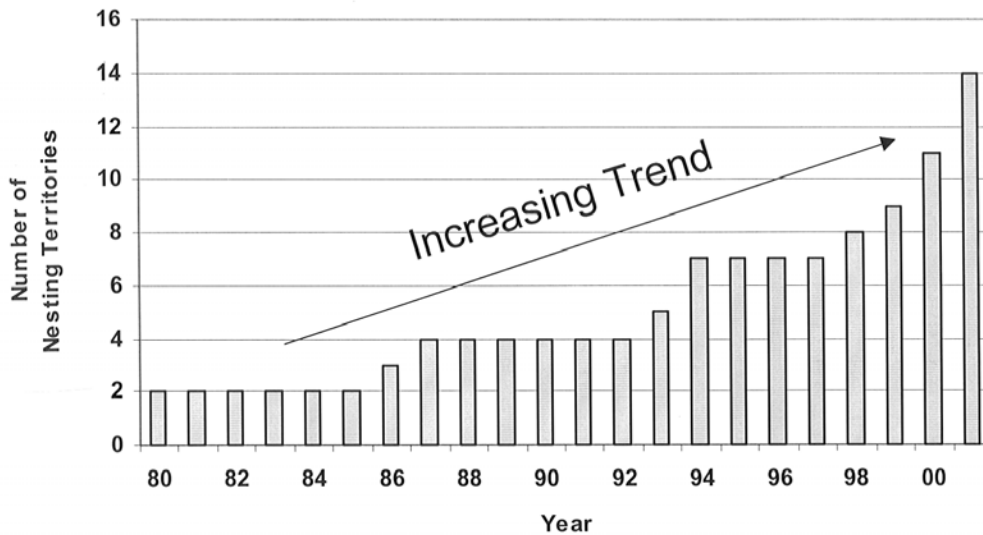


Figure 5 - Bald Eagle Nesting Territories

Rationale - The Oswego RAP and related planning and regulatory initiatives, including the FERC power dam relicensing process, have provided vehicles to evaluate and resolve impairments of beneficial uses. The dynamic nature of the Lake Ontario ecosystem indicates the necessity for adaptiveness and flexibility in planning initiatives. It is therefore recognized that RAP protection and restoration strategies need to be adaptive and flexible to the changing dynamics of the Lake Ontario and the Oswego River nearshore ecosystem. The FERC requirements addressing river flow, fish passage, fish access, and protection address the fish population and habitat needs as well as restoring other ecosystem conditions for the AOC. Key is the modified “run-of-river” requirement satisfying needs identified by USFWS and NYSDEC fishery staff. Compliance is to be monitored and enforced by FERC. All entities will observe results. The assumption of responsibility for the long-term resolution of this indicator by the FERC license under the auspices of the Lake Ontario LaMP is consistent with the delisting principles and guidelines developed by USEPA.

NYSDEC Fisheries’ Position Statement on Fish Population - Fish populations in the AOC are directly linked through their association with Lake Ontario. The fish populations of the lake actually have the greatest influence on the AOC fish populations. Fish movement in and out of the AOC is dominated by the lake characteristics. With river flow and fish habitat addressed in the AOC under the FERC license, the fish populations will reach a level consistent with natural conditions allowed by Lake Ontario. The FERC license will require the power dam operator to monitor operations for compliance with prescribed terms addressing river flow and fish passage.

3. Loss of Fish and Wildlife* Habitat

The fish habitat impairment is due to the periodic dry river area created below the Varick Dam. The physical disturbance created by the presence and operation of the power dam is the cause of the use impairment. Chemical causes are related to the lakewide fish consumption advisory and are not identified as direct causes of habitat impairment in the AOC. Remedial measures associated with the requirements of relicensing of the Varick Power Dam fully address the fish habitat use impairment which in turn will address the fish population impairment. The level of restoration is dependent on out of AOC sources (i.e. the overall river flow and the conditions of Lake Ontario). The desired endpoint for the AOC, as identified by the Remedial Advisory Committee, is to have no restricted use of fish habitat from flow or contamination (contaminants are discussed further under the restrictions on dredging use impairment indicator #10). [* indicates no wildlife population or wildlife habitat impairments are identified for the Oswego AOC.]

Resolution - The impacted habitat area below the Varick Dam is directly caused by the restricted river flow from the presence and operation of the dam. The requirements of the power dam relicensing, on behalf of the Federal Regulatory Commission (FERC) with input from the US Fish and Wildlife Service and NYSDEC, establishes the long term (40 year license) conditions addressing fish habitat. The degree of the restoration of the fish habitat, and associated populations, is directly related to the maintenance of sufficient river flow during fish spawning season as is now required under the renewed FERC license issued 11/30/04. **Figure 6** below summarizes the

provisions to be established by the FERC license that establish a modified “run-of-river” flow requirement needed for restoration as identified by federal and state fisheries personnel. The FERC license is the appropriate responsible environmental program to address the restoration. The license provisions restore and protect, to the maximum extent practicable, the beneficial uses for fish. Implementation oversight is to be provided by FERC, USFWS, NYSDEC, and local agency and environmental interests. Reporting and compliance actions are under the FERC license. Under the RAP process, a springtime observation is to be conducted. In the fall, a fish creel survey is planned.

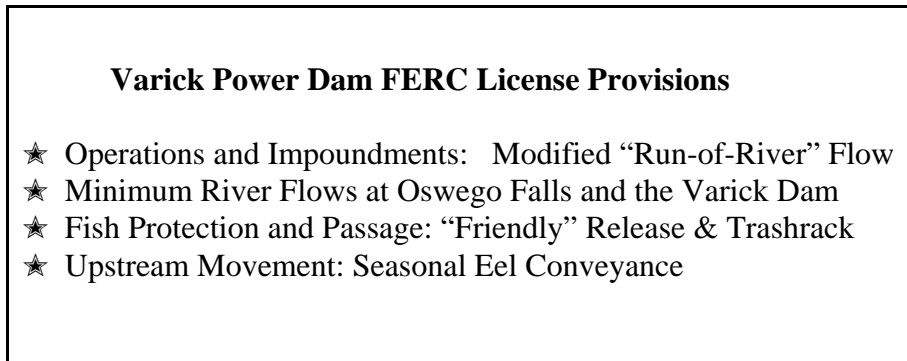


Figure 6 - Summary of FERC License Provisions

Support Data - The **1994 Fisheries Enhancement Plan** (reference Appendix H.59) for the Oswego River was prepared by the US Fish and Wildlife Service Lower Great Lakes Laboratory staff and NYSDEC. DEC contributed mainly to the Management Goals and Objectives section. There are five major goals in the Plan:

- Restore and maintain a healthy aquatic community.
- Restore the New York State threatened species, Lake Sturgeon.
- If ecologically feasible, restore Atlantic Salmon to the Oswego River watershed with adults ascending the system from Lake Ontario and reproducing naturally in the headwaters.
- If ecologically feasible, restore American Eel to the Oswego River above the Varick Dam and provide passage for adults and juveniles.
- Provide adequate angler access to all portions of the Oswego River.

Ecological change is occurring rapidly in Lake Ontario, affecting the fisheries that are being produced. These changes and changes in angler use may render some of the objectives not fully attainable. The most limiting aquatic habitat in the Oswego River RAP Area of Concern is the Varick bypass reach, over 1,500 feet in length. Restricted flow over the dam has caused much of the reach stream bed to be dry during spring/ summer flows. The upper part consists primarily of bedrock. This bedrock area can be utilized by a number of species for spawning (steelhead, Atlantic

salmon, chinook salmon, brown trout, smelt, walleye and panfish consisting of catfish, bullhead, bluegill, bass, and perch) and can offer excellent fishing for migratory salmonids at desired flows.

An In-stream Flow Incremental Methodology (IFIM) study was conducted in 1993 as part of the hydro-relicensing efforts. Several different minimal flow levels were used to calibrate the model for the upper bypass reach. The results of the study have been useful to the relicensing process. NYSDEC identified minimal resource needs of the aquatic community and the anglers who utilize the waters. The license requirements address a seasonal modified “run-of-river” flow for protection needs of desired resident fish (panfish) and forage fish species, and higher fall/winter flows for migratory salmonids/fishing and higher flows yet for walleye spawning and incubation. Fish passage and protection is also addressed by requiring a bar rack or trashrack with spaced openings and overlays. Upstream fish passage is to have seasonal protection and ramps. In the Great Lakes, fish ladders have been successful in combating sea lamprey and providing selected species fish passage. Additional details on the FERC license provisions are in Appendix J.

Rationale - The new FERC license has incorporated the Fisheries Enhancement Plan objectives to restore adequate flow, while assuring the fish conditions and access, to address the fish habitat impairment below the Varick Dam. The FERC requirements addressing river flow, fish passage, fish access, and protection address the fish population and habitat needs as well as restoring other ecosystem conditions for the AOC. Key is the modified “run-of-river” requirement satisfying needs identified by USFWS and NYSDEC fishery staff. Compliance is to be monitored and enforced by FERC. All entities will observe results. The assumption of responsibility for the long-term resolution of this indicator by the FERC license is consistent with the delisting principles and guidelines developed by USEPA.

NYSDEC Fisheries’ Position Statement on Fish Habitat - The fish habitat is addressed by the flow requirements of the FERC license. Maintaining the required flow will satisfy the fish habitat needs to the maximum extent practicable and also result in benefits to the fish populations of the AOC and Lake Ontario. In fact, with the upstream source of water flow to the Oswego AOC addressed, there is no AOC source for further impairment of fish habitat. Lake Ontario exerts the largest influence on the AOC, and with the river flow addressed there is no significant cause of habitat impairment in the Oswego River AOC. Essentially, with the flow and habitat conditions addressed in the AOC under the FERC license, the fish habitat will produce fish populations consistent with natural conditions allowed by Lake Ontario. Under FERC, the dam operation will be monitored for compliance with prescribed terms addressing river flow and fish passage. The provisions will enhance the fisheries resource in and above the AOC. Limiting fluctuations of water levels behind the dam should result in increased nesting success of centrarchid species here (bass, bluegills, etc.). Maintaining minimum flows in the bypass reaches will provide riffle habitat required by many species life stages and should increase diversity of species. The result is designed to provide spawning habitat for walleye and other fish. Fishing opportunities are to be enhanced. Downstream fish passage will reduce mortality. Required seasonal upstream eel passage provides for fish species population restoration.

4. Eutrophication or Undesirable Algae

This use impairment was identified in the early RAP stages as caused by excessive phosphorus attributable to point source discharges from wastewater treatment facilities, combined sewer overflows, and nonpoint discharges related to urban/rural land runoff. Significant actions and improvements have been implemented to address point and nonpoint flows thereby greatly mitigating nutrients, solids, and floatables discharged to the waters of the Oswego River. The unplanned introduction of the exotic species zebra mussels in the Three Rivers System (the Oswego, Seneca, and Oneida Rivers) also serves to improve water quality. Zebra mussels filter the water removing nutrients and improve water clarity although they can lower dissolved oxygen content. The 1994 Oswego River Water Quality Survey found no eutrophication or algae impairment in the AOC; however, algae has been reported in certain upstream river segment waters and associated directly with some of the waters in the locks along the river. The desired endpoints as identified by the Remedial Advisory Committee are: no persistent water quality problem due to cultural eutrophication, water quality standards achieved, and the beneficial use goals met and maintained.

Although the Water Quality Survey did determine no impairment in the AOC, some nuisance conditions were identified in the shallower western part of the harbor where boats are docked and in upstream non-AOC locations. In the western harbor area, weed harvesting is conducted to address this nuisance. The benthic community and aesthetics are discussed and addressed respectively under use indicators # 5 and # 8. In the AOC there is a healthy balance between the aquatic plant growth and the algae that constitutes an important relationship in the water quality as discussed below.

Practically all of our northeastern lakes support a diversity of large aquatic plants attached to the bottom (benthic macrophytes) which are an important factor in maintaining potable, recreational, and aesthetic characteristics, as well as the ecological functioning of most waters. These plants compete directly with algae in the water column (phytoplankton) for nutrients, thereby maintaining water clarity. The plants protect shorelines from erosion and stabilize deeper substrates thus limiting turbidity from silts and clays in physical disturbances. By preventing the resuspension of sediments which have nutrients attached to them, algal growth is thereby limited. Aquatic macrophytes also provide food and cover and/or supplement oxygen supplies for all of the organisms (fish, mammals, amphibians, reptiles, and invertebrates) that make up shallow water (littoral) aquatic communities. Plants are the basis of aquatic food webs in these areas, providing indispensable links between the sun's energy and animals that eat them which are, in turn, eaten by predators. In these ways, plants regulate the size and character of game fish and waterfowl populations as well as impact other biotic resources we cherish.

In the Great Lakes region, including Oswego, there are a few introduced plant species (e.g. Eurasian milfoil, water chestnut, and pondweed) that can aggressively out-compete our native flora under conditions of excess nutrient loading which destroys biodiversity and causes beneficial use loss. The dense beds commonly formed by these plants often can reduce the recreational quality of the waters.

These introduced exotic plants are responsible for the great majority of the complaints heard from recreational users of the waters. Aquatic plant management depends on protocols that usually vary from one water body to another dependent on the expectations of the stakeholders and their concurrence regarding the appropriate missions of their management plans. Education programs are important to assure that expectations are developed into equally realistic plant management goals.

Introductions of exotic plants are most aggressive when native plants or substrates are disturbed. If rooted plants are completely removed, algae will grow unimpeded, clouding the water and preventing further macrophyte growth which results in de-stabilization of substrates and loss of food and cover for higher organisms. Managing non-native plants must therefore be selective. Recreational navigation has been the main reason for intervention and mechanical harvesting the main remedy. Several problems result from harvesting nuisance plants. Since the majority of exotic species are more competitive in disturbed situations, harvesting enhances growth of these undesirable plants. Because harvesting is non-selective, native plants are also removed allowing for the exotics to grow faster. Herbivorous insects which potentially serve as natural bio-control agents for the exotics are also removed. Increased harvesting to maintain trouble-free utilization of an area can be expensive. The use of herbicides is additionally complicated because of potential toxicity in trying to attain control without killing non-target species.

Ecological succession occurs naturally in all water bodies. It is the process whereby one type of plant community, through its impact on the environment, actually changes conditions so that they become more optimal for an entirely new community, which eventually displaces the first. Many bottom areas become muddy with a high organic content and clear waters become more turbid with algae as populations rise. Conditions range from few plants rarely reaching the surface to those with surfaces covered with vegetation. Shallow areas over time fill in and become wetlands. Under normal conditions, management activities should be avoided since nutrient levels (that drive the process) cannot practically be expected to be reduced below natural baseline levels. However, if the process is enhanced by human activities to the degree where undesirable conditions exist, then intervention is reasonable. In the presence of excess nutrient loading (phosphorus and nitrogen) both planktonic algae and rooted macrophytes will grow.

Recreational and other stakeholder users of the waters are concerned about aquatic weed growth, but must recognize the benefits derived from rooted plants. By taking steps to eliminate the rooted plants, planktonic algal populations will flourish (bloom) and vice-versa. The algal or plant growth can become very abundant without reducing nutrient loading. Remedial measures to reduce nutrients and other pollutants have been accomplished in the Oswego River watershed and AOC. Such activities are expensive, long-term, social, and political undertakings. Likewise, in the Great Lakes drainage basin significant steps have been taken to reduce loadings of pollutants including nutrients to the receiving waters. Lake Ontario and the Oswego River Area of Concern have benefitted from the implementation of the Clean Water Act and the Great Lakes Water Quality Agreement. To a large extent, watershed nutrient and contamination sources have been addressed that affect the Area of Concern.

Overall, sources of pollutants contributing to use impairments in the AOC can be classified as either 1) point or nonpoint sources within the Seneca-Oneida-Oswego River basin or 2) from Lake Ontario. This is because the waters of the Area of Concern are made up partly of what comes down the Oswego River and partly of what enters the AOC from Lake Ontario. Little is known about the dynamics of interchange of Lake and river waters, but that it occurs is certain. Waters entering the AOC from Lake Ontario can carry contaminants with them, as can the fish that swim from Lake Ontario into the AOC. Likewise, waters from upstream can carry contaminants which may effect the AOC and Lake Ontario. Therefore, remedial actions on the sources of pollutants throughout the Oswego River drainage basin must and have been coordinated and implemented to properly address the problems within the Area of Concern as well as effects on Lake Ontario.

Point sources of pollutants include municipal and industrial discharges of wastewater that are regulated by point source discharge permits (State Pollution Discharge Elimination System or SPDES permits). Current point source discharge permitting practices provide extensive control of point source discharge wastewaters. Combined sewer overflows that include stormwater are being remedied by the City of Oswego under a five phase compliance schedule that is well underway. Nonpoint sources of pollution are also a focus for remedial and preventive measures that primarily include implementation of improved management practices. Nonpoint pollution is characterized by releases from contaminated sediments, runoff/leachate from hazardous waste sites, erosion and storm flow in developing areas, or poor agricultural land practices. See Appendix K (parts 3 and 4) for additional details on progress in point and nonpoint pollution control.

Resolution - The remedial actions taken by State and Local government agencies over the past ten to twenty years have served to limit and address the nutrient input into the Area of Concern. The nutrient control, reduction, and remedial measures have resolved the AOC sources contributing to a eutrophic stress condition and provided the protection of best uses for the waters in the AOC. Water quality surveys confirm that no eutrophic condition or impairment from undesirable algae is present. Other than completing the remaining activities to address CSOs, no further remedial work is pending. The long term monitoring of the Rotating Intensive Basins Survey (RIBS) program, as well as the regulatory presence of NYSDEC environmental quality surveillance and monitoring staff, provides protection to assure the beneficial uses of the waters of the AOC are maintained. The desired endpoints of no persistent water quality problem due to cultural eutrophication, water quality standards achieved, and the beneficial use goals met and maintained, have all been accomplished. Although nuisance conditions and aesthetics from nutrients are affected in certain areas of the Oswego River, no further remedial action is planned or warranted under specific oversight of the Remedial Action Plan to address eutrophication or algae in the Area of Concern.

Support Data - NYSDEC published the EPA grant funded **Oswego Harbor Survey** in 1994 (Appendix H.35). The main objectives of the survey were to investigate the potential causes, the possible sources, and the current status of several use impairment indicators. Eutrophication or undesirable algae, beach closings, and degradation of plankton populations were the main conditions

investigated. It was known that past anthropogenic loads to the upper Oswego River drainage basin had contaminated some sediments in the river and had carried contamination in the flow to receiving waters in Lake Ontario. Results from the data indicate that the AOC is a healthy environment concerning dissolved oxygen, eutrophication, nutrients, coliforms, pathogens, and the planktonic community. What appeared to be toxicity effects were encountered when conducting some BOD and biological toxicity tests. The cause, extent, and effect of this earlier observed toxicity was never identified and not replicated in future sampling. In the subsequent toxicity test sampling and analyses that were conducted, the results indicate no statistically significant reproductive or survival effects when compared to control samples.

Figure 7 shows the Dissolved Oxygen (DO) concentrations at all sample locations in the Area of Concern were high and did not indicate a eutrophication problem. The observed concentrations ranged from 5.3 mg/l to 13.3 mg/l. Out of 176 dissolved oxygen measurements made through out the summer at the various stations and depths through out the water column, none of the measurements were below the desired New York State standard of 5 mg/l. In fact, only three measurements were below the 6.0 mg/l. level. Most of the DO measurements were made at or near the saturation value. DO is reported as % saturation in figure 7 because it is a function of temperature and concentration.

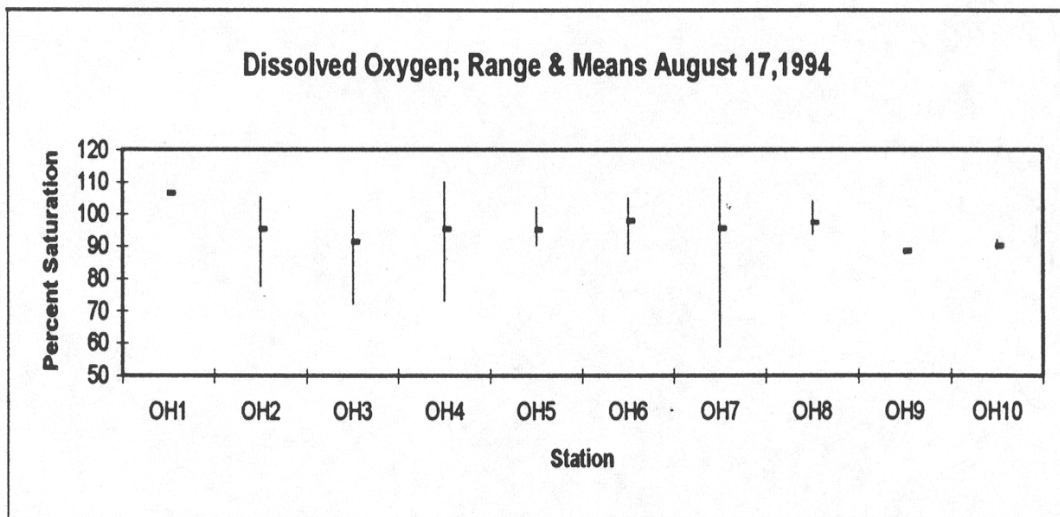


Figure 7 - Dissolved Oxygen at Depths and % Saturation

When supersaturated DO conditions are observed in a waterbody, one usually expects to find algal blooms. However, the Chlorophyll *a* measurements in **Figure 8** and field observations did not indicate an over-abundance of free-floating algae in the harbor (see rationale page 37). The Harbor's shallower areas did support an abundant vascular macrophyte (water chestnut) crop. These rooted plants were so prolific in the shallower areas that they had to be harvested mechanically in order to keep the boating marina operational. It is these plants that are photosynthesizing the oxygen that keeps the oxygen concentrations at or above saturation.

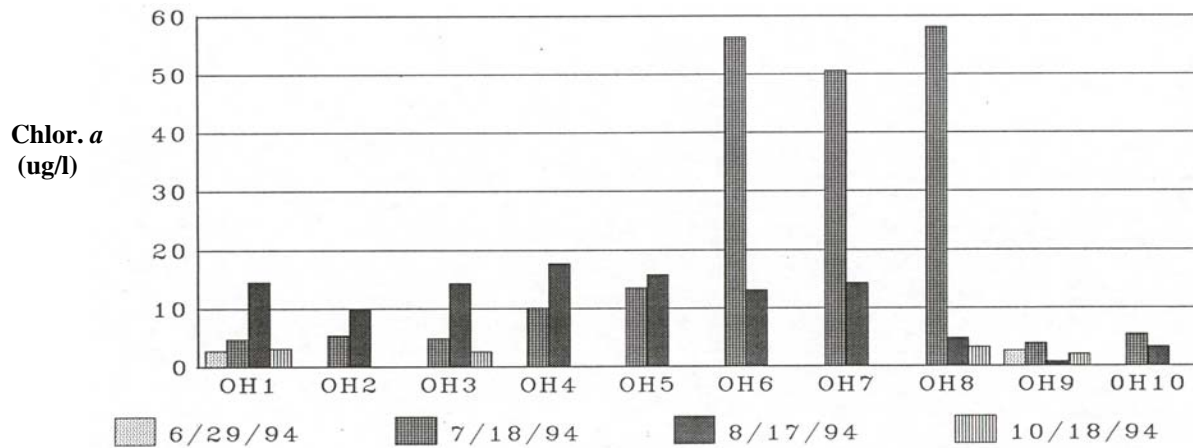


Figure 8 - Chlorophyll *a* in the Oswego Harbor (ug/l)

The phytoplankton populations do not appear to be limited by the available nutrients in the Oswego Harbor. Phosphorus is identified as the nutrient of concern for this area and sampling results are shown in **Figure 9**. Although the nutrient concentrations are sufficient to support a much larger algal population, the concentrations do not appear to be excessive for a river flow. Under the GLWQA the 10 ug/l goal is being achieved in open lake waters.

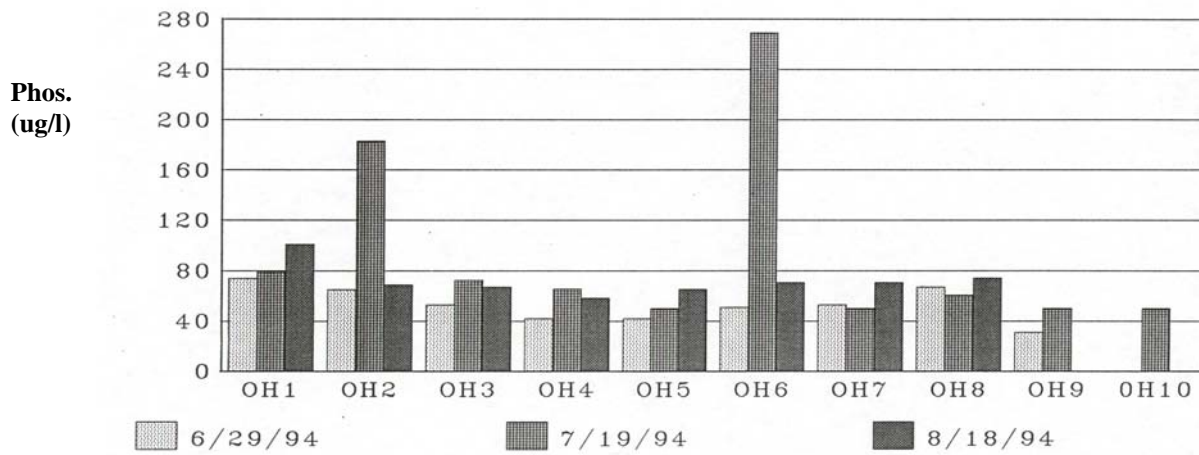


Figure 9 - Total Phosphorus in the Oswego Harbor (ug/l)

The 1999 RIBS study report provides water column results for phosphorus at Minetto, five miles upstream from the harbor, in a range similar to the average concentrations in Figure 9 (40 to 80 ug/l). This indicates that upstream (out of AOC) sources therefore account for the majority of phosphorus loading to the AOC and Lake Ontario.

In the 1994 study, ammonia results were low and there was no evidence of ammonia toxicity. The initial toxicity test results conducted during the summer months of June and July in 1994 identified a potential toxic effect in the ambient waters. Algae was observed in the samples prior to testing. Certain blue-green algae are known to produce cyanobacteria toxins that can affect fish, wildlife, and sample results. Examples of such algae (*Aphanocapsa*) were identified in the Oswego samples. Sample bottle testing for contamination did not identify a problem. The toxicity was not observed in repeat samplings conducted later that summer, again in the fall, and the following year. Filtering of the algae was also applied to the testing, but no difference was noted. Even some controls exhibited mortality in the test results as noted in the bar diagrams in **Figure 10** below from September 1994. In this set of samples, no statistically significant reproductive or survival effects were identified. Subsequent toxicity testing conducted during the 1995 season did not identify toxicity. Overall, toxicity test results do not support a chronic toxicity problem.

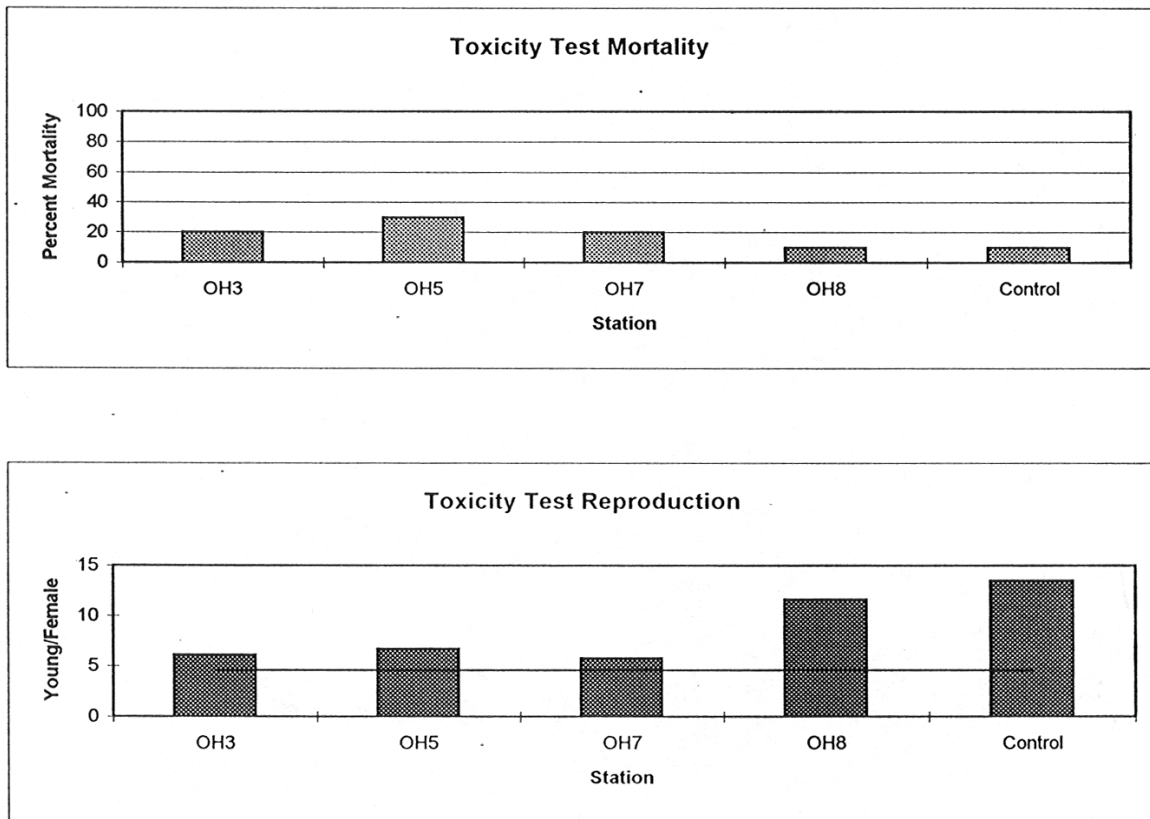


Figure 10 - Oswego Harbor Toxicity Tests
(% Mortality and # of Young /Female)

Rationale - The Oswego River watershed is very large; it encompasses over 5,100 square miles. The riverine characteristics contribute to preventing eutrophication in the AOC by being subject to “flow through” conditions. The waters of the AOC meet the DEC water quality narrative standard for phosphorus by not impairing best uses. From several perspectives, the AOC is not eutrophic because: 1) wastewater treatment and CSO controls greatly reduce nutrients; 2) the growth of zebra mussels and closings of industrial discharges, such as the local paper mill (International Paper) and upstream brewery (Miller), reduce nutrients to the AOC; 3) fishery management and sport-fishery persons are not calling for added nutrient controls, in fact, additional phosphorus is expressed as a need; 4) tourist best uses of the water are intact; and, 5) water quality and other AOC related use indicators are not impaired due to nutrients.

When applying watershed protection and remediation strategies we need to break the work down into manageable parts. The Oswego River receives discharges from point and nonpoint sources. For example, heavy metals and organics can be present in some municipal wastewater discharges as well as runoff. The Great Lakes Water Quality Initiative (addressing bioaccumulative chemicals of concern or BCCs) requires strict standards necessitating source trackdown and pretreatment implementation. NYSDEC has been and continues to work with municipalities to correct combined sewer overflows and to implement industrial pretreatment. The City of Oswego has completed major phases of CSO work required by their discharge permit. Further New York State discharge permit requirements are being imposed and administrative orders are used for enforcement. BCCs are being addressed through these initiatives as well as pretreatment, CSO, and pollution prevention requirements (see Appendix K for point and nonpoint source controls).

Ongoing watershed monitoring and surveillance activities assure that protection and remedial measures are effective. The RIBS sampling program for ambient waters and specific hazardous waste site monitoring for remediated sites addresses these needs. Project funding provided under the Clean Air / Clean Water Environmental Bond Act, the Great Lakes Protection Fund, and nonpoint source program activities has and continues to benefit the Oswego AOC. NYSDEC is maintaining effective monitoring and surveillance activities to assure beneficial uses are protected.

The AOC is not impaired for eutrophication and algae; however, some nuisance conditions exist in isolated areas (upstream locks and western shallow harbor area). These have included some algae and weed conditions. The locks are not part of the AOC. Weed harvesting is conducted to address the weed nuisance in the western harbor area. In the Oswego River AOC and watershed, nonpoint source remedial activities are being conducted by the Oswego County Soil and Water Conservation District, the Oswego County Water Quality Coordinating Committee, and other government and public organizations working on various projects. These include monitoring activities, studies, implementation of best management practices, stream corridor protection actions, weed control, and input into the FERC relicensing process and the Lake Ontario Lakewide Management Plan.

Again, the assumption of responsibility for the continuation of monitoring and implementation efforts to assure the maintenance of beneficial uses involving eutrophication, algae, and weeds by NYSDEC and county governmental organizations is consistent with the RAP delisting principles and guidance developed by USEPA which states that RAPs can only address impairments caused by local sources and that it is recognized and permissible that a beneficial use may not be capable of fully restoring to pristine conditions even though all remedial actions have been implemented.

5. Degradation of Benthos

The early stages of the RAP identified with low confidence that a benthos impairment may exist. Although no cause was known, sediment contamination was suspected because toxicity tests carried out on sediments in 1987 suggested benthic macroinvertebrate populations may be impaired. Subsequently, the 1997 results of the Oswego River Sediment Study indicated a benthic community in the AOC (harbor) as diverse, well balanced and typical of minimally impacted conditions. In this

study, no impact on the benthos upstream at Battle Island and Phoenix was found. Some benthic impacts were however identified upstream of the second dam above the AOC, in some of the sediments around Fulton, and at the Onondaga Lake outlet. The desired endpoint for delisting the Area of Concern, as identified by the Remedial Advisory Committee, is a benthic community having an integrity substantially similar to unimpacted reference communities.

Sampling results and trend data from the NYSDEC's Rotating Intensive Basin Studies (RIBS) program can also be very useful to the Oswego River AOC benthos assessment. RIBS is a statewide monitoring, evaluation, and reporting program that is currently conducted and repeated every five years on a selected drainage basin. In order to address the number and variety of monitoring objectives, the RIBS Sampling Program is actually composed of three separate monitoring networks. Each of these statewide networks operates concurrently, yet somewhat independently, to provide data and contribute to the overall RIBS assessment.

- The **Routine Network** provides continuous sampling (4-6 samples annually) of water column chemistry at 19 selected sites across the state in order to monitor basic stream characteristics and determine long-term trends in water quality.
- The **Intensive Network** employs more frequent water column sampling along with multimedia (macroinvertebrates, fish, toxicity testing, bottom sediment chemistry) sampling to provide more detailed assessments of water quality in selected basins.
- The **Biological Screening Network** employs "on-site" macroinvertebrates sampling to provide a qualitative assessment of water quality at a larger number of sampling sites with minimal analytic expense.

The Seneca-Oneida-Oswego (Three Rivers) drainage basin now has eleven total sites that are monitored under the RIBS program. The closest to the Area of Concern is the Minetto site which is five miles upstream from the AOC. Minetto is a sampling site for each network and over a five year sampling cycle receives routine, intensive, and biological screening monitoring. The watershed covers an area of over 5,100 square miles. There are nine major lakes located in the basin: Canandaigua, Keuka, Seneca, Cayuga, Owasco, Skaneateles, and Otisco (all seven in the Finger Lakes group), and Onondaga and Oneida.

Because there is no RIBS sampling site directly in the AOC, the upstream Minetto site is used to represent and document the Oswego River's discharge flow into the AOC and Lake Ontario. The community surrounding this site is rural residential. This segment of the stream is deep and wide having a muddy bottom and shore line. Boat traffic is heavy here because of the close proximity to the lock used for navigation. This location is also a Lake Ontario enhanced monitoring site where additional water column sampling has been performed for PCBs, PAHs, and organochlorine pesticides to support the former Lake Ontario Toxics Management Plan which is now embodied in the Lake Ontario Lakewide Management Plan (LaMP). The most recent sampling of the Minetto site was during 1995-1996 and is reported on in the April 1999 RIBS "Three Rivers" drainage basin report. This area received repeat RIBS biological and intensive monitoring over the years 2002-

2003. The RIBS sampling includes a wide range of studies addressing: 1) conventional and toxic water column parameters, 2) macroinvertebrate community and tissue assessment, and toxicity testing, and 3) some bottom sediment and fish tissue analyses. Sampling data is provided in the RIBS reports referenced in Appendix H, item #48. To complete a five year sampling cycle assessment report, data is combined from the three network samplings described above.

Since the first RIBS sampling in 1987, enhancements to the five year monitoring cycle have been implemented to focus on priorities and use resources most effectively in a given drainage basin. The biological screening network has been expanded to provide qualitative macroinvertebrate assessment at more sites. The intensive network uses a more focused set of parameters, applies a more rigorous quality control sampling program, and performs benthic community assessment and tissue analysis. Both networks have an expanded use of ambient toxicity testing. Finally sediment toxicity testing and fish tissue are included where it is needed and can be coordinated. The set of permanent routine sampling sites has been further refined to improve the statewide coverage.

Resolution - The results of the 1997 Oswego River Sediment Study and RIBS studies data provide the data needed to establish that the benthic community in the AOC is not impacted and is representative of a healthy reference community. The benthic community is documented as having an integrity substantially similar to unimpacted reference communities. The beneficial use is therefore not impaired and is further protected by ongoing agency surveillance and monitoring activities including the RIBS sampling program.

Support Data - The 1997 sediment study was a special study conducted under the RAP (funded by USEPA) to assess sediments in the Area of Concern. The 1997 final report results for this Oswego River Sediment Study indicate no impact to the benthic community in the Area of Concern. The sediment study further defined the benthic communities in the harbor as diverse and well balanced, typifying minimally impacted conditions. The Rotating Intensive Basin Survey (RIBS) macroinvertebrate study results support this conclusion for the Area of Concern.

Details of the 1997 Oswego River Sediment Study establishing that the benthic community in the Oswego River AOC is not impacted are provided below. Sediments sampled in the study were typical of large river sediments, dominated by silt, clay, and sand. Organic material such as mollusk shells, macrophytes, and wood chips were also present in most samples. In **Figure 11**, the Biological Assessment Profile of index values for the Oswego River is shown. Index values include: SPP= species richness; DIV = species diversity; HBI = Hilsenhoff Biotic Index; DOM3 = % contribution of top three species; and, PMA = Percent Model Affinity. The index values are plotted on a normalized scale of sediment quality. Station 1 is the Oswego Harbor; Station 2 is upstream of Canal Lock 6 above the AOC and Varick power dam; Station 3 is near Battle Island downstream from Fulton; Station 4 is at Big Island; Station 5 is at Phoenix; and, Station 6 is in the Seneca River downstream of the Onondaga Outlet. Test results follow:

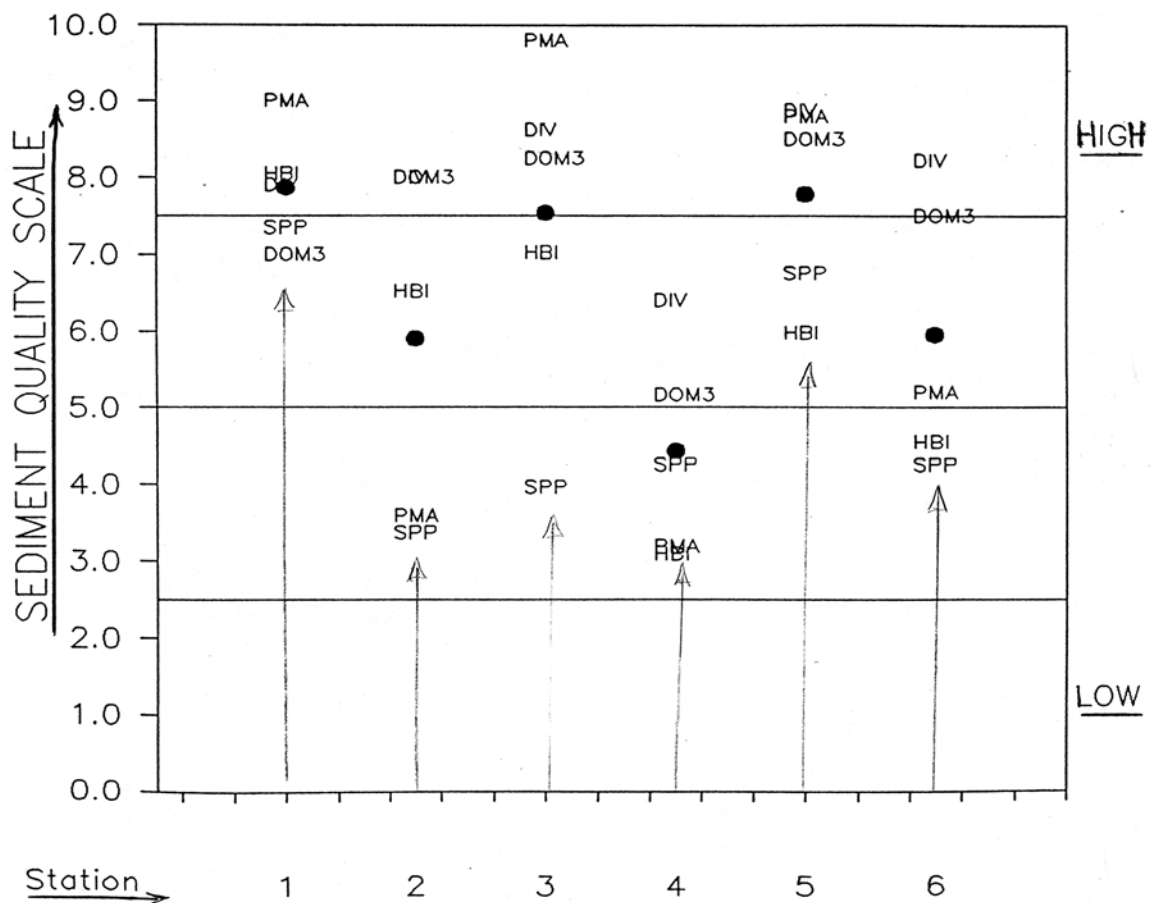


Figure 11 - Biological Assessment Profile of Index Values for Oswego River
 SPP= species richness; DIV= species diversity; HBI = Hilsenhoff Biotic Index
 DOM3= %contribution of top three species; PMA= Percent Model Affinity
 Values are plotted on a normalized scale of sediment quality

Macroinvertebrates (the Benthic Community) at Stations 1 (Area of Concern), 3 (Battle Island), and 5 (Phoenix) were diverse and well balanced, typifying minimally impacted conditions. These samples contained representatives of many groups, and the communities were generally diverse and well balanced. The other upstream sites had some impacts.

Zebra Mussels (*Dreissena polymorpha*) entered the Great Lakes in 1986, and most likely entered the Oswego River in 1991. These prolific mollusks require hard substrate for attachment. In the sediment study, Zebra Mussels were found at two of the sampling sites (Oswego Harbor and at Phoenix) where clam shells were also present for attachment. At this time, the observed low number of individuals at these sites was considered to have little impact on the benthic community or water quality assessments.

Toxicity Testing was conducted with *Daphnia magna* (water flea) or *Pimephales promelas* (fathead minnow). Ten-day solid phase acute elutriate toxicity testing results indicate the only statistically significant difference in survival and growth between the Oswego River and control sediment exposures was reduced *Chironomus tentans* (midge) growth in surficial sediment samples collected at Lock 6 (station #2) and Battle Island (station #3). The Area of Concern (station #1) was found to have no impact.

Microtox sediment assay tests were performed to assess relative toxicity among locations. The pore water and sediment were tested for all stations. All sediment samples elicited a response in the Large Sample Procedure at the detection limit. No relationship between relative toxicity and concentration of contaminants in sediments could be established. Some PAH toxicity was noted upstream of the AOC. Pore water elicited a low toxicity only at the Battle Island sample station, but with unacceptable confidence levels. Sediment core results for PAHs are shown later in Figure 15 and discussed under the Restrictions on Dredging Activities use impairment indicator # 10. Along with results from sediment analyses for PCBs, metals, dioxin/furan, Mirex, and OCR the assessment concludes that there are no active sources and that upstream sediments are not significant.

In the 1999 RIBS report, addressing the permanent Minetto sampling site, the water quality in the Oswego River going to the AOC and Lake Ontario was rated as fair. Overall, the RIBS data supports no impact in the AOC. Details of this upstream data follow: a slight impact to macroinvertebrates was indicated by using the multi-plate artificial substrate sampler. Zebra mussels were found at Minetto, and water clarity had increased greatly from previous years. No organic compounds or metals were measured in the mollusks that exceed tissue assessment criteria. PAHs which have no criteria were however detected in the tissue and at low levels in the sediment.

Also detected in the bottom sediments at Minetto, were manganese, lead, and DDD. In the 1992 RIBS report, the fauna were identified as dominated by midges, scuds, and filter-feeding caddisflies, indicating sufficient levels of suspended plankton at that time at Minetto. The 1992 RIBS study results involving macroinvertebrate tissue analysis found some detection of chromium (not exceeding background level). Metals testing included aluminum, mercury, zinc, iron, manganese, cadmium, copper, lead, and nickel. DDE and PCBs were detected in caddisflies but none exceeding tissue assessment criteria. Water column analysis results were mostly non-detects with no assessment criteria exceedences. The 1990 study found only iron present at background levels. Toxicity testing results at this time indicated no significant mortality or reproductive impairment.

The documentation (of no impact to the AOC) provided in these two RIBS drainage basin reports is further supported by several other RIBS produced trend reports. The 20 Year Trends in Water Quality document, based on macroinvertebrate data (1972-1992; Appendix H.45), describes improving environment trends based on repeat water quality sampling. The slight impact on macroinvertebrate at Minetto includes notes of a high standing crop, species richness, and species diversity. The 1995 Trends in Water Quality document (Appendix H.44), based on long-term RIBS routine monitoring network data, corroborates the RIBS data and water quality improvements described in discussion of the eutrophication and algae use impairment indicator in #4 above.

Rationale - Because an unimpacted benthic community endpoint as defined by the Remedial Advisory Committee and supported by the delisting criteria has been documented and achieved, the status of the use impairment indicator is resolved by the revised designation of “not impaired”. The monitoring and surveillance programs conducted by NYSDEC’s RIBS program provide sufficient protection of the beneficial use. In addition, the State Pollution Discharge and Elimination System (SPDES) has accomplished significant control of combined sewer overflows and other point source discharges. Discharger sampling and reporting requirements under the federal and state Permits Compliance System (PCS), along with annual field inspections and monitoring, provide additional restoration and protection mechanisms for New York State’s receiving waters including the Oswego River and the AOC.

Although certain pollutants of concern are not detected in sufficient quantities to warrant remedial action in the Area of Concern itself, the strategy to address these pollutants (and the opportunity for public involvement) exists as part of ongoing environmental programs and new initiatives to address watershed restoration and protection. See Appendix K for public outreach activities having involved the RAP and Appendix N for the initiative entitled Watershed Restoration and Protection Action Strategies (WRAPS). The purpose of a WRAP Strategy is to develop and/or compile and document a strategy for the entire watershed that brings together all appropriate agencies and stakeholders to focus support in the form of grant dollars, technical assistance and other resources to address the priority water and natural resource needs in that watershed.

New guidance values are being applied to identify upstream potential sources that are subject to current environmental protection laws and regulations. For example, bioaccumulation guidance values for characterizing PCB concentrations in sediments for human and wildlife protection are shown in Figure 16 under the dredging restriction use indicator #10. By applying these guidance values, remedial actions and trackdown activities in the watershed can be further identified, developed, pursued, and implemented to address threats from upstream sources.

6. Fish Tumors or Other Deformities

No definitive statement about any fish tumor/ deformity impairment could be made in the early Oswego RAP stage documents. A recommended study was designed, funded, and conducted involving fish samples from the AOC in 1993 and 1994. A final report of the Oswego River Fish Pathology Study was completed by Dr. Jan Spitsbergen, Cornell University, for the Oswego Harbor AOC using samples over this two year period. The results indicate no significant occurrence of tumors and little evidence for impairment of fish health by anthropogenic contaminants in the AOC. In this study, some difficulty was encountered in finding resident fish, which underscores the close link of fish in the harbor area to Lake Ontario. The original status of the “unknown” use impairment indicator has been revised to a status of “not impaired” based on the study results and consultation with the Remedial Advisory Committee. Although suggested as a potential next study (and requiring resources not available or warranted at this time), further research targeted at studying fish reproductive health and deformity has been deemed unnecessary to resolve this use impairment indicator. Reference to the discussion and observations made under the “Bird and Animal Deformity/Reproductive Problems” use impairment indicator #7 is made in support of this conclusion. As identified by the Remedial Advisory Committee, the desired endpoint of no abnormal incidence of tumors or deformities in the Area of Concern has been achieved.

Resolution - Based on the fish pathology study completed in 1994, no significant occurrence of tumors and little evidence for impairment of fish health was observed in the Oswego River Area of Concern. The beneficial use is therefore considered unimpacted and the use impairment indicator status “not impaired”.

Support Data - Dr. Jan Spitsbergen conducted a fish pathology study in 1993 and 1994 in the Oswego Harbor Area of Concern (AOC). During that time, Dr. Spitsbergen investigated the health of a number of fish from the AOC and from control sites. Her techniques consisted of necropsy and microscopic evaluation (histopathology) of tissues of collected fish. Although the study focused on three target species of fish (brown bullhead, white sucker, and rockbass), a number of other species of fish were also examined. As Dr. Spitsbergen stated, one would ideally want to focus on species of fish that have a relatively small home range, are relatively easy to collect and are relatively sensitive to environmental contaminants. Ideally such a species would be a resident solely of the AOC for its entire life. Unfortunately, such a species of fish was not observed for the tumor study of the Oswego River AOC. The alternative was that Dr. Spitsbergen did the best that could be done in examining a reasonable number (40+ per species) of the three target species. Data from these fish were compared to fish collected from a number of other locations designated as control/ non-impacted areas. Given the realities of the environment at hand, this was certainly a logical approach. The brown bullhead and white sucker have been identified and recommended in other lake tumor studies as good study candidates due to their feeding characteristics (bottom) and environmental sensitivity.

The results of the Spitsbergen investigations indicated that a variety of tumors and other pathological conditions were found in fish from both the AOC and from the control/ non-impacted areas. However, statistical evaluation of tumor-prevalence did not indicate a significant difference in the prevalence of tumors between the fish from the AOC and the control/ non-impacted areas. In some cases, tumor prevalence was actually higher in fish from the control / non-impacted areas. This finding may appear surprising, but it is certainly consistent with past investigations conducted at Cornell by Dr. Spitsbergen and by her predecessor, Dr. Marilyn Wolfe.

Dr. Paul Bowser, also from Cornell University, was actively involved in some of these fish tumor investigations. Dr. Bower reviewed the Spitsbergen study and results for a presentation at the 1998 Oswego River RAP Workshop. He commented that the findings of the Oswego Harbor Fish Pathology Study bring to light some of the problems associated with using fish tumors as an indication of pollution of the aquatic environment. This is not to say that toxic compounds cannot cause tumors in fish. They certainly can. The literature has many laboratory-based studies in which tumors are caused in fish following exposure to a toxic compound. On the other hand, there are few studies where a definitive experiment was conducted proving that a raw contaminant in the environment caused a specific fish tumor. One that comes to mind is the study where Dr. Jack Black of Roswell Park “painted” river bottom sediments on bullheads. One must essentially complete a controlled exposure experiment where the specific candidate toxicant (or mixture) from the environment is used to cause the specific tumor on the fish following a controlled exposure. This is not a trivial matter. But it was done by Dr. Black. One must also keep in mind that a number of other factors can also cause, or be involved in, the development of tumors.

As is stated in the report, such factors as diet, genetics, age, and viruses have been implicated in the development of tumors. The presence of naturally occurring nitrosamines, radon, nickel, chromium and arsenic have also been hypothesized as potential contributors to the development of tumors on fish. In the natural environment, where these factors cannot be controlled (as in the laboratory), one has to be extremely careful not to jump to a conclusion regarding the cause(s) of a tumor. These latter factors (and maybe some others) may be responsible for the presence of the tumors on the fish from the control/non-impacted sites. Dr. Bower agreed with Dr. Spitsbergen's conclusions that, on the basis of the data she collected, there was no statistically significant basis upon which to conclude that the presence of tumors on fish from the AOC was caused by environmental pollution. Given the “real world” limitations of the Oswego Harbor environment and the lack of an “ideal candidate fish species”, it is not certain that more would be gained by continuing to look at tumor prevalence as an indicator of general fish health and the impact of the present contaminants. Even though a potential avenue of investigation might be studying the impact of the contaminants on the reproductive capabilities of the target species, this is not recommended at this time. In conducting further studies, one must keep in mind that there is not an ideal candidate fish species present in the Oswego AOC on which to base a study.

Rationale - Because no fish tumor impairment was found in the Oswego River Fish Pathology Study, the use impairment indicator is considered not impaired and therefore resolved. Routine monitoring and surveillance activities for the Great Lakes Program provide adequate protection to assure the beneficial use is maintained. This is consistent with the delisting principles and guidance.

7. Bird and Animal Deformities or Reproductive Problems

The “unknown” status of this use impairment was based on no definitive studies reported. The presence of PCBs in fish flesh associated with the Lake Ontario fish consumption advisory was the possible cause and connection to other use impairment indicators. Since the early stages of the RAP, we now have study results and program initiatives in place that resolve the other indicators and address this “unknown” concern for bird and animal deformities or reproductive problems. The Marsh Monitoring Program supports the not impaired conclusion for the Oswego AOC. In addition, trend data from reporting on the status of use impairments for the Lake Ontario LaMP indicate significant improvement in several environmental indicators. For example the reported number of eagle nests and the number of eaglets per nest for the Lake Ontario watershed have increased. See Figure 5 under the Fish and Wildlife Populations indicator showing increase eagle nesting.

The oversight and protection provided by NYSDEC’s ongoing regulatory environmental programs involving monitoring, inspection, and enforcement activities for the media of air, water, hazardous waste, spills, remediation, and multimedia pollution prevention also serve to address this indicator. The desired endpoint, as identified by the Remedial Advisory Committee, is no abnormal high incidence of deformities or reproductive problems. All evidence indicates the endpoint has been achieved and is maintained and protected.

Resolution - The delisting criteria have been satisfactorily addressed by study results and information available through marsh monitoring and ongoing program initiatives. Environmental trend data associated with the larger Lake Ontario LaMP watershed supports this conclusion. The indicator status is therefore “not impaired”.

Support Data - The Canadian Marsh Monitoring Program (MMP) was initiated in 1994 by Long Point Bird Observatory (now Bird Studies Canada) and Environment Canada in response to a recognized need for information on the status and trends of marsh breeding amphibian and bird populations, particularly in some highly impacted Great Lakes coastal wetlands (Areas of Concern). The Marsh Monitoring Program (MMP) is a binational, long-term monitoring program that coordinates the skills, interests and stewardship of hundreds of citizens across the Great Lakes basin to help understand, monitor and conserve the region’s wetlands and their amphibian and bird inhabitants. Since its initiated in 1994, the MMP has been developed and expanded through the

additional support of the U.S. Environmental Protection Agency and the Great Lakes Protection Fund. The MMP depends on the commitment of individuals, foundations, governments, and non-governmental organizations that together form a strong partnership working towards effective conservation of wetlands and their inhabitants.

The Marsh Monitoring Program is a volunteer-based program focused on surveying birds and calling frogs and toads in coastal and inland marsh habitats in the Great Lakes basin. From 1995 through 1997, ten MMP participants have surveyed a total of nine routes associated with the Oswego River Area of Concern. Seven of these routes have been surveyed for both amphibians and marsh birds and two routes for birds only. Considered as a whole, species richness values of amphibians and marsh birds were high in surveyed marshes of the Oswego River AOC relative to those observed outside the AOC. A number of individual routes, however, were lower in species diversity than routes external to the AOC. Abundance indices of marsh birds and amphibians in the Oswego River AOC tended to be similar to the average values for MMP routes outside the AOC. Analyses of the Oswego River AOC based on this first set of monitoring data from current MMP routes provide useful measures of Area of Concern recovery.

The information gained through the MMP fills a need for baseline data on habitat associations and populations trends of Great Lakes marsh birds and amphibian species. Based on input from experts in marsh birds and amphibian ecology, a set of species were selected as indicators (i.e., surrogate measures) of marsh function and habitat provision. Species were selected as indicators based on their population being sufficiently common, their breeding dependent on a diverse marsh vegetation, their need for relatively undisturbed habitat conditions, knowledge concerning population declines, and amphibians having both early and late season callers. Volunteers were trained and diversity measures of species were recorded over several years. As part of the MMP assessment of AOC marshes, a ranking system was developed to compare amphibian and marsh bird occurrence in surveyed marshes within each AOC relative to that recorded in other marshes in the same lake basin referred to as non-AOC marshes. Expected values were developed for comparison to the AOC with results indicating either healthy (above), not impaired (similar), or impaired (below expected).

The Oswego River AOC marsh bird and amphibian habitat survey scored above the average of the non-AOC marshes in the same lake basin in terms of the number of species present. This healthy assessment for habitat under this Bird and Animal Deformities or Reproductive Problems indicator #7 provides further support for the not impaired status for both the Fish and Wildlife Populations and Habitat Indicators #2 and #3 above. Efforts should be made to continue to maintain and rehabilitate Great Lakes marsh habitat, monitor populations, and improve migration routes.

Additional multi-year monitoring surveys of marsh bird and amphibian populations and habitat are recommended to continue proper assessment and to document that AOC health conditions are intact. **Figure 12** below lists the marsh bird and amphibian indicator species composing the assessed high quality marsh habitat that exists for the Oswego River AOC and provides summary results of the 1995-1996 surveys. Further Marsh Monitoring Program methods and results are delineated in Appendix M.

Indicator Species

The presence of the following suite of marsh bird and amphibian species indicates high quality marsh habitat.

“✓” “indicates species in the Oswego River AOC marshes.”

Birds

- ✓ Pied-billed Grebe
- ✓ American Bittern
- ✓ Least Bittern
- ✓ Blue-winged Teal
- Black Tern
- American Coot
- ✓ Common Moorhen
- ✓ C. Moorhen/A. Coot
- ✓ Virginia Rail
- ✓ Sora
- Common Snipe
- ✓ Marsh Wren

Amphibians

- ✓ Bullfrog
- ✓ Leopard Frog
- ✓ Chorus Frog
- Mink Frog
- ✓ Spring Peeper

Highlights of the MMP's Oswego River Results

- In 1995, one route was monitored for marsh birds only in the Oswego River AOC. In 1996, 7 routes were monitored for marsh birds and 5 routes were monitored for amphibians. In total, 7 marsh bird routes and 5 amphibian routes have been established in the Oswego River AOC.
- Overall, 8 amphibian species were present in the AOC — a high level of diversity. Gray treefrog, green frog and spring peeper were present in high densities (CLC-3 *). American toad and bullfrog were present in moderate densities (CLC-2 *). Chorus frog, northern leopard frog and wood frog were present in low densities (CLC-1*).
- Four amphibian indicator species were present in the AOC. Bullfrog abundance scored above average. Northern leopard frog and spring peeper abundance scored as average; only chorus frog abundance was lower than expected.
- Overall, 20 species of marsh nesters were recorded in the Oswego River AOC — again a high level of diversity. Densities of many marsh nesting species were greater than the Great Lakes basin non-AOC averages.
- In total, 9 marsh bird indicator species were recorded in the Oswego River AOC. Only Common Moorhen/American Coot was below average in abundance; the abundances of the other species scored as average.
- Most marshes in the Oswego River AOC watershed were deficient in terms of marsh bird and amphibian diversity. Overall, however, the marsh habitat in the Oswego River AOC appears to have healthy marsh bird and amphibian communities.

* Call Level Codes (CLC):

1 = Individuals can be counted; calls not simultaneous

2 = Calls distinguishable, some simultaneous calls

3 = Full chorus; calls continuous and overlapping



Figure 12 - Marsh Bird and Amphibian Indicator Species & Results - Oswego AOC

In a presentation given at the State of the Lakes Ecosystem Conference (SOLEC), New York State DEC Lake Ontario LaMP staff provided indicator monitoring results that document evidence of a number of improvements in the watershed environment. Among these is an increase in the number of Herring Gull nests, a decrease in the sea lamprey wounding rate for Lake Trout, an increase in the observation of the presence of Mink and Otter, an increase in the number of nesting territories for bald eagles, and an increase in the number of bald eagle eaglets produced per nest. Current New York State DEC field observations note that the bald eagle shoreline nest east of Oswego has produced two eaglets, which is great news since one eaglet per nest is typically considered good. A nest is also observed in Irondequoit Bay near Rochester, New York.

Rationale - No evidence of bird or animal deformities or reproductive problems exist to suggest a use impairment. Supporting data provides the evidence to indicate that the best use is not impaired and that sufficient monitoring and surveillance exists to provide protection against an impairment.

8. Degradation of Aesthetics

There was a low confidence of any aesthetics use impairment in the early stages of the RAP. Any concern would involve the observance of periodic excessive algae in certain upstream shoreline and calm river areas. Although turbidity occurs occasionally during high flow, it is not excessive, and is largely of natural origin and is not an aesthetic problem. It is noted that the turbidity associated with the Oswego River is much less than in other rivers of similar character (e.g. Genesee River). The 1994 Oswego Harbor Survey identified no aesthetics impairment in the Area of Concern. The desired endpoint, as identified by the Remedial Advisory Committee, is the absence or minimal presence of floatables and odors, and includes weed control to non-nuisance levels.

During RAP implementation, concern developed about the general spread of nuisance and invasive species including weeds, fish, and mussels. These exotic species have a life cycle and impact on the waters in the AOC that is both beneficial and detrimental. For example, the zebra mussel improves water clarity, but can decrease dissolved oxygen content for fish and increase sunlight penetration for weed and algae growth. Invasive aquatic weeds and plants (e.g. water chestnut) can be extremely prolific to the detriment of recreation and habitat. Excessive aquatic plants in the Oswego harbor (at Wright's Landing) are controlled by harvesting. One important method to limit the introduction of exotic species is through Great Lakes program activities addressing ship ballast water.

Under NYSDEC's Priority Waterbody List (PWL) the lower Oswego River historically is classified as stressed for aesthetics. The main cause and source is identified as the City of Oswego combined sewer overflows (CSOs). Projects to address both CSO and turbidity sources have been and continue to be implemented. For additional detail, refer to the remedial activity updates for point and nonpoint source management controls in Appendix K under sections 3 and 4. The 1995 PWL classification of "stressed" is under management by the NYSDEC Regional Office. The City of

Oswego has been required to take corrective action. Because of implementation progress in mitigating CSOs, a change to the less severe classification of “threatened” is under consideration and recommended in the current updating.

The delisting of the Area of Concern, however, is not dependent on a PWL class change. Under both the PWL and the RAP use assessments, the water uses of the lower Oswego River and harbor are not classified as “impaired” or “precluded” (the more severe classifications under PWL). The current “lower level” PWL classification for the AOC is consistent with the RAP “not impaired” assessment. This in turn is consistent with a continuation of NYSDEC, Oswego County, and the City of Oswego’s responsibility in maintaining the best uses by taking actions to control the nuisance conditions associated with aesthetics. The beneficial uses are therefore able to be enjoyed even though there has been some impact in the shallow harbor area which has caused the aesthetics to be stressed. The CSO correction actions involve five major phases of planned actions. The first three major phases have been completed. Significant improvements are evident and additional work is proceeding under the revised SPDES point source discharge permit requirements.

Resolution - The delisting criteria and desired endpoint for this aesthetics indicator have been achieved for the Area of Concern. The original status of the indicator as “may not exist” has been confirmed as “not impaired”.

Support Data - Since the development of the early stages of the RAP, many remedial activities have been accomplished by NYSDEC and others that have had a positive impact on the Oswego River and the Area of Concern. The 1996 Clean Water/Air Environmental Bond Act has providing funding for a number of environmental projects in the watershed. These include wastewater treatment plant upgrades, combined sewer overflow improvements, aquatic habitat projects, Brownfields development, landfill closures, recycling initiatives, air quality projects, Open Space Preservation, and nonpoint source projects. The Onondaga Lake cleanup projects are moving forward. New initiatives in pollution prevention (re: mercury) and on-going core environmental protection programs are underway to address the control, cleanup, and use of hazardous substances. Monitoring and inspection activities in the water, air, and hazardous/solid waste programs continue to provide a significant level of protection to the local environment. Conducting a bio-diversity study for the Oswego River corridor is under review for funding. In September 2002, the City of Oswego, was awarded grant money from the Environmental Protection Fund to continue the development of the Oswego River west side riverbank and establish itself as a major harbor center.

Upstream in the Oswego River drainage basin, the Seneca River is the major river that does exhibit eutrophic conditions in certain areas; however, it is generally in good shape. Contributing to this condition is the presence of excessive nutrients, aquatic weed growth, and low dissolved oxygen. This upstream area also has zebra mussels and fish consumption advisories. Much progress has been made in the last ten years including activities involving Oneida Lake and Onondaga Lake. Management of these lakes involves balancing the demands of land and water use issues. In both cases fact finding is recommended as a key initial step. The “Comprehensive Watershed Approach”

involves the following categories of activities: first, establish a management team consisting of the water users; then, collect data; assess the data and target activities to include in an action plan; develop strategies to implement the action plan; conduct the activities; evaluate results and make adjustments to continue implementation. NYSDEC's Watershed Restoration and Protection Strategies (WRAPS - see Appendix N) embraces these activities.

Results of the Oswego Harbor Survey in 1994, which are presented in use impairment indicator #4 above as part of the supporting data to resolve the Eutrophication and Undesirable Algae, also provide useful information supporting a not impaired status for aesthetics in the AOC. For example, dissolved oxygen is not a problem in the AOC. Although nutrient levels may be considered high, inputs have been curtailed. Aquatic weed and algae growth have been assessed as not impaired based on an improved understanding of what characterizes a healthy environment. We know there is a balance between the macrophytes and algae and that the reduction of excess nutrients and prevention of toxic inputs to the system are fundamental to accomplishing restoration and protection of the best uses of the water resources. Actions have been taken to address these concerns as well as document achieving the primary endpoints of an absence or minimal presence of floatables and odors, and for weed control to non-nuisance levels through mechanical harvesting. Observations of the water quality and intact multi-purpose uses in the AOC corroborate the not impaired status. Further, the influence of Lake Ontario and the "flow-through" characteristics of the Oswego River AOC provide for maintaining good water quality now and into the future.

The Oswego County Planning Board acted to further improve and protect the best uses of the Oswego River. Their recommendations were provided in the 1992 Oswego River Scenic Assessment report. A study to increase the appreciation of the Oswego River corridor from Phoenix to Oswego was conducted to improve and provide visual and physical access to the river. The study lasted over one year to include consideration for seasonal changes. The study methodology was extensive and included mapping, photos, video, land use assessment and inventory, river access, river transportation use, planning, public information sessions, public officials involvement, reporting, and recommendations.

This Oswego River Scenic Assessment study identified landscapes with similar physical features (character areas). Techniques for maintaining scenic quality were discussed (e.g. development practices, land use planning, and vegetation management). Recommendations address modifications to the Riverside Park and improvements to the Varick Overlook. Enhancements to the Minetto Park and Boat Launch, Apple Landing, South End Lock Island Park, and Canal Lock facilities are described. Creation of a Riverway Trail as part of a proposed recreationway is also noted. Additional proposed new or improved public access areas include: Granby Community Park, Scriba/Volney Community Park, Black Creek Fishing Access, and Battle Island State Park. Ten viewsheds and bridge view locations are identified. The role of local communities in planning and developing strategies for implementation are included in the report with a list of responsible agencies for project sites.

Figure 13, on the next page, depicts the various components of the Oswego River Scenic Assessment Action Plan and illustrates the comprehensive planning and public involvement.

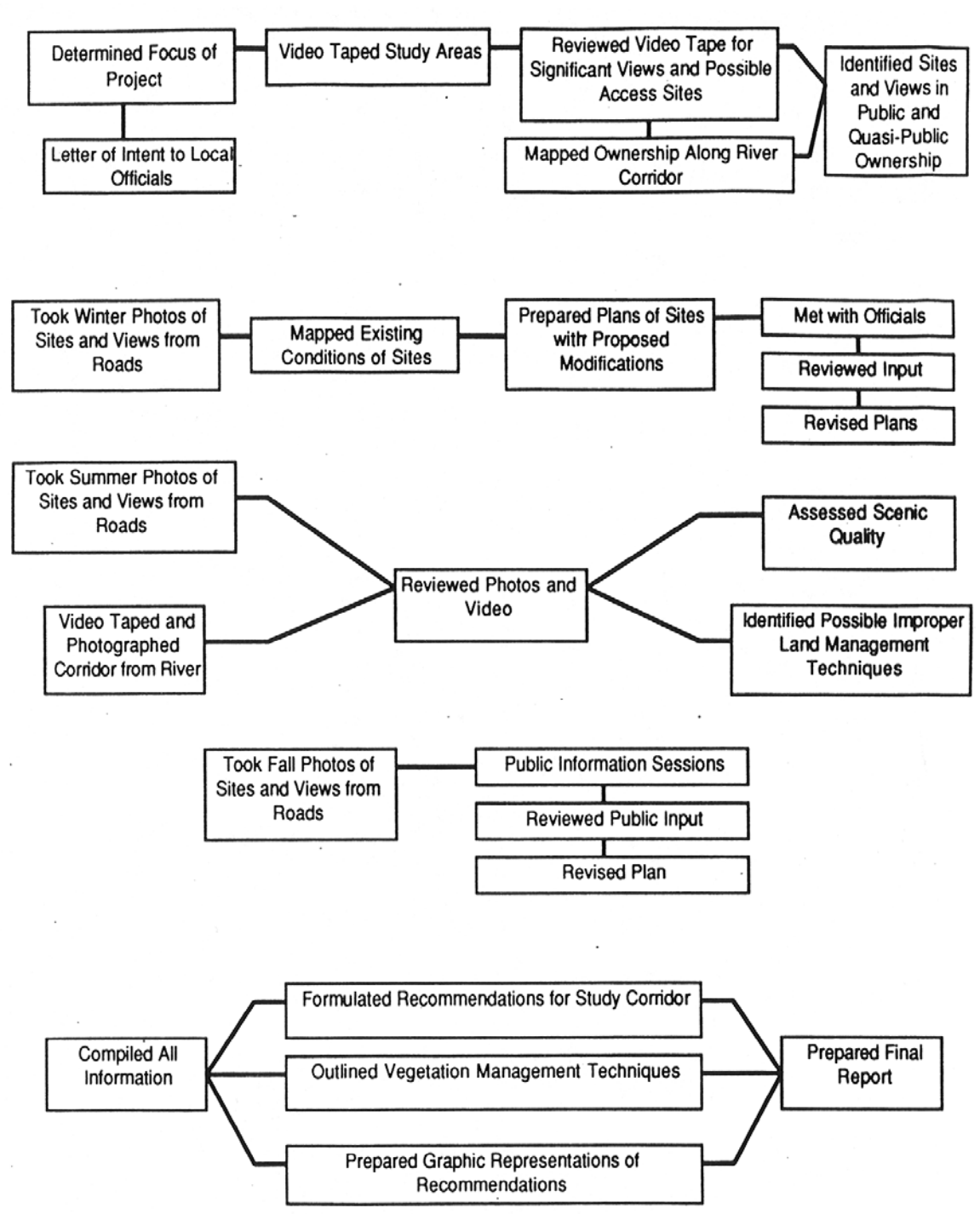


Figure 13 - Oswego River Scenic Assessment Action Plan

Rationale - Because no significant aesthetics problem has been identified in the Oswego AOC and water quality survey data support the not impaired status for the indicator, concern for aesthetics as a use impairment is considered resolved. Routine monitoring and surveillance activities in all environmental quality program areas benefit the Great Lakes Program in providing an ample level of protection to assure the beneficial use is maintained. The Oswego County Soil and Water Conservation District (OCSWCD), the Oswego County Water Quality Coordinating Committee (OCWQCC), and NYSDEC provide protection oversight and activity implementation.

9. Degradation of Zooplankton and Phytoplankton

The early stages of the RAP had no plankton data in the Area of Concern on which to base a status determination. The “unknown” status of this use impairment was due to this lack of data. Earlier, in a 1987 report, Dr. Makarewicz of SUNY Brockport noted that the phytoplankton assemblages observed in the Oswego Harbor and river in 1981 were represented by many species widely associated with eutrophic environments. These assemblages had higher nutrient and chloride ion concentrations than that found in the nearshore areas of Lake Ontario. Since then, watershed remedial measures have been implemented and major industrial operations have ceased. Also, major construction on the City of Oswego’s sewer system, including interceptors and combined sewer overflow corrections have been accomplished. Upstream nutrient sources have also been reduced by similar actions as well as nonpoint source reduction measures. Further, the open-air salt storage operation in the harbor area was discontinued, and chloride output from upstream Onondaga Lake dropped markedly when Allied Chemical’s discharge ceased. Other remedial measures in the watershed have improved conditions for healthy plankton populations in the Oswego River. The desired endpoint, as identified by the Remedial Advisory Committee, is plankton populations substantially similar to reference communities. For the lower river and harbor Area of Concern, more recent observations indicate the plankton are healthy although not diverse or abundant. In other words, riverine waters can possess such characteristics and be healthy without indicating impairment. A not impaired status is concluded herein and further described in the plankton resolution, supporting data, and rationale statements below.

In keeping with the definitions of ecosystem health and biological integrity, we understand the beneficial use of plankton communities to be the conversion of solar energy to chemical energy (biomass), the incorporation of nutrients into biomass and the conveyance of these materials to normal, diverse fish and wildlife communities and ultimately to human populations by a plankton community that is balanced and adaptive to change. Impairment of the beneficial use is defined as a decrease in the ability of these communities to perform these functions as a result of stresses within the ecosystem caused by anthropogenic activities. Anthropogenic stresses on plankton populations can result (and range) from the addition of nutrients and toxicants to aquatic environments, fish harvesting and stocking practices, introduction of exotic species, and habitat alterations which could include changes in ultraviolet light conditions and increased temperature associated with climate change (Johannsson 1998). The Oswego River Area of Concern has experienced these stresses to varying degrees.

As described in the Eutrophication and Algae use impairment indicator #4, practically all of our northeastern lakes support a diversity of large aquatic plants attached to the bottom (benthic macrophytes) which are an important factor in maintaining potable, recreational, and aesthetic characteristics, as well as the ecological functioning of most waters. These plants compete directly with algae in the water column (phytoplankton) for nutrients, thereby maintaining water clarity. They (the plants) protect shorelines from erosion and stabilize deeper substrates and thereby limit turbidity from silts and clays in physical disturbances. By preventing the resuspension of sediments which have nutrients attached to them, algal growth is limited. Aquatic macrophytes provide food and cover and /or supplement oxygen supplies for all of the organisms (fish, mammals, amphibians, reptiles, and invertebrates) that make up shallow water (littoral) aquatic communities. They are the basis of aquatic food webs in these areas, providing indispensable links between the sun's energy and animals that eat plants which are, in turn, eaten by predators. In these ways, plants regulate the size and character of game fish and waterfowl populations as well as impact other biotic resources we cherish.

Recreational and other stakeholder users of the waters are concerned about aquatic weed growth, but must recognize the benefits derived from rooted plants. By taking steps to eliminate the rooted plants, planktonic algal populations will flourish (bloom) and vice-versa. The algal or plant growth can become abundant without reducing nutrient loading, which is usually an expensive, long-term, social, and political undertaking to address. In the Great Lakes drainage basin significant steps have been taken to reduce loadings of pollutants including nutrients to the receiving waters. Lake Ontario and the Oswego River Area of Concern have benefitted from the implementation of the Clean Water Act and the Great Lakes Water Quality Agreement. Contamination sources have been greatly reduced and in many cases eliminated.

According to the International Joint Commission's (IJC) Listing and Delisting Criteria for the fourteen use impairment indicators for Great Lakes Areas of Concern, plankton are impaired when the phytoplankton or zooplankton community structure significantly diverges from unimpacted control sites of comparable physical and chemical characteristics. In addition, plankton will be considered impaired when relevant field validated plankton bioassays (with appropriate quality assurance/quality controls) confirm toxicity in ambient waters. In the absence of community structure data, the beneficial use is considered restored when phytoplankton and zooplankton bioassays confirm no significant toxicity in ambient waters.

Resolution - To answer the question: "Are Plankton Communities in the Oswego River Area of Concern Impaired?", we must weigh any "individual indications of impairment" against an overall assessment of impairment and derive a "determination of significance" based on the observed data and by comparison to the control / reference plankton communities. Although earlier data provide indications of impairment, more recent data and an improved understanding of the planktonic community in the environment suggest otherwise. Toxicity testing associated with the Oswego Harbor Survey did not identify a chronic problem or AOC sources of contamination.

Upstream watershed and Lake Ontario LaMP activities provide responsible program areas to pursue further concern for impacts on the planktonic community. ***In conclusion, the preponderance of the evidence indicates that plankton community of the Oswego River AOC is not significantly impacted nor impaired.***

Together, the status of remedial measures, influences outside of the AOC, and the data support a not impaired status for the plankton indicator in the AOC. Routine monitoring and surveillance activities in all environmental quality program areas benefit the Great Lakes Program by providing an ample level of protection to assure the beneficial use is maintained. The Oswego County Water Quality Coordinating Committee (OCWQCC) and NYSDEC will continue to provide protection oversight. This is consistent with the delisting criteria.

Support Data - In 1981 Oswego River phytoplankton assemblages were observed as influenced by higher nutrients and chloride ion concentrations than in the nearshore areas of Lake Ontario. However with, construction of the City of Oswego's interceptor lines, upgrading of wastewater treatment facilities, correction of combined sewer overflows, decrease in chloride output from Onondaga Lake from industrial shutdown, and ceasing of the practice of open-air salt storage in the Oswego harbor, many of these influences have been greatly decreased and/or eliminated. The 1994 Oswego Harbor Survey report found no use impairment involving eutrophication, algae, beach closings, or degradation of plankton populations. Overall, the data indicates there is a healthy environment in the AOC. One has to consider other information in addition to the water quality survey data to arrive at a conclusion of no plankton impairment in the AOC. The health of the planktonic community is based on a number of factors including the factors affecting the indicator assessments for eutrophication, algae, toxicity, water quality, and upstream watershed and downstream Lake Ontario influences. Results from plankton sampling from the Oswego River harbor, represent a mix of harbor, river, and Lake Ontario waters. River waters are known to have less abundance of plankton populations and nearshore areas of Lake Ontario waters may have stressed plankton populations.

Bioassays were a part of the 1994 Oswego Harbor Survey and according to the IJC delisting criteria are recommended in the absence of community structure data or as follow-up to a known plankton impairment that may have a toxic cause. Results of the bioassays, addressed under the eutrophication and algae use impairment indicator #4 above, indicated no statistically significant reproductive or survival effects when compared to control samples. In the 1994 study, Dr. C. Siegfried, of the New York State Museum, made the observation that the plankton populations in the AOC are highly variable and fluctuate over time and space, making it difficult to draw conclusions from limited sampling. He noted that the phytoplankton community of the harbor area are generally quite different from the open lake. This is especially shown in the June and July samples. The August samples were dominated by a large population of dense *Aphanocapsa*, a blue-green species (know to produce toxins). The zooplankton community in the river was noted as always low, with no rotifers, which can reflect flowing river water conditions which are not usually abundant in plankton. The August populations in the harbor were also low and the blue-green algae presence suggests the possibility of *cyanobacteria* toxins. Since this sampling occurred at a low point in the seasonal dynamics, it was noted as difficult to draw any conclusion from the low populations in the sample results.

The preponderance of evidence indicates that the planktonic community of the lower Oswego River and harbor area are not significantly impacted as a result of conditions in the lower river and harbor. A tributary river environment with Lake Ontario influence, combined with seasonal changes, sample timing, and other local site characteristics involving the growth of macrophytes can be challenging in data assessment and reference site comparison. The limited plankton sample data are noted as inconclusive. Although a diverse and abundant community was not identified, a degraded community is not demonstrated, thereby indicating no overall degradation or impairment in the planktonic populations from pollutant sources in the Oswego River AOC. In any event, a remedy for plankton restoration and protection in the AOC would not be directed at an AOC source, but would be focused on upstream watershed and downstream Lake Ontario causes and effects. The upstream actions by the FERC licensing process creating additional year round “run-of-river” flow in the AOC should also benefit the plankton populations. Associated stresses on the AOC related to Lake Ontario are to be addressed through the Lake Ontario LaMP. Therefore, upstream and downstream actions by responsible environmental watershed (WRAPS) and LaMP programs will provide the solution and forum for any additional remediation or resolution regarding the planktonic community in the AOC. Further action by NYSDEC and the Remedial Advisory Committee under the RAP process has been determined not warranted. There are no known sources of significant impact specific to the plankton in the AOC. Under these circumstances, resolution of the plankton impairment indicator by watershed management activities and the Lake Ontario LaMP is consistent with the federal EPA delisting criteria.

Rationale - In the 1980's study, Phytoplankton species richness in the Oswego River in August was almost three times as high as species richness at Eighteenmile Creek (another AOC on Lake Ontario 100 miles west of Oswego). The more recent data in the 1994 Oswego Harbor Survey did not identify this same richness (as compared to the 1980 study) which is most likely due to noted improvements in water quality in the Oswego River water and the influences of the upstream watershed and Lake Ontario waters on the Area of Concern over twenty years.

Ecologists have grappled with the concepts of biological integrity, ecosystem health, and biodiversity in trying to define the normal condition of ecosystems. The capability of the ecosystem to support and maintain a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitat in the region is most desired. If the system has this integrity, it will be healthy; however, the lack of diversity does not imply impairment. Therefore, using comparable sites having known healthy and unimpacted characteristics are key to such evaluations.

Overall, the status of remedial measures, influences outside AOC, and the data support a not impaired status for the plankton indicator in the AOC. Routine monitoring and surveillance activities in all environmental quality program areas benefit the Great Lakes Program by providing an ample level of protection to assure the beneficial use is maintained.

10. Restriction on Dredging Activities

Periodic navigational maintenance dredging in the Area of Concern has been determined to be not impaired. The early stages of the RAP assessed this dredging restrictions indicator as not impaired with high confidence based on no restrictions on the disposal of dredged materials from the harbor. The presence of contaminants (PCBs, PAHs, mercury, Mirex, dioxin and furan) has been detected in the Oswego River; however overall, sediment quality and toxicity are acceptable and federal and state requirements for dredging and disposal are achieved. The most recent sediment surficial and core sampling results are consistent with this finding. The concentrations identified in the Area of Concern sediments (particularly the navigational channel) are not of a level or threshold where their dredging and disposal involves contamination restrictions.

The most recent harbor area dredging (of the western and outer harbor channel) by the United States Army Corp of Engineers (USACE) for navigational purposes was approved and performed without restrictions on the dredging and disposal in the summer of 1999. An assessment of sediment sampling data supports the not impaired status for the AOC. Investigation of upstream sediments as potential sources was recommended and conducted as part of source trackdown studies. Although no AOC threat was identified from upstream sources, an additional study in the vicinity of upstream Battle Island (near Fulton, NY) to assess the local environmental impact of these sediments has been proposed by SUNY Oswego for a USACE matching grant (see Appendix O). For the AOC the desired endpoint (as identified by the Remedial Advisory Committee) of no USACE dredging restrictions on the harbor dredging has been achieved. This is documented by sediment study results and recent approval / certification for navigational dredging of the harbor channel area.

Resolution - No dredging restrictions exist in the Oswego River Area of Concern. The approved navigation channel dredging, and sediment core analyses data support the status of not impaired for this use impairment indicator.

Support Data - The US Army Corp of Engineers (USACE) dredges the Oswego harbor navigational channel approximately every five years. This permitted navigational dredging activity was most recently conducted in the summer of 1999. Sediment samples have been conducted that assess four tiers: past chemistry and site history, new chemical uses, sediment toxicity and bioaccumulative testing, and special testing. Records summarize results of the physical, chemical, and biological testing in the Oswego harbor. No significant impact is indicated. The disposal of dredge material in Lake Ontario has not been a problem for the Oswego harbor dredging. Bioassay results for water and sediment have produced 10 to 20 percent mortality rates which are not considered significant. The USACE considers the Oswego harbor dredged material to not be problematic and has noted this dredged material as one of the cleanest currently dredged in the Great Lakes. Below, a description of a hypothesis raised by academic study is subsequently addressed by DEC water quality studies. Details of the 1997 and 2002 sediment reports are also presented.

Academic Study and Mass Balance Modeling of Mirex developed a suspended sediment model for the Oswego River which tracks observed suspended solids concentrations in the river. The model however fails to account for the high mirex loads observed in an independent academic study because the observed bottom sediment contamination was not high enough. Based on the study data, these results indicate the inventory of mirex present in the river and in the sediments of its discharge are an influence on Lake Ontario. The data and model prove two (of three) reasonable causative hypotheses false. The remaining conclusion is that there is likely an ongoing external source of mirex to the river that is most likely from an upstream source. The study model concludes that the Oswego River was and may still be a source of mirex to Lake Ontario (reference Appendix H.2 by DePinto). Loading events are likely episodic and related to extreme flow events in the river. Some evidence indicates that high loading occurs via highly contaminated particles. Attempts to locate the exact source of the continued loading have not been successful. In general, during low-flow, low concentration periods, substantial conversion of mirex to photomirex in the environment has been observed and is known to occur.

NYSDEC Water Quality Studies conducted sampling studies of tributaries to Lake Ontario in 1993 and 1994 using passive samplers for dissolved PCBs, PCBs on suspended solids, and whole water mercury. These intensive water column sampling efforts included a sample site in the lower Oswego River at Lock 6 above the AOC known to accumulate upriver sediments. Results indicate that among the multiple sampled areas, PCBs were consistently lowest in the Oswego River. Mirex was occasionally detected in the Oswego but was found in higher concentrations in the Genesee River and Eighteenmile Creek (reference Appendix H.17 by Litten). Mercury concentrations were also low in the Oswego River. In other sampling specifically involving Lake Ontario in 1997, using large volume water sampling with a quantitative sampling system (TOPS), exceedences of the GLI water quality criteria for dioxins, PCBs, dieldrin, DDE, and a-HCH were found. With such results, source trackdown and trend analyses become increasingly important. Trend analyses activities indicate overall improving trends in the Oswego River. Follow-up on contaminated sediment source trackdown investigation has focused on the Battle Island area, eight miles upstream of the Area of Concern, where some sediment contamination has been identified. A sediment core taken near Battle Island in the Oswego River found historically higher mercury levels but recently deposited sediments were much less.

Although contaminants of concern are not detected in sufficient quantities to warrant remedial action in the Area of Concern itself or in upstream sediments, the strategy to address these pollutants (and the opportunity for public involvement) exists as part of ongoing environmental programs and new initiatives to address watershed restoration and protection. See Appendix K, Section 8, for public outreach activities involving the RAP and a transfer of stewardship. Further, Appendix N describes an initiative entitled Watershed Restoration and Protection Action Strategies (WRAPS) to coordinate watershed activities. The purpose of a WRAP strategy is to develop and/or compile and document a strategy for the watershed that brings together all appropriate agencies and stakeholders to focus support in the form of grant dollars, technical assistance, and other resources to address the priority water and natural resource needs in a selected watershed.

As reported in the **Oswego River Sediment Study 1997** (Appendix H.28), sediment cores and surficial sediment samples were taken at six sites on the Oswego and Seneca Rivers. All samples were collected from depositional areas located outside of navigational channels which are normally dredged. Report conclusions addressed a number of parameters. Measurable concentrations of trace metals for cadmium, copper, lead, and mercury were measured in a sediment core collected adjacent to Battle Island (upstream of Fulton, NY). Very few samples collected during the study were found to have pesticide concentrations greater than analytical detection limits. Therefore any presence of DDT and metabolites are considered the result of past application and are not a major or widespread current problem. PCB assessment looked at human health and wildlife bioaccumulation and secondly for wildlife bioaccumulation which are derived using equilibrium partitioning methodology. PCB concentrations were detected in the upper sections of all core samples except the farthest upstream. The largest PCB concentrations were detected near Battle Island (also detected at Battle Island were dioxins, furans, PAHs, and Mirex). Specific results from the 1997 Oswego River Sediment Study indicated the following findings:

Metals had their highest concentrations encountered in the sediment core at Battle Island. Cadmium, copper, lead, and mercury exceeded NYSDEC sediment guidance. Radionuclide dating results indicate that the 28-48 cm. core layer represents pre-1950' s sediments and contaminants deposited during a major depositional event.

Mirex, of relatively high concentrations, was measured in two sediment cores at Battle Island and Canal Lock 6; the highest being at the Battle Island sampling site. Additional core sampling was recommended and subsequently conducted in 2000 with a focus on this Battle Island area. Elevated concentrations of Mirex (1,500 to 2,100 ppb) were found in core samples, as well as DDT (40 to 90 ppb) in various layers of the core samples. These sediments may appear to present a potential source of contamination for downstream waters; however, after further assessment, the mirex is not present in concentration or in amount that meets remediation criteria. Further, water column study has not identified an active source nor has an environmental impact been determined. This localized condition has not met remedial action thresholds. The presence of this upstream contamination does not necessarily prevent delisting. This is consistent with the EPA Delisting Principles and Guidance.

In the 1997 study, mirex was detected in surficial and near surface samples in the Oswego Harbor but below guidance values. **Figure 14** illustrates mirex detection at the six sample locations along the Oswego River from the 1997 study. The presence of contaminated sediments upstream at Battle Island is not causing a use impairment in the AOC. In any event, further upstream investigation and possible remedial work can proceed independent of the RAP. Any accompanying stakeholder concern and public involvement on mirex contamination is more appropriately addressed as a separate individual site remediation project, or local watershed planning/ investigation, or under the larger regional Lake Ontario Lakewide Management Plan (LaMP) process. If a condition of “pass through” of contamination to Lake Ontario can be identified, the LaMP will need to address this source and load. Photo-mirex was not specifically addressed as part of the sediment studies. (Note: Station No. 2 is upstream of the AOC above canal lock 6).

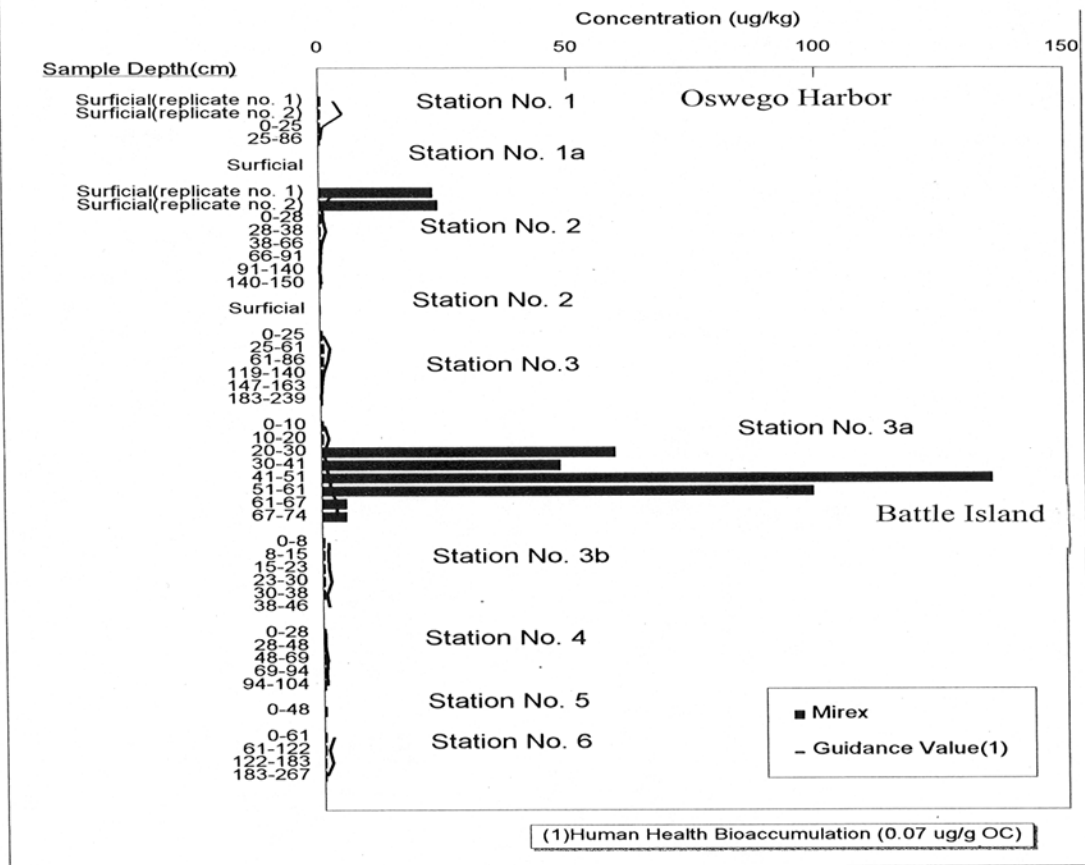


Figure 14 - Oswego River Mirex Results

Octachlorostyrene was not detected in any of the samples performed by the contract lab in the 1997 Oswego River Sediment Study. The NYSDOH laboratory reported similar results (minimum detection limit less than 0.5 ng/g) except for a few samples where only trace amounts of the compound were detected present but less than the reported concentration. Overall, Canadian and US fish tissue monitoring experts do not regard OCS as a significant problem for Lake Ontario and no longer include analyses for OCS as part of routine fish monitoring programs. As a result, concern for OCS as an Oswego River RAP or Lake Ontario LaMP contaminant is considered not significant.

PAHs (Polynuclear Aromatic Hydrocarbons) had their most apparent pattern observed in the major spike in concentration analyzed in the 119 to 140 cm. (middle and below) core section of station #3 (Battle Island). PAH compounds exceeding DOW and DFW guidance include acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene and indeno(1,2,3-cd) pyrene. Upstream samples in the Seneca River at the Onondaga Lake Outlet suggest a history of PAH contamination with PAH presence throughout the core sample. The AOC harbor sediment core sample indicated a slight surface or near-surface presence of PAHs. **Figure 15** illustrates the concentrations for Benzo(a)pyrene at the 6 sampling stations along the Oswego River and is representative of the PAH findings overall.

As addressed under mirex above, the USEPA Delisting Principles and Guidance state that an upstream source of contamination may not prevent delisting the AOC. In the event, the identified sediment contamination in the core samples upstream at Battle Island and in the Seneca River becomes a cause of contamination to downstream receiving waters including Lake Ontario, further upstream remedial investigation and possible remedial work can proceed independently of the RAP. Public outreach would also be more appropriately addressed under an individual remedial project involving local agencies and perhaps the larger Lake Ontario Lakewide Management Plan (LaMP). In the event a “pass through” of contamination to Lake Ontario is identified, the LaMP could address this pollution source.

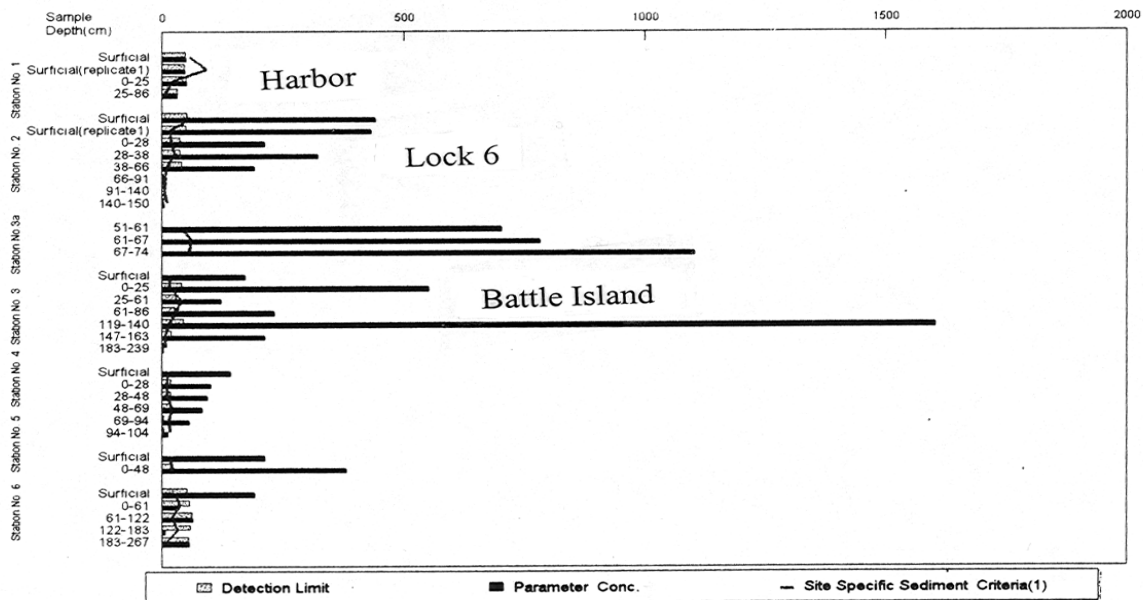


Figure 15 - PAH Sediment Core Concentrations - Benzo(a)pyrene (ug/kg)

PCB sampling and assessment involved two independent sediment evaluation protocols that provide guidance values for characterizing PCBs in sediments: NYSDEC Division of Fish and Wildlife 1993 publication entitled “Technical Guidance for Screening Contaminated Sediments” and the Canadian 1993 publication by Persaud, et.al. entitled “Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario”. The DEC assessment applies two guidance values: one for human health bioaccumulation and a second for wildlife bioaccumulation which are derived using equilibrium partitioning methodology. The Canadian guidance applies three guidance values: one for a no-effect level, another for a lowest-effect level, and a third for severe-effects. **Figure 16**, from the 1997 sediment study, on the following page shows sample results and these guidance values for characterizing PCBs in sediments.

PCB Aroclors and congeners were detected in five of the six core sample stations along the Oswego River. Two surficial sample stations detected PCBs: the Oswego Harbor and the next sample site upstream at the canal lock. The sample results document relatively low concentrations and many “non-detects” for PCBs. For the surficial and core sediment these guidance values are quite low. Applying the guidance values does not directly translate to a final decision on sediment contamination or dredging restrictions. An overall level of threat to the environment is applied to the assessment of a detected contaminant in the sediment to determine any restrictions for dredging. Considerations include the concentration present, the potential for release, bioaccumulation pathway, the toxicity, and potential remedial cost and benefits. Navigational dredging for the Oswego harbor is therefore regulated and permitted but not restricted as a use impairment. Lake disposal of dredged materials is provided for navigational channel dredged materials. The most recent sediment surficial and core sampling results are consistent with and support this determination. The sediment sampling data does identify upstream sources as a potential threat to the ecosystem and Lake Ontario. However, the concentrations identified in the Area of Concern sediments are not of a level or threshold where their dredging and disposal involves contamination restrictions. USACE testing of sediments for dredging were all non-detects for organochlorine pesticides and PCBs.

It should be noted that basically any detectable level of PCBs would exceed the sediment guidance for human bioaccumulation, since the analytical reporting levels for both methods are generally greater than the corresponding human bioaccumulation guidance values. Sample results for PCB concentrations in sediments show detected values at Battle Island in the 25 to 61 centimeter core depth and in the Oswego Harbor near the surface. These PCB sample results are in line with the findings for the other parameters and could support the academic proposal for further investigation of environmental impact at the upstream Battle Island location. The concentration and amount of contaminated sediments do not however warrant any current further action by DEC.

Overall, upstream causes and sources of PCB contamination are the primary concern regarding downstream locations in the river, harbor, and Lake Ontario. Because the identified sediment contamination upstream is not causing an identified use impairment in the AOC, any upstream investigation and possible remedial work can proceed independently of the RAP. Contaminated sediments in the watershed involving PCBs are more appropriately addressed under an individual remedial project, Oswego River watershed planning by responsible government agencies, or the larger Lake Ontario Lakewide Management Plan (LaMP).

Station No.	Sample Depth (cm.)	Analytical Results			DEC Technical		Persaud Provisional			DEC Interim	
		Sum of 91-11 Congener	Sum of 8080(1) Aroclor	TOC (%)	Bioaccumulation Guidance Human	Wildlife	NEL	LEL	SEL	No Appreciable Contamination	High Contamination
1 Harbor	0-25	0.20591	0.270	1.29	0.00001032	0.01806	0.01	0.07	6.837	0.1	10
	25-86	0.00042	ND	0.577	0.00000462	0.008078	0.01	0.07	3.0581	0.1	10
2 Lock 6	0-28	0.11084	0.073	1.26	0.00001008	0.01764	0.01	0.07	6.678	0.1	10
	28-38	0.07195	ND	1.95	0.0000156	0.0273	0.01	0.07	10.335	0.1	10
	38-66	0.0049	ND	0.695	0.00000556	0.00973	0.01	0.07	3.6835	0.1	10
	66-91	0.00036	ND	0.416	0.00000333	0.005824	0.01	0.07	2.2048	0.1	10
	91-140	ND	ND	0.26	0.00000208	0.00364	0.01	0.07	1.378	0.1	10
140-150	ND	ND	0.601	0.00000481	0.008414	0.01	0.07	3.1853	0.1	10	
3 Battle Island	0-25	0.09646	0.220	1.03	0.00000824	0.01442	0.01	0.07	5.459	0.1	10
	25-61	0.6253	0.440	2.88	0.00002304	0.04032	0.01	0.07	15.264	0.1	10
	61-86	0.17666	ND	2.12	0.00001696	0.02968	0.01	0.07	11.236	0.1	10
	119-140	ND	ND	0.89	0.00000712	0.01246	0.01	0.07	4.717	0.1	10
	147-163	ND	ND	0.395	0.00000316	0.00553	0.01	0.07	2.0935	0.1	10
183-239	ND	ND	0.308	0.00000246	0.004312	0.01	0.07	1.6324	0.1	10	

Figure 16 - PCB Sediment Concentrations (Core & Surface - ug/g) showing Selected Guidance Values for Characterization in Sediments at site 1=harbor; 2=Lock 6; and 3=Battle Island. Shaded areas exceed guidance values.

After to the 1997 study, a focused sediment sampling study on the Battle Island area was conducted. The **2002 Final Draft Battle Island Sediment Assessment** document reports results of this year 2000 study. Sediment samples were collected at eight sites and analyzed for heavy metals, pesticides, PCBs, PAHs, dioxins and furans. Sediment toxicity tests and a biological assessment of the benthic invertebrates were also performed in this study. Concentrations of heavy metals were measured for chromium, copper, lead, mercury, nickel, silver, and zinc immediately downstream of the Armstrong Industrial Specialties, Inc. facility. This is believed to be due to historic practices and spills as the higher levels were found deeper in the sample cores. Surficial concentration for metals parameters of concern were found for copper and mercury.

Toxicity testing results showed no statistically significant reduction in survival or growth for test organisms. The macroinvertebrate fauna was assessed as moderately impacted at the one site just downstream from Armstrong since it was limited to worms, midges, and crustaceans, with few species represented. All other sites were biologically assessed as slightly impacted. Few samples were found to have pesticide concentrations exceeding analytical detection levels. None of the

pesticides encountered exceeded their respective PEC or Severe Effect Level sediment quality guidance values. High Mirex concentrations in the sediments were detected downstream from (and on the same side of the river as) the Armstrong facility site. More than half of the PCB samples exceeded guidance values and the guidance value concentrations identified. As discussed above in Figure 16, the bioaccumulation guidance values are so stringent that simply a detected value in the lab analyses is most likely identified as an exceedence.

Figure 17, from the recent 2002 report, shows the PCB sample results identifying some high concentrations just downstream from the Armstrong site with the other sites relatively low compared to the guidance values; however, these higher levels were generally found in deeper core samples.

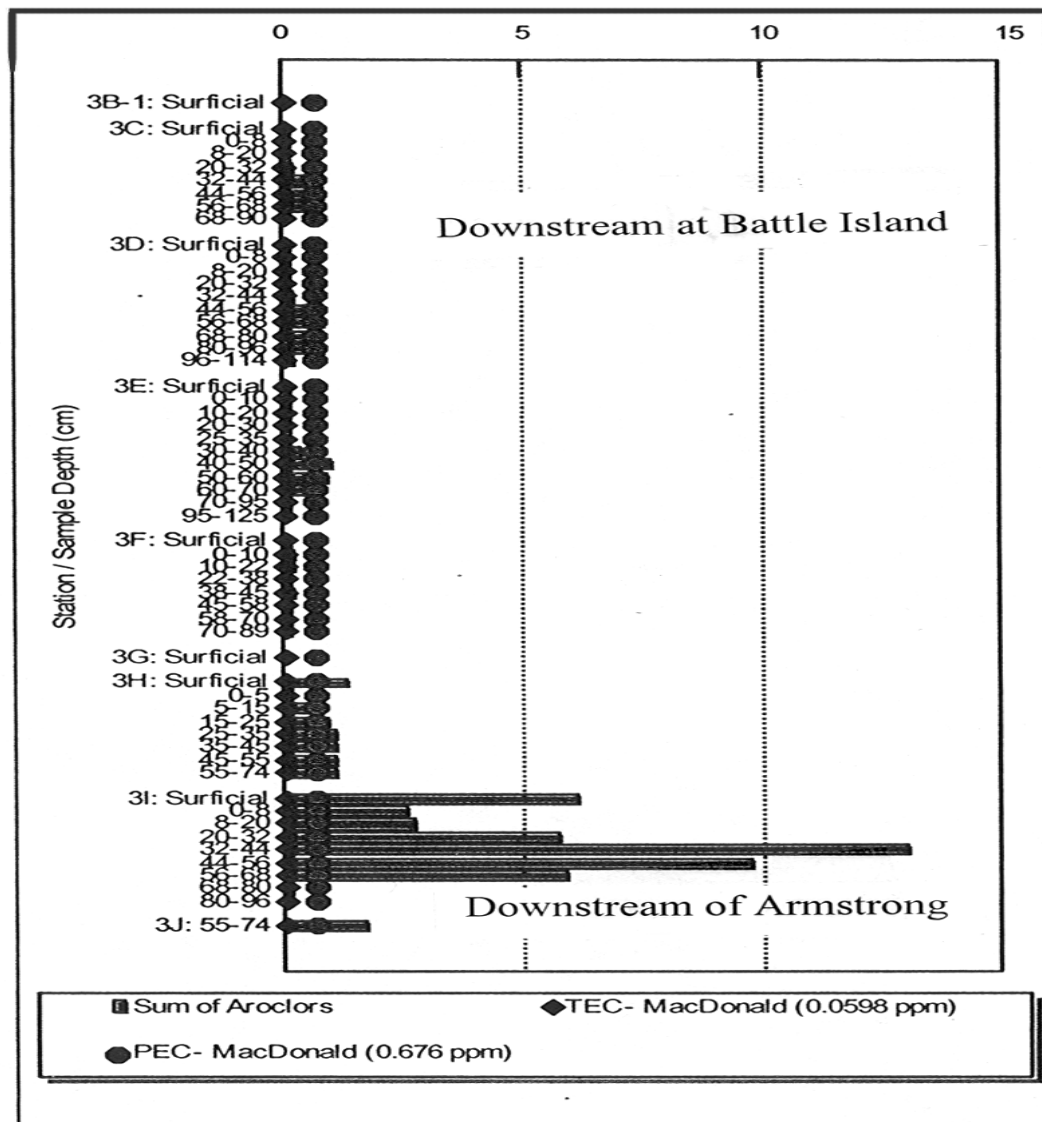


Figure 17 - Battle Island Area PCB Concentrations (ppm) and Sediment Guidance

Dioxins and Furans (polychlorinated dibenzo dioxins and furans) sample results were evaluated from three different perspectives in the 1997 Study. Battle Island again is identified as a sampling site of concern as described below by the analytical concentrations, toxic equivalents, and percent abundance patterns:

- **Analytical Concentrations** - The deep subsamples were very low or non-detect for the dioxin/furan analytes. Only two cores (stations #2 and #3) contained other than low or non-detect concentrations in the subsamples collected near the sediment surface. The concentrations at Battle Island (station #3) likely warrant further investigation to delineate the depths and breadth of the dioxin and furan contamination. The concentrations in the Oswego Harbor core sample had low background levels with no distinguishing characteristics.
- **Toxic Equivalents** - Toxic equivalency is a methodology that quantifies the toxicity of 2,3,7,8-substituted dioxin and furan congeners by proportionalizing their toxicities to 2,3,7,8-TCDD. These values can then be added and the total represents the aggregate toxicity of the various substituted congeners. To provide some evaluation of these values, they are compared to human health and wildlife bioaccumulation sediment guidance values present in the already referenced 1993 DEC publication entitled "Technical Guidance for Screening Contaminated Sediments". The guidance values are based on equilibrium partitioning methodology and are a function of the organic carbon content of the sediment being evaluated.

Results indicate no pollutant concern in the Oswego Harbor at station #1. At station #2, the upper third of the sample was above the wildlife guidance value. The mid portion of the station #3 sample exceeded the wildlife and human guidance values. Station #4 had low toxic equivalence in the upper half of the sample. Stations #5 and #6 did not indicate a toxic concern. There is likely minimal significant environmental impact from these dioxin/furan concentrations as they are buried by many centimeters of cleaner sediment.

- **Percent Abundance Patterns** - Percent abundance patterns help characterize the composition of complex compounds such as dioxins, furans and PCBs. The dioxins are dominated by OCDD and the furans by the HpCDF and OCDF. For the Oswego Sediment Study two separate patterns were established. The homolog ratios show the furans are more abundant in the lower chlorinated homologs while the dioxins dominate the higher chlorinated. The patterns showed characteristics that are typically found in sediments thought to be produced by contamination from multiple combustion sources.

Rationale - No dredging restriction use impairment exists in the Oswego River Area of Concern. Responsible agencies (NYSDEC, USEPA, USACE, and locals) are present to identify and implement remedial measures necessary to address an identified source of contaminated sediments. Overall, upstream contaminated sediments at the Battle Island area in the Oswego River were identified as the primary source of contamination responsible for inclusion of this upstream segment of the Oswego River on the NYSDEC Priority Waterbodies List. Although the 2002 sampling

results do not identify the Battle Island area as a hazardous waste site, nor as an active source of contamination downstream (remedial measure threshold criteria are not met) further study may be called for to assess this potential based on the identification of a local environmental impact.

A study (food uptake impact and environmental threat) has been discussed for proposal by SUNY at Oswego and USACE and is endorsed by NYSDEC as within the scope of the RAP delisting (see Appendix O). In addition, with certain more restrictive regulation changes, NYSDEC's remediation division could reassess remedial requirements for this area. In the event further investigative action, study, or remedial activity is ultimately undertaken, such action is to be conducted as a site specific environmental cleanup project or as part of a larger watershed or Lake Ontario management planning action. As the source of this potential upstream contamination is outside the RAP Area of Concern and there is no use impairment in the Area of Concern, the Remedial Action Plan has accomplished its objective. Further, there is no identified dredging restriction use impairment within the Area of Concern and open lake disposal of dredged materials from the AOC is approved.

In conclusion, because the identified sediment contamination upstream is not causing a use impairment in the AOC, an upstream investigation and possible remedial work can proceed independently of the RAP. Stakeholder concern and public outreach on an upstream / watershed contaminant of concern is more appropriately addressed under an individual remedial project, or Oswego River watershed planning by responsible government agencies, or the larger Lake Ontario Lakewide Management Plan (LaMP). In the event a "pass through" of contamination to Lake Ontario can be identified, the LaMP will need to address this source and impact. Designation of the dredging restrictions use impairment indicator as not impaired is consistent with the USEPA delisting principles and guidance.

11. Beach Closings

In the Stage 1 document, the Beach Closings use impairment indicator was determined to be not applicable to the Area of Concern. Because there are not beaches within the Area of Concern, this impairment indicator has been evaluated as not impaired. At one time, there was a concern regarding the classification of the waters in the AOC for swimming. In New York State the waterbody classifications A, B, C, etc. denote best usage and should not be misrepresented as a specific rating of water quality. For example, the AOC is classified as "C" with the best usage of the waters as fishing. Class C waters shall be suitable for fish propagation and fish survival under this best use. The water quality of Class C waters shall also be suitable for the other uses of primary and secondary contact recreation, although other factors may limit the specific use for these purposes in a designated area or river segment. For Class "B" waters the best usages are primary (swimming) and secondary contact recreation and fishing. Class B waters shall also be suitable for fish propagation and survival. Therefore the best usages of a water segment are designated by the classification of "highest" use which does not necessarily or directly rate the water quality or differ significantly.

Because of the boat and ship traffic, swimming is not encouraged in the harbor. As Class C waters, the AOC is suitable for partial-body contact and perhaps swimming; however, in the interest of safety, swimming is not a designated use for the lower Oswego River and harbor area. The 1994 Oswego Harbor Survey data supports a not impaired status for partial-body contact. The desired endpoint, as identified by the Remedial Advisory Committee, is to have swimming areas in the AOC open to swimming. Since there are no such areas in the AOC, the beach closings use impairment indicator is not applicable to the AOC. In support of this status for the indicator is the fact that secondary or partial-body contact within the waters of the AOC is safe and not restricted.

Resolution - The Beach Closings use impairment indicator has been determined to be not impaired because there are no designated beaches in the AOC. Water quality survey results support this status and indicate that partial body-contact of the AOC waters is an on-going activity that is not impaired.

Support Data - The Oswego Harbor (water quality) Survey data supports body contact with the AOC waters as acceptable although there are no designated beaches in the AOC to provide public swimming access. Water quality for partial-body contact has also been determined acceptable.

Rationale - The resolution statement and supporting data provide the necessary information to support the not impaired status for the Beach Closings use impairment indicator in the Area of Concern.

12. Tainting of Fish and Wildlife Flavor

The Stage 1 document determined this use impairment may not exist and since that time no significant study reports or public information has been reported to indicate a use impairment. The desired endpoint, as identified by the Remedial Advisory Committee, of no evidence of fish and wildlife tainting, has been confirmed by associated studies, stakeholder observation, and local fishing reporting.

Resolution - Associated fish and wildlife studies, water quality data, local person comments, and local discharge requirements indicate no cause for tainting as a use impairment. NYSDEC water quality guidance values and standards address tainting in discharges to protect fish and wildlife for consumption. In the New York State Water Quality Regulations modifications of 1998, the requirements for tainted were reorganized to enhance application in water discharge permits. The narrative requirements for tainting is part of the standards and guidance values based on aesthetic considerations in NYSDEC Codes, Rules, and Regulations, Title 6, Chapter X, Part 702.14; the parameters and standards are delineated in Part 703.5. The Oswego River does not have a tainting restriction and therefore the use impairment indicator is assessed as not impaired. Further, long term concern for tainting monitoring and surveillance is part of the Lake Ontario LaMP. The lack of reports from sports persons on tainting in a popular fishing and hunting area indicates that it is highly unlikely a tainting impairment exists. This has and continues to be the case since the development of the Stage 1 document in 1990.

Support Data - Results of the **Fish Pathology Study** support the not impaired status. In the sport fisheries community, the Remedial Action Plan (RAP) process has not been well known. Onondaga Lake has been viewed as a pollution source with a bad reputation and as having a negative impact on the downstream Oswego River fish. Local, state and federal government and agencies are responsible for sport fishery controls. The questions have been: what is being done to solve pollution problems and how does the average person get involved in the process? The answer is that through environmental protection program activities, including the Great Lakes program and RAPs, the identification of pollution sources has resulted in corrective and preventive measures being implemented to mitigate, end, and remediate contamination. Habitat loss below the Varick dam has long been recognized and attributed to the dewatering of the bypass regions below the dam due to dam operational procedures. The presence of the dam and resulting dewatering has led to the crowding of fish in other areas of the river and inadequate upstream and downstream passage for the fish. An occasional Lake Ontario Walleye caught in the river has been reported to have a tainted flavor that is to be addressed as part of the Lake Ontario LaMP.

The 1996 Oswego River Remedial Action Plan Update document includes: a description of the RAP goals and RAP process; a summary of the status of the use impairments and their causes and sources; reporting on remedial activity progress including investigation results; restoration and protection strategies; delisting criteria; identification of priorities; a description of other RAP enhancing initiatives; and figures, tables, and appendices. The 1998 RAP Workshop and Oswego River RAP Workshop Summary and Update document in 1999 concluded that tainting is not an impairment of the Oswego RAP.

Rationale - Observation and associate study results support the not impaired status for the tainting of fish and wildlife flavor use impairment indicator. The Lake Ontario LaMP and ongoing environmental programs provide the necessary monitoring and surveillance to address a future concern for this beneficial use. Priority needs, for the stakeholders of the RAP process, are to have a means to continue to receive new information and to have a voice on environmental concerns. The Lake Ontario LaMP and watershed activities provide stakeholders both a participation process to maintain a voice on environment issues and concerns and to have access to information to identify and address issues.

13. Drinking Water Restrictions; Taste and Odor Problems

The early RAP stages identified this indicator as not applicable to the AOC because there are no drinking water supply intakes in the AOC and none has been proposed. The waters in the AOC are not classified for human consumption by New York State. The AOC is a working harbor, a boat recreation access area, and sport fishery. The use impairment indicator is therefore not applicable to the Oswego River Area of Concern.

The desired endpoint, as identified by the Remedial Advisory Committee, is no drinking water restrictions or taste or odor problems. Taste and odor problems have not been observed as problematic and the AOC is not a drinking water source. In some areas of the Great Lakes used as

a drinking water source, taste and odor has been observed in more recent years. With the occurrence of the exotic species zebra mussels, increased water clarity has contributed to the presence of the compounds “Geosmin and MIB”. Research has indicated that these compounds can create a taste and odor in drinking water supply that is considered a nuisance. Typically, taste and odor problems are seasonal occurrences and are treatable with activated carbon treatment in the water supply. Algae can also contribute to the generation of seasonal taste and odor problems that are treatable with chlorination. Local governments focus much effort on the control of nonpoint sources of pollution (nutrients and pesticide application) to protect drinking water supplies and recreational uses of water resources.

Resolution - The restrictions on drinking water consumption or taste and odor impairment indicator is not applicable to the AOC because there are no drinking water supply intakes in the AOC and no intakes are planned for the harbor area. In addition, the waters in the AOC are not classified for human consumption by New York State. The AOC is a working harbor, a boat recreation access area, and sport fishery. In the event an additional drinking water source is needed, Lake Ontario would be a likely source. Lake Ontario already serves as a drinking water source for many communities such as Onondaga County which is upstream of the AOC. Because there are no drinking water restrictions or taste and odor problems, this use impairment indicator is considered not impaired.

Support Data - The use impairment indicator involving drinking water restrictions or taste and odor problems has been assessed as not applicable and therefore not a use impairment in the Oswego River Area of Concern. In New York State and the Oswego River watershed, a number of water supply protection measures are in place that maintain good drinking water quality for both groundwater and surface water sources. The Safe Drinking Water Act of 1996 requires the City of Oswego to develop a “Source Water Assessment Program” or SWAP to identify potential sources of water supply, to determine protection threats/needs, to expand monitoring, and to streamline testing procedures. These requirements are in response to a real need to implement measures for the protection of drinking water sources (formerly voluntary) and to provide additional treatment where needed. In general, algae observed in drinking water sources and the occasional water quality taste must be watched so as not to become a burdening use impairment. Beyond monitoring, a “multi-barrier” approach to drinking water supply protection has included the Wellhead Protection Program and the Watershed Protection Approach. These programs, along with several others, put a strong emphasis on trying to prevent contamination of a water supply. Most recently, this same general approach called, “Source Water Protection” focused attention on identifying the sources of water supply, the possible sources of contamination to a supply, and the susceptibility of that supply to inventoried contaminants. These contaminants and their potential pathways for entry into a stream, river, lake, or aquifer are the same sources of degradation with which natural resource managers have traditionally been concerned. We all must support environmental protection measures to protect our drinking water supplies.

Rationale - The described uses of the Area of Concern do not include use of the waters as drinking water. Taste and odor are not observed as a problem in the Oswego River AOC community. The indicator is therefore considered not impaired.

14. Added Costs to Agriculture or Industry

Because there are not identified causes or additional costs required to treat the water of the AOC prior to use for agriculture purposes (i.e. including but not limited to livestock feeding, irrigation, and crop spraying) or industrial purposes (i.e. intended for commercial or industrial applications and non-contact food processing), this use impairment indicator is not impaired in the AOC.

To maintain good ambient water quality in the Oswego River and the Area of Concern, significant resources have been committed to implement projects involving conservation landscape and Best Management Practices (BMPs) to address the causes and sources of nonpoint pollution. In the Oswego River watershed, Lake Neatahwanta is a good example of having a number of projects implemented in its watershed to remediate and protect against environmental damage to beneficial uses. Stream protection projects including buffer zones, vegetation controls, farm management, homeowner sewage improvements, stream conservation, fish stairs and other BMPs involving farmland and stream corridors are examples of the types of projects utilized.

In assessing a watershed and where to apply limited environmental protection resources, we need to consider the Priority Waterbodies List (PWL) developed by NYSDEC and include the local knowledge of environmental conditions and impacts of planned actions (see indicator #8 for PWL discussion). Coordination with local officials is therefore a key to project success and to assure the most efficient funding. The desired endpoint, as identified by the Remedial Advisory Committee, is no abnormal added costs to agriculture or industry.

Resolution - The early stages of the RAP assessed this indicator as not impaired. This status is supported by current information and the Remedial Advisory Committee. Further, the endpoint of no abnormal added costs to agriculture or industry as established by the Remedial Advisory Committee is noted as achieved.

Support Data - There is no agricultural uses of the water from the AOC and there are no known additional costs to industry for treatment of waters taken from the AOC. In the Great Lakes, zebra mussels have created a problem for some water intakes and therefore to some degree an added cost. Although this has not had a significant impact on the Oswego River AOC, there are strength and duration components to the growth and life cycle of zebra mussels. Overall, the strength of growth of zebra mussels in the Great Lakes has been very high where as the duration in a given area can vary (i.e. the growth cycle peaks and then reduces to a lower level of presence in an area of the environment). Exactly where we are along the cycle in the Oswego River RAP Area of Concern and in the watershed is difficult to determine. In the long term, an overall lower level of zebra mussel populations is expected as a more steady state is reached.

Rationale - Because there is no added costs to agriculture or industry for uses of the Area of Concern waters, the indicator is considered not impaired. This status was established in the problem definition Stage 1 document and remains the same today.

IV. DELISTING FOLLOW-UP

The Great Lakes community including USEPA, IJC, Great Lakes States, RAP Remedial Advisory Committees, and Canadian counterparts have conducted numerous meetings in the development of principles and guidance towards accomplishing delisting. Consistent with this guidance as it applies to the Oswego Area of Concern, NYSDEC and RAP Remedial Advisory Committee have adopted the following key delisting principles and guidance points, formulated a schedule of delisting steps or actions, and identified responsibilities in conducting post-delisting activities. The guidance, schedule, and responsibilities identification are each necessary and appropriate for moving ahead to accomplish delisting of the Oswego River AOC:

A. Delisting Principles and Guidance:

- 1. The International Joint Commission's (IJC) responsibility in the delisting process is to review and comment on the Local/State/Federal position to delist an Area of Concern.** Under the Great Lakes Water Quality Agreement, AOCs were designated (listed) by the respective federal governments. Therefore, the federal governments ultimately decide to delist. Local/ State governments can and should provide the basis for delisting. IJC is not an approval authority; however, their consultation is to be sought and their comments addressed. The Stage 3 RAP Process has accomplished IJC, EPA, and peer review, coordination, and liaison. A collaborative effort moving forward delisting is proceeding. In addition, for the Oswego RAP, comments are to be gathered through a public involvement/ review process and responded to in the preparation of the final Stage 3 document and a responsiveness summary (comments/ responses are addressed in Appendix G).
- 2. IJC and EPA have taken the position that there may still be some use impairment indicators where the beneficial uses may not be fully restored for justifiable reasons, and that this should not prohibit the delisting of an AOC** (e.g. natural conditions exist; boating disturbances; all remedial work implemented and beneficial use not expected to be restored). When these conditions occur and ongoing concerns exist, the resolution of the use impairment indicator can be resolved by a larger management plan activity that is responsible to the issue. An "assignment of responsibility" is appropriate to accomplish this resolution and is based on the fact that the RAP Process cannot provide the solution to the concern (i.e. within the Oswego RAP Area of Concern, achieving the endpoints for the fish habitat/ population and fish consumption impairments is being addressed respectively by the FERC power dam license requirements and the Lake Ontario LaMP human health advisories addressing fish).

For the Oswego RAP, the goals or endpoints have therefore been achieved to the maximum extent practicable and the ultimate resolution strategy for "out of AOC" causes or sources concern are now part of these larger or alternate plans and actions.

The Oswego RAP has provided the data to show that the Area of Concern is not impaired by local sources. The RAP needs to (and for Oswego, it does) establish that inclusive management plan activities will resolve any larger concerns that cannot otherwise be fulfilled within the RAP process. Other examples of a larger management plan activity accepting oversight responsibility include: the Great Lakes Binational Toxics Strategy, watershed management strategies (WRAPS Appendix N), lead agencies for fish consumption advisories, local oversight groups, and agencies for licensing or permitting processes. For the Oswego RAP, all applicable RAP process activities have been accomplished to the maximum extent practicable and no further action is planned under the RAP process.

3. **Remedial Action Plans can only address impairments caused by local sources; impacts from outside an AOC (either upstream, downstream, via air deposition, or from the open lake waters) which cause use impairments should not impinge on the ability to delist the AOC.** A source issue outside the AOC presents a concern that needs to be addressed by a larger management plan and the accompanying acceptance of responsibility. It is important that stakeholders continue to have a voice on their issues of concern and that an opportunity for public input exists. In order to delist, these types of impairments (i.e. concerns relating to non-AOC causes) and their attendant sources need to be assigned to a responsible party, environmental project, or program area for follow-up action and resolution. For the Oswego RAP, all appropriate action has been taken within the AOC under the RAP process, remedial activities have been accomplished to the maximum extent practicable, responsibilities have been identified, and no further action is planned under the RAP process. The Stage 3 document substantiates that the Oswego AOC is not impaired by contamination from local or upstream sources. The upstream river flow does affect the fish habitat and fish population in the AOC and is addressed by the FERC license requirements.
4. **The preparation of a draft Stage 3 document is fundamental to the delisting process. The preparation of the document must involve a public consultation process (by the lead agencies and locals).** There needs to be a peer group review incorporated into the document preparation. Consultation with IJC and USEPA (for content and review comments) must be accomplished. With these items addressed, a final Stage 3 RAP document can be prepared for delisting the Area of Concern. For the Oswego RAP, the public consultation has involved presentations at local environmental group meetings, consultation with peers, and government agency review. A final draft Stage 3 delisting document, website posting, power point presentation, summary handout, and formal Environmental Notice Bulletin comment period for the public at large will assure the delisting information is communicated and comments responded to in the completion of the AOC delisting steps (in the next section, Table 3 lists the next steps to delisting).

5. **With the completion of the final Stage 3 RAP document, the next step is for the State and Federal leads to declare the AOC as delisted.** To realize this, certain steps need to be accomplished which include: State submittal of the final Stage 3 document to USEPA (review by EPA may involve a federal management committee or review team); final consultation with IJC; completion of minor adjustments to the document based on EPA and IJC review; statement letter of delisting to the Federal Department of State by USEPA; and, Federal Department of State announcement and action on the delisting. As described below, significant progress has been accomplished in these next step activities.

B. Oswego AOC Delisting Steps:

In order to accomplish delisting, the steps to address the finalization of the Stage 3 delisting document and the coordination with other government agencies are listed in **Table 3** below. Several public involvement activities are identified to support this process which leads to the completion of the final report. The steps include a formal notice for final public comment with peer group and government agency review. Finally, the US Secretary of State acts on delisting. A check list column is provided in the delisting steps below:

Table 3 - Oswego River AOC Delisting Steps

1. ✓ 4/02 DEC in consultation with RAC completes the preparation of the draft Stage 3 delisting proposal and public slide (Power Point) presentation on the Area of Concern delisting with handout materials.
2. ✓ 4/02 DEC conducts slide presentation at meetings of the Great Lakes Basin Advisory Council, the Oswego County Soil and Water Conservation District, the Oswego County Water Quality Coordinating Committee, the RAP Remedial Advisory Committee, and to members of the Environmental Management Council.
3. ✓ 5/02 DEC conducts peer review including internal DEC and state agencies (Departments of Health and State). Draft Stage 3 delisting proposal posted on internal website.

4. ✓ 5/02 DEC begins informal consultation with USEPA Region 2 and IJC on the draft stage 3 delisting proposal.
5. ✓ 8/02 DEC addresses comments to date in revised draft Stage 3 delisting proposal and public slide (Power Point) presentation.
6. ✓ 9/02 DEC meets with RAC on September 6th. Committee endorses Stage 3 document, slide presentation, and next steps. Subsequently, DEC posts draft Stage 3 delisting proposal on external DEC website.
7. ✓ 9/02 Consultation among GLNPO, EPA Region 2, and DEC achieves agreement to continue with delisting steps based on conditions (i.e. FERC license progress).
8. ✓ 9/03 DEC in consultation with the RAC and EPA Region 2 completes revised draft of Stage 3 delisting proposal and receives informal comments from IJC.
9. ✓ 8/04 Verify the FERC Settlement Agreement signed and relicense issuance certain.
10. ✓ 10/04 DEC in consultation with RAC completes revisions (addressing informal IJC and EPA comments), adds provisions of FERC license in Appendix J, and produces a final draft Stage 3 delisting document for formal transmittal to IJC and further approval by EPA (Region 2 and GLNPO).
11. ✓ 3/05 Complete final draft Stage 3 document & formal submission to IJC by EPA Reg. 2.
12. ✓ 7/05 Receive IJC formal response and support for delisting. DEC, EPA, and GLNPO collaborate on delisting steps.
13. 10/05 EPA coordinates internal briefings with Directors, RA, DRA, and GLNPO.
14. 10/05 DEC prepares final draft Stage 3 delisting document (being readied for public notice). DEC proceeds with preparations for formal public notice including web posting update.
15. 11/05 EPA consults with the Directors of GLNPO, IJC Great Lakes Regional Office, DEC's Division of Water and the City of Oswego on the draft final document and recommendation to delist the Oswego AOC.
16. 12/05 IJC Regional Office, EPA Regions 2, 5, and GLNPO, and DEC collaborate on plans and final document prior to formal public notice period.

17. 1/06 DEC, in consultation with the RAC and EPA, conducts a formal public review to include all stakeholders in a final review and comment period. A New York State formal Environmental Notice Bulletin (ENB) 60-day comment period is to be utilized to assure restoration conditions exist.
18. 3/06 DEC, in consultation with the RAC and EPA, incorporates revisions to the Stage 3 delisting document based on the formal public review comments. In addition, the Responsiveness Summary (Appendix G) is further developed to address all comments. This time period provides for the observation of the “modified run-of-river” flow habitat restoration and fish access in Spring 2006.
19. 4/06 DEC in consultation with the RAC completes the final Stage 3 delisting document and submits to EPA Region 2. (EPA then conducts further internal briefings with EPA Director, Regional Administrator (RA), Deputy RA and prepares letter of transmittal for RA).
20. 5/06 EPA Region 2 Regional Administrator, transmits final Stage 3 delisting document and letter recommending AOC delisting to U.S. Department of State with copies to NYSDEC Commission and appropriate Canadian Federal and Provincial agencies, and the International Joint Commission.
21. 6/06 U.S. Secretary of State officially removes water body from list of Areas of Concern.
22. 6/06 U.S. Secretary of State sends formal notice of delisting to IJC.
23. 7/06 Announcement(s) and commemoration activity (discussion involves the dedication of tree planting(s) and commemorative plaque along river walk area in the AOC and coordination with other local events such as the annual Oswego Harbor Festival in late July 2006. (Re: “30 year celebration and rebirth of the Oswego”)

C. Post-Delisting Responsibilities:

Post-delisting activities are to be conducted by responsible parties to implement the actions that are to address the remaining concerns of the Oswego RAP Process. The RAP identifies four specific concerns resolvable by larger management plan activities as delineated below. These four concerns are the fish consumption advisory, the fish habitat/population restoration, the upstream (out-of-AOC) Battle Island Sediments, and the weed and algae growth. Specifically, fulfilling certain actions under the larger management plans will assure: accomplishing the maximum removal of the fish advisories as part of Lake Ontario LaMP process; the highest level possible of restoration of the fish habitat and populations under provisions of the FERC license requirements; a satisfactory remedial decision for the fate of the Battle Island contaminated sediments; and, the best reduction and control of weed and algal growth in upstream and nearshore Lake Ontario area. Each of the four concerns described below are followed by a brief description of how each is to be addressed. Sub-listings of the responsible parties and implementation actions are then developed. These identified responsible parties and actions are to address the restoration and assure the protection of beneficial uses for the Area of Concern.

1. **Lakewide Fish Consumption Advisory:** The endpoint defined by the Remedial Advisory Committee is the removal of the lakewide fish consumption advisory. Continued reductions of contaminant inputs through point and nonpoint pollution control is being pursued under the Lake Ontario Lakewide Management Plan (LaMP). Continued monitoring of adult fish flesh for levels of contamination, along with young-of-year fish assessments are conducted by NYSDEC Fisheries in the development of data needed by NYSDOH in establishing human health advisories for fish consumption. The fish monitoring and analyses provide a level of protection for the Oswego area and the Lake in the assessment of the presence of toxic contamination in the water column and its effects on the aquatic environment. Studies indicate that the lakewide fish consumption advisories are not impacted or caused by toxics in the water or sediments of the Oswego AOC but are attributable to non-AOC sources predominately in Lake Ontario. NYSDEC implements the human health advisory for fish consumption in New York State.
 - **New York State Department of Environmental Conservation** - Continue to pursue reductions in sources and loads while monitoring fish flesh and young-of-year. Assure that fish consumption restrictions are removed or reduced to the maximum extent practicable while coordinating the establishment of the advisories with the NYSDOH.
 - **New York State Department of Health** - Assess fish data as provided by NYSDEC and determine human health advisories. Assist in development of informational material for public information and protection.
 - **United States Environmental Protection Agency** - USEPA is one of the four parties to the Lake Ontario LaMP (the other 3 parties are NYSDEC, Environment Canada, and Ontario Ministry of the

Environment). The scope of the LaMP includes resolving lakewide beneficial use impairments such as the “restrictions on fish consumption”. One focus of the LaMP activities is the identification and reduction of critical pollutants to the lake.

- **International Joint Commission** - Assure that the federal governments (Canada and United States) fulfill their responsibilities under the Great Lakes Water Quality Agreement to address Areas of Concern in the Great Lakes. Assist states in RAP and LaMP activities and comment on the progress and actions in order to provide lakewide consistency in assuring the restoration and protection of beneficial uses.
- **Lake Ontario LaMP** - Report on use impairment indicator monitoring of beneficial uses as developed and documented by the state, provincial, and federal governmental workgroup and management committee. Continue to develop and implement the workplan for the restoration and protection of beneficial uses for the lake, nearshore areas, and the drainage basin.

2. Fish Habitat and Populations below the Varick Dam: The endpoint defined by the Remedial Advisory Committee is no restricted use of fish habitat from flow or contamination, and fish populations substantially similar to reference communities. Continued monitoring of the FERC license requirements and implementation of the provisions to address a “modified run-of-river” minimum flow, fish passage, and fish protection is to be conducted. Implementation and maintenance of these provisions will address the fish habitat and fish populations concerns. The fish habitat is addressed by the flow requirements of the FERC license providing the desired conditions and fish access in the AOC. Maintaining the required flow will satisfy the fish habitat needs to the maximum extent practicable and also result in benefits to the fish populations of the AOC and Lake Ontario. The fish population in the AOC is directly linked through its association with Lake Ontario. The fish populations of the lake actually have the greatest influence on the AOC fish populations. Fish movement in and out of the AOC is dominated by the lake characteristics. With river flow and fish habitat addressed in the AOC under the FERC license, the fish populations will reach a level consistent with natural conditions allowed by Lake Ontario. Compliance, monitoring and reporting activities will be performed under the FERC license and various divisions within DEC. Fish access to the “critical habitat area” restored by river flow is verified by delisting.

- **New York State Department of Environmental Conservation** - Maintain that fish habitat issues (i.e. river flow and fish access) are addressed to the maximum extent practicable by the FERC license. Maintain a regulatory presence to protect water quality, the benthic community, fish (and wildlife) survival and propagation, and best uses of the water including aesthetics. Complete remediation of upstream hazardous waste sites and continue implementation of watershed protection strategies. Confirm with other agencies and the fishing public that (lakewide) fish populations are restored to satisfactory levels.

- **FERC Licensing Provisions** - License provisions require the operating permittee to comply with minimum river flows, fish passage, and fish protection. FERC is the primary monitor and enforcer of these provisions. NYSDEC, USFWS, and the fishing public will oversee that compliance with the dam relicensing provisions is achieved. Assure that fish habitat and fish populations are restored to the maximum extent practicable under the FERC license. Report on progress through monitoring to verify conditions and fish access.
 - **United States Fish and Wildlife Service** - In conjunction with NYSDEC, assure that provisions and operating schedule for the Varick Power Dam are achieved. Coordinate with the New York State Canal Corporation (dam owners) to reinforce operating conditions for the Varick Dam and to assure fish access in the waters below the dam.
 - **United States Environmental Protection Agency** - The EPA is one of the four parties to the Lake Ontario LaMP (the other are: NYSDEC, Environment Canada, and Ontario Ministry of Environment). The scope of the LaMP includes resolving lakewide beneficial use impairments such as the “restrictions on fish consumption. One focus of LaMP activities is the identification and reduction of critical pollutants to the lake.
 - **Watershed Restoration and Protection Strategy or “WRAPS” Implementation** - Observe monitoring data and set goals and objectives to restore and to protect beneficial uses for Oswego River watershed. Conduct routine, special, and new monitoring to assure adequate assessment data. Report on trends. Implement corrective actions. Refer to Appendix N for a description of WRAPS.
- 3. Upstream Battle Island Area Contaminated Sediments:** For the Oswego River Area of Concern, the endpoint is to have no United States Army Corps of Engineers’ restrictions on dredging. This has been achieved and is the case for the Oswego River AOC. However, at this upstream Battle Island location, the goal is to reassure that contaminated sediments are not a source or significant threat of contamination to the immediate river segment or to downstream areas including Lake Ontario. Follow-up activities identified to address the Battle Island sediment concerns are: determine any change in the status of the contaminated sediments present as to their activity as a source and their presence in consequential amounts so as to cause a significant threat to the environment; facilitate a local biological study proposal to address food uptake; provide for a strategy to address the fish consumption advisory in this upstream Priority Waterbody Listing (PWL) location; and, completion of the TMDL evaluation for the Oswego River as applicable. Further assessment of the 2002 Battle Island sediment study results by DEC has determine no need for remedial action or further priority governmental monitoring at this time.

- **New York State Department of Environmental Conservation** - Monitor and assess data to evaluate the threat of the presence of contaminated sediments in the Oswego River. Based on any new information, reassess if further remedial action is needed to restore and/or protect beneficial uses in this upstream segment or as a threat to downstream locations. Further develop strategy to address fish consumption advisory in the PWL segment. Conduct TMDL evaluation as appropriate (see * note next page). Review ongoing new RIBS sampling data that addresses upstream sources (through the RIBS network site at Minetto that addresses potential watershed sources.)
- **WRAP Strategy Implementation** - As resources permit, NYSDEC is to conduct this initiative in conjunction with local jurisdictions. Observe monitoring data and set goals and objectives to restore and to protect beneficial uses for the Oswego River watershed. Evaluate existing monitoring and conduct any needed additional monitoring to assure adequate assessment of watershed data. Report on trends. Implement corrective actions as determined from the fish consumption advisory, area hazardous waste site remediation considerations, TMDL evaluation, and Priority Waterbody List (PWL).
- **United States Army Corp of Engineers** - Consider academic proposal to develop a feasibility study and conduct an investigative plan (possibly in conjunction with a local sponsor) for a matching grant to address the threat of contaminated sediments to the environment in the area of Battle Island.
- **SUNY at Oswego** - Pursue matching grant funding proposal, as a sponsor, to develop a feasibility study and conduct an investigative plan to address contaminated sediments upstream of the AOC near Battle island in the PWL segment of the Oswego River. Coordinate with USACE the intentions of developing a biological food uptake analyses in this upstream of the AOC river segment. Seek corrective action as necessary to address suspect pollutant release from contaminated sediments and/or any suspect area hazardous waste site.

***Note:** NYSDEC is to conduct a review of the Oswego River (upstream of the AOC) regarding the 303(d) listing and TMDL requirements. The fish consumption restriction, upstream of the AOC to Fulton, is for Channel Catfish and is PCB related attributed to contaminated sediments. Water quality monitoring has not documented an active PCB source in this area although sediment study has identified limited contamination in several sites around Battle Island. If there were an active source of priority organics, then the implementation of a TMDL would likely result in further reductions of these pollutants subject to allocation in the watershed. Downstream receiving waters would benefit. However, the need to implement a TMDL is not certain based on the fish advisory for Channel Catfish caused by contaminated sediments.

4. **Weeds and Algae Nuisance:** The endpoint defined by the Remedial Advisory Committee is to maintain water quality standards, beneficial uses, and to have no persistent water quality problem due to cultural eutrophication. This is the case for the Oswego River AOC. Water quality monitoring indicates good water quality while maintaining best uses with no weed or algae impairment. Nuisance weed conditions are managed by weed harvesting equipment. Nonpoint source controls and Best Management Practices implementation in the watershed continue to reduce pollutant loadings. Beneficial uses are maintained in receiving waters. The concern is to assure that the overall condition is monitored, continues to improve, and does not deteriorate. The presence of bottom weeds and/or algae in other upstream (stagnate) or in nearshore areas of Lake Ontario during summer months heightens this concern and has spawned action by citizens and professionals along the lake shore.

- **Lake Ontario Coastal Initiative (LOCI)** - Restoring the ecological integrity of New York's North Coast—Lake Ontario's 300 miles of southern and eastern shoreline, embayments, river and creek mouths, wetlands and ponds—is key to the region's economic vitality. Remediation requires collaboration among public and private sectors and local, state, and federal agencies and elected officials. Actions are to address public commitment, mitigation measures, land use, habitat protection; and water quality research.

The locally driven **Lake Ontario Coastal Initiative (LOCI)** is responding to these needs. The initiative, spearheaded by the Center for Environmental Information (CEI), has received federal funding in 2004 and 2005 for strategic plan development and implementation activities. CEI is working with its partners, the Finger Lakes-Lake Ontario Water Protection Alliance (FL-LOWPA), SUNY Brockport Department of Environmental Sciences and Biology, and the LOCI Steering committee, representing public and private stakeholders. Projects are to remediate, restore, protect and sustain the Lake Ontario, New York Great Lakes Coastal region including the St. Lawrence.

As part of the strategic plan, a set of maps to characterize the watershed and, with local input from the seven coastal counties is planned to identify and start priority projects where current funding and resources have critical needs. It will be possible to continue research and monitoring to evaluate the effectiveness of actions and to inform community decision makers about sources and appropriate water quality correction actions. For mor information about the LOCI program visit he CEI website at <http://www.ceinfo.org/> or call 585-262-2870.

- **New York State Department of Environmental Conservation** - Continue to conduct environmental monitoring under DEC's core environmental quality programs (water, air, hazardous substances, remediation, etc.). Implement WRAP Strategies for the Oswego River watershed to compile data, set goals, and measure objectives. Further, weed

and algae concerns are addressed by the watershed management practices and local area weed harvesting. NYSDEC maintains a regulatory presence to protect water quality, the benthic community, fish and wildlife survival and propagation, and best uses of the water including the aesthetics. Complete remediation of upstream hazardous waste sites, continue efforts to eliminate CSOs, and continue implementation of watershed protection strategies to manage weeds and algae improve conditions and assure against deterioration.

- **WRAP Strategy Implementation** - NYSDEC to conduct WRAP in conjunction with local jurisdictions. Observe monitoring data and set goals and objectives to restore and to protect beneficial uses for the Oswego River watershed. Evaluate existing monitoring and conduct any needed additional monitoring to assure adequate assessment of watershed data. Report on trends. Implement corrective actions as determined needed by state and local agencies, through hazardous waste site remediation considerations, by TMDL evaluation, and in PWL evaluations.
- **Oswego County Soil and Water Conservation District** - Continue implementation projects to protect against erosion and provide stream bank protection and best management practices in Oswego County as resources permit. Assist NYSDEC in monitoring and surveillance activities for improved water quality. Implement SWCD mission to protect, promote, and improve natural resources. Continue to work with land users to educate and encourage actions that mitigate erosion and runoff.
- **Oswego County Department of Planning and Development** - Implement actions to further the protection and planned development of the lands around the Oswego River. Maintain a healthy balance between environmental and economic interests.
- **Oswego County Water Quality Advisory Committee** - Work to maintain and restore the quality of Oswego County's water resources, through a cooperative, coordinated manner which includes educational and technical efforts.
- **Oswego County Environmental Management Council** - Work with citizen support and with county governments to achieve environmental goals of the local community in conjunction with the county government.

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APPENDIX A

Oswego River Remedial Action Plan List of Active Remedial Advisory Committee (RAC) Members -2002

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- | | | |
|----|---------------|-----------------------------------|
| 5. | Ed Marx | Former Oswego Co. Planning Dept. |
| 6. | Greg Neal | Former Oswego Waterfront Revital. |
| 7. | Frank Page | Armstrong World Industries |
| 8. | Terry Hammill | Former Oswego Mayor |
| 9. | Steve Murphy | Orion Power New York |

Other Stage 1, Stage 2, CAC and RAC Past Members:

- | | | |
|-----------------------|---------------------|-------------------|
| - Samuel Sage | - Muriel Allerton | - Eli Rapaport |
| - Dr. Ronald Scrudato | - Gary Schoonmaker | - Thomas Young |
| - Auralie Ashley-Marx | - Michael Stoll | - Mike Rosen |
| - Michele Bielman | - Sandy Weston | - John Sullivan |
| - Michael Cole | - Robert Burch | - Dr. Donald Ross |
| - Dr. Helen Daly | - Tim Eder | - Carolyn Rush |
| - John Fitzgibbons | - Mark Lichtenstein | - Jack Khun |
| - Julia Portmore | - Ronald Woodward | |

Other persons contributing to the RAP Process :

- | | |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| - Ken Lynch | DEC Region 7 Regional Director |
| - Steve Eidt | DEC Region 7 Water Engineer |
| - Bob Townsend | DEC RAP Coordinator |
| - Benjamin Manton | RAC Committee Facilitator, CNYRPDB |
| - Les Wedge | DEC Region 7 Fisheries, Cortland |
| - Dan Bishop | DEC Region 7 Fisheries, Cortland |
| - Steve Effler | Upstate Freshwater Institute |
| - Mike Goldych | Oswego Co. Dept. of Planning |
| - Russ Nemecek | Onon. Co. Health Dept. |
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| - Dave Melfi | US Army Corps of Engineers |
| - John Hassett | SUNY ESF at Syracuse |
| - James Haynes | SUNY Brockport |
| - Paul Bowser | Cornell University |
| - Dieter Busch | United States Fish and Wildlife Service |
| - Russ Weeber | Marsh Monitoring Program of Bird Studies Canada |
| - Helen Domske | Great Lakes Program / Great Lakes Research Consortium |
| - Joe DePinto | Great Lakes Program |
| - John Dergosits | New York Canal Corporation |
| - Bruce Kirschner | International Joint Commission |
| - Margit Brazda | Monroe County, New York (Rochester Embayment RAP) |
| - DEC Authors | Wendy Rosenbach, Richard Draper, Lois New, Gerry Mikol, Tom Cullen, Marna Gadoua. |
| - DEC Research | Simon Litten, Bob Lange, Larry Skinner, Tim Sinnott, Frank Estabrooks, Bruce Garabedian, Phil O'Brien, Jay Bloomfield, Bob Collins. |
| - DEC Assistance | Colby Tucker, Sharon Thatcher, Libby Smith, Sue Balmuth, Rich Georgeson, Fran Verdoliva, Norm Boyce, Charles Branagh |

* current RAC members who were also original committee members

APPENDIX B

Oswego River Remedial Action Plan Remedial Advisory Committee Indicator Evaluation Strategy

Context: The systematic evaluation of impairments in the context of the Oswego River Area of Concern (AOC) is considered an administrative (dynamic and diverse multipurpose group) process supported by defensible scientific information. As such, designation of an impairment as “Not Impaired” may not meet the rigors of a scientific investigation and associated statistical evidence requirements. By the very nature of this program (addressing use impairments), actions taken by the Remedial Action Committee (RAC) require public input and we will strive to achieve public acceptance of any outcomes. (The RAP delisting criteria in Appendices E and F herein are designed to meet the scientific, public, and ecosystem considerations needs for the RAP Process.)

Primary Objective: It is the mandate of the RAC to support the New York State Department Environmental Conservation (DEC) in addressing use-impairments in the AOC and restoring beneficial uses by ensuring that the water quality is capable of supporting swimming and edible, diverse, and self-sustaining fish and wildlife populations. Once the RAC has achieved closure on all the use impairments, it will recommend to the DEC that the AOC be delisted.

Area of Concern (AOC): The Area of Concern is delineated by geographical boundaries without reference to ecological, chemical or other riparian characteristics. This AOC is defined as including the Oswego River downstream from the Varick Dam to and including the Oswego Harbor.

Use Impairments: Fourteen (14) use impairment indicators were developed by the International Joint Commission as a common means to assess all Great Lakes’ AOC use impairments. Their status in the Oswego River AOC is given in (Table 2 of the Stage 3 document). In 1990, the status of each impairment indicator has been categorized as “Impaired”, “Likely Impaired”, “Not Impaired”, or “Unknown”. (Use impairment status was defined without conducting new study and was determined by assessing available technical information and the RAC member’s understanding of the AOC and its watershed.) In Stage 3 each indicator has been resolved.

Objectives and Measurable Endpoints: In the context of the International Joint Commission, “re-designation” (or resolved) shall mean that the beneficial uses for each use impairment are considered restored and protected and that the re-designation criteria have all been achieved. In order to evaluate the status of each use impairment it is therefore necessary to have agreed upon re-designation criteria. Each criterion shall have measurable and unambiguous endpoints that when evaluated will indicate whether a use impairment can be considered for assignment to another agency or re-designation. The rationale for re-designation should be recorded along with the supporting data and any stipulation for further monitoring requirements.

Strategy Conditions: The following conditions will be held by the Remedial Advisory Committee in conducting an evaluation of the status of each use impairment:

- A. The programmatic assessment (systematic evaluation) of use impairments is limited to the confines of the Area of Concern, as defined by DEC. The RAC will only evaluate use impairments for re-designation which are caused by an activity or condition originating from within the AOC. However when a use impairment within the AOC is the result of an activity or condition outside the AOC the Oswego RAC will address it as indicated in item #1, of the indicator evaluation strategy (strategic approach) below.
- B. Based on the Stage 1 definitions, all 14 programmatic use impairments in the Oswego AOC had status designations ranging from “Impaired” to “Unknown” to “Not Impaired”. However, as re-designation criteria have been developed and finalized each of the status designations has also been reevaluated.
- C. “Re-designation” in the context of this RAC is defined as meeting one or more of the following conditions:
 - 1. Sufficient scientific and public input information exists such that the evaluation with the re-designation criteria supports a re-designation to that of “Not Impaired”.
 - 2. Where the source of a use impairment is an activity or condition outside the AOC, the RAC can recommend to DEC its reassignment if an organization can be identified as being responsible for addressing the source. Where the source of the impact or organization can not be determined by the Oswego RAC, notification will be made to DEC of such status. Any reassignment by the DEC shall not eliminate the responsibility for tracking progress of remediation activities and ultimately re-designating of the use impairment when such is verifiable (in the AOC as well as lakewide or in the watershed).
 - 3. A recommendation by the RAC for a use impairment re-designation within the jurisdiction of the RAC shall include public input as determined by any acceptable and agreed upon method for soliciting input from the public.
- D. Delisting of the entire AOC is the responsibility of the DEC once it is assured that all the use impairments have been either reassigned or re-designated to “Not Impaired”. This will include specifically all impairments in the AOC that were addressed by the RAC, and upon recommendation to the DEC were reassigned by DEC to another agency or responsible organization.

This proposed strategy contains an overall philosophy that recognizes that the AOC is geographically defined and that the RAC is not responsible for activities and conditions outside the designated AOC. It also places a high value on public input in determining the status of each use impairment within RAC jurisdiction and also the overall delisting of the AOC. Ultimately recommendations made by the RAC fall within the responsibility of the DEC to provide for the final disposition of the Area of Concern.

OSWEGO AREA OF CONCERN IMPAIRMENT EVALUATION

RAC Indicator Evaluation Strategy [STRATEGIC APPROACH]

Background: This evaluation strategy is to be used to evaluate the status of the fourteen (14) current use impairment indicators identified for the Oswego River Area of Concern (AOC) and to develop a systematic process for re-designating each impairment and delisting the AOC.

The strategy is formulated around five primary issues. These issues are identified and briefly discussed below:

1. How do we address use impairments that are caused by activities outside the AOC?
Remedial Advisory Committee (RAC) members should be concerned with use impairments affecting the AOC that are caused by activities either from within or from outside the AOC. Where a use impairment is caused by activities or conditions upriver or in Lake Ontario, the RAC should attempt to identify an organization that is responsible for addressing the cause of the impairment. The RAC is responsible for making recommendations to the NYS Department of Environmental Conservation (DEC); however, corrective action in such cases is beyond the scope of the Oswego RAC.
2. How do we address impairments to determine if they are ripe for closure and re-designation?
To address impairments the RAC is responsible for developing “re-designation criteria” and determining if the current state of the impairment meets the criteria. The RAC should finalize the criteria, evaluate existing data, and identify monitoring requirements (if any) required to fully assess the status of all the use impairments. Determinations made by the RAC relative to the criteria shall be used to support the “re-designation” of the use impairments.
3. What does “delisting” mean in dis-positioning impairments?
Closure in this strategy means that all re-designation criteria for a given impairment have been achieved and/or the responsibility for addressing said impairment has been identified as that of another party (e.g. dis-positioning of the fish advisory to the Lake Ontario LaMP).
4. How do we interact more comprehensively with the public?
Interaction with the public will require public information meetings at each significant juncture of the re-designation process. Additional information can be collected through the development and dissemination of a questionnaire.
5. How do we communicate RAC results to the public?
Communicating with the public to inform them of the RAC progress can be accomplished through the use of the newspapers, newsletters, brochures, and perhaps even a video that could be made available to the public. A public information meeting is recommended to accomplish delisting of the Area of Concern.

12/6/00

APPENDIX C

TABLE 4 - OSWEGO RIVER AREA OF CONCERN

Remedial Advisory Committee Endpoints and Status

IJC USE IMPAIRMENT INDICATOR	ENDPOINTS	RELEVANT INFORMATION	STATUS
1.Fish and wildlife* consumption restrictions	Removal of (lakewide) fish consumption advisory (for humans).	Monitoring (sample and data results); Health advisories by NYS Dept. of Health [1]	Impairment due to lakewide and upstream advisories; Not specific to Area of Concern.
2.Degradation of fish and wildlife* populations	Fish and wildlife populations substantially similar to reference area communities	Comparative community structure evaluation of reference area populations [2]	Impairment linked to Habitat indicator; Lack of evidence for impaired status in the Area of Concern
3.Loss of fish and wildlife* habitat	No restricted use of fish habitat from river flow or contamination	FERC "Run-of-River" proposal and final license requirements. [2]	Impairment due to river flow; FERC license to rectify. Evaluate and monitor to verify.
4.Eutrophication or undesirable algae	Water quality standards achieved; Beneficial use goal met and maintained; No persistent water quality problem due to cultural eutrophication	Water quality survey results do not indicate eutrophic conditions; No undesirable weeds or algae present [3] (See Aesthetics indicator for nuisance)	Not Impaired - (seasonal algae observed in lock area is not a natural part of the AOC environment; weeds constitute managed nuisance condition)
5.Degradation of benthos	Benthic community integrity substantially similar to reference communities	Comparative community structure study results [4]	Not Impaired - (monitoring data supports)
6.Fish tumors or other deformities	No abnormally high incidence of tumors and deformities	Comparative evaluation of deformities in reference populations [5]	Not Impaired - (monitoring data supports)
7.Bird or animal deformities or reproductive problems	No abnormally high incidence of deformities or reproductive problems	Comparative evaluation of deformities and reproductive problems in reference populations [6]	Not Impaired - (monitoring data supports)

8.Degradation of aesthetics	Absence or minimal presence of floatable material or odors; Weeds controlled to non-nuisance level	No floatable materials or odors evident; Weed nuisance addressed by weed harvesting	Not Impaired - (Harbor Survey monitoring data supports) [3]
9.Degradation of plankton populations	Substantially similar plankton populations to reference populations	Comparative evaluation of plankton populations in reference populations	Not Impaired - (Harbor Survey monitoring data supports) [3]
10.Restrictions on dredging activities	No US Army Corps of Engineers restrictions on dredging	NYSDEC dredging approval and 401 Water certification with lake disposal	Not Impaired - (Harbor Survey monitoring data and actions support) [3]
11.Beach closings	All beaches in AOC open to swimming	There are no public beaches in the AOC; Secondary contact is safe and not restricted	Not Impaired - (not specifically applicable to AOC)
12.Tainting of fish and wildlife flavor	No evidence of fish or wildlife tainting	Fish and wildlife pathology studies confirming status	Not Impaired - (study addressed fish; no evidence of wildlife tainting)
13.Drinking water restrictions, Taste and odor problems	No drinking water restrictions, taste, or odor problems	Not impaired based on water quality studies in Harbor Survey and RIBS studies	Not Impaired - (Harbor Study and RIBS monitoring data supports)
14.Added costs to agriculture or industry	No abnormal added costs to agriculture or industry.	No added costs to industry and no agriculture use of AOC waters.	Not Impaired -

[1] = NYSDEC, 2002, Young-of-Year report and NYSDOH Fish Advisory pamphlet

[2] = Study not yet available; to be addressed under larger management plan (e.g. LaMP; FERC)

[3] = NYSDEC, 1994, Oswego Harbor Survey

[4] = NYSDEC, 1999, Rotating Intensive Basin Studies and Water Quality trend studies

[5] = Jan Spitsbergen, 1995, Fish Pathology Study

[6] = Environment Canada, Birds Study Canada, and EPA, 1999, Marsh Monitoring Program.

* = Use Impairments for the Oswego RAP involve only fish (i.e. no wildlife impact identified)

APPENDIX D

Workshop Summary Results

(Conducted in Oswego, New York on June 18-19, 1998)

I. The purpose of the Oswego River RAP Workshop was to:

- ◆ Report on study results and environmental program activities in the Oswego Area of Concern and the Seneca-Oneida-Oswego Rivers drainage basin as they directly relate to the use impairments identified in the RAP; and to
- ◆ Use this information and the improved understanding to better define the next steps and needed actions to restore and to protect the Oswego River AOC; and to
- ◆ Report on the workshop proceedings such that the Remedial Advisory Committee may apply the information to review the use impairment indicator status, assess progress, further define delisting criteria, and refine remedial strategies to achieve the goal of restoring and protecting the Area of Concern.

II. Results [*Comments, Recommendations, and Impressions*]

A summary of the results of the Oswego RAP workshop are presented below in three sections: overall comments, a list of recommendations, and impressions/concluding statements.

◆ **Comments**

The Oswego River RAP Workshop provided a (an):

1. Wonderful two day learning session
2. Forum to clarify mis-information
3. Opportunity to ask questions and obtain clarification
4. Opportunity to meet and discuss with technical experts
5. Opportunity for new contacts (e.g. Canadian Marsh Monitoring Program)
6. Good exchange of ideas
7. Good cross section of presenters and presentations
8. Step forward in integrating water quality and fish/wildlife natural resource information

Suggested Improvements for future workshops and RAP activities are:

1. Additional citizen participation
2. Better Communications among RAP area technical persons (e.g. study results)
3. Additional time to discuss subject matter
4. Implementation activities that go beyond receiving and collecting information

◆ **List of Recommendations**

The Oswego River RAP Workshop included many presentations. Presentation abstracts were provided to the participants as handouts at the beginning of the workshop. Some abstracts were developed after the workshop. Below is a brief version of the recommendations which are excerpts of the presentation abstracts. Complete narratives of the abstracts and the recommendations are presented in the May 1999 Oswego River RAP Workshop Summary and RAP Update and Appendix documents. The summary listing of the recommendations from the presentations / abstracts follows. Below, a check (✓) has been added to each to show the concern/ action has been addressed to a satisfactory degree.

1. Focus on the Area of Concern to resolve use impairment status.✓
2. Pursue stakeholder involvement.✓
3. Develop delisting criteria.✓
4. Work on the implementation of selected achievable projects.✓
5. Involve the research community more in data review and recommendations.✓

6. Apply a watershed approach to address water quality problems in L. Ontario.✓
7. Coordinate nonpoint project implementation with local officials.✓
8. Obtain professional recommendations and leadership for decisions.✓
9. Communicate progress, recommendations, and decisions to the public.✓
10. Work through watershed organizations (FL-LOWPA) to achieve RAP goals.✓

11. Restore habitat below the Varick Dam.(FERC license does) ✓
12. Implement DEC's Fisheries Enhancement Plan.(under FERC provisions) ✓
13. Apply a "whole system approach" to the basin to address use impairments.✓
14. Convene a conference: assess environment, report on health. (too big for RAP) ✓
15. Report on new air regs. progress; relate regional data to impacts on the AOC.✓

16. Increase representation on the Remedial Advisory Committee.✓
17. Increase level of and specificity of studies. (e.g. contaminant sources) ✓
18. Report on human health information to benefit all AOCs. ✓
19. Define sound remedial strategies regardless of cost. ✓
20. Maintain protection and remedial efforts; increase monitoring activities.✓

21. Develop local watershed plans for waterbodies not yet addressed.(e.g. WRAPS) ✓
22. Obtain commitments and funding (local & other) to implement local plans. ✓
23. Repeat toxicity testing (Re: cause/source of any toxicity).✓
24. Conduct further water quality sampling (Re: plankton or BOD problem).✓
25. Conduct add'l mirex study (Re: possible Lake Ontario loading source).✓

26. Conduct add'l quantitative sampling (Re: identify possible loading sources).✓
27. Continue to implement drinking water source protection programs.✓
28. Conduct add'l sediment sampling (Re: harbor, lower river, and Battle Island)✓
29. Complete hazardous waste site remediation; assure no ongoing impact.✓
30. Investigate the Armstrong site for an ongoing source of mirex leachate.✓

31. Continue chemical residue sampling of fish and advisory assessment.✓
32. Implement Fisheries Enhancement Plan and restore flow and habitat.(FERC) ✓
33. Use trend data and fish and wildlife goals to address impairments.✓
34. Additional marsh monitoring data (bird and amphibian) is needed.(obtained) ✓
35. No fish tumor impairment found; if needed, pursue fish reproduction study.✓

36. New power dam owners (or others) need to address habitat issues.✓
37. RAP strategies need to be adaptive and flexible to changing dynamics.✓
38. Complete the delisting criteria and apply to use impairment reassessment.✓
39. Involve the public in the RAP process and get out the information.✓

◆ Impressions / Concluding Statements

These are key results from participants of the workshop provided as impressions and concluding statements to observing the workshop presentations and panel discussions:

1. The loss of fish habitat appears to be the only use impairment that the Remedial Action Plan and the Advisory Committee will be able to take action on and cause an effect. The resolution of other use impairments are either dependent on larger regional actions, require more information to make a determination, or are considered not impaired. The suggested “White Hypothesis” by definition dictates that we pursue remedial activities only on this known fish habitat impairment for which we can cause improvement.
2. One result of the workshop is the perception and understanding that the data indicate that most problems and causes are coming from outside the Oswego River Area of Concern (AOC).
3. There is a frustration with the AOC vs. a watershed focus in dealing with the Oswego River use impairments. (i.e. the AOC limits the scope of the impairment).
4. We need to apply both a watershed and ecosystem approach and make a connection. The RAP cannot proceed without recognizing the watershed link.
5. The major unique problem of the Oswego River RAP is the habitat impairment below the Varick dam which needs to be resolved; other problems are watershed related and a watershed approach is needed.
6. Workshop participant notes: impressed with the number of people that are disappointed with the lack of resolution of the power dam relicensing process and the restoration of the habitat impairment.
7. Outside of the dam relicensing process under FERC, the Thruway Authority needs to be contacted regarding resolving the minimum flow issue. (The New York State Canal Corporation was involved in the process to address this concern.)
8. Fish habitat restoration should be a concrete action item to focus on and get money for and gain recognition for to restore the beneficial uses.
9. It’s interesting how the AOC groups (RACs/PACs) struggle with aligning the AOC definition with the work to be done and the problems and causes. At the same time larger scope environmental groups (e.g. Bird Studies Canada) operate on a watershed basis and are willing to assist and work with RAP efforts.
10. We need to improve the integration of information and data from water quality, habitat, sediment, and fish to better define what we do and do not know, and what needs to be accomplished.

11. The Oswego RAP has created a good foundation of public information but there needs to be an update to the slideshow (to a video). The workshop needs to have a brief executive summary of the proceedings prepared and distributed broadly among the public. (Power Point presentation and summary developed.)
12. The RAP and the implementation of remedial actions should move ahead and not wait for International Joint Commission actions or positions.
13. Delisting criteria are needed to be defined. The RAP committee should work on things that they can influence or control and not deal with other issues.
14. Additional citizen education and involvement with the RAP is needed. A workshop or forum format provides a good opportunity to increase public participation. Summary materials are needed in libraries and academic locations.
15. Overall, people do not have a good understanding of the issues. Is this needed? (Developed in Power Point presentation and delisting document)
16. A distillation of the important projects to focus on and achieve the goals of the RAP is needed. The workshop contributed to this effort.
17. Improved distribution of RAP related information is needed. The Area of Concern designation should not “scare one away”.
18. The workshop met the expectation to have a tool to assess the status of the RAP. There is a tremendous amount of information. Future workshop efforts should “trim” some material.
19. If done again, a workshop like this may be good to have prior to a Stage 2 report. There is no need to wait for the International Joint Commission to recognize this RAP effort.
20. The City of Oswego can provide boat access to researchers interested in conducting river/harbor studies and sampling. (Note: additional toxicity testing was conducted in early September 1998 with the City’s assistance; results were negative.)

◆ **Stakeholder Comments (Concluding Workshop Panel Discussion)**

Time constraints limited detailed responses to a prepared sequence of questions in the workshop. Stakeholder comments did focus on key elements noting accomplishments to date and emphasizing the needs to move the RAP process forward. Also, most of the prepared workshop questions had already been addressed in the course of the two-day workshop presentations and therefore additional focus and discussion during this final panel session was focused on stakeholder comments. Following is a narrative of these stakeholder comments provided by workshop participants in this concluding panel discussion session.

1. Water Quality and Remedial Activities Comments:

G. Neal: Significant water quality changes have been observed in the harbor area. Water clarity is improved due to the zebra mussels; however, rooted weed growth has increased. The main problem area is the shallow western part of the harbor. Weed harvesting is performed, but because it is labor intensive, the positive effects are limited.

L. Monostory: Because of the Combined Sewer Overflow abatement actions, the use of the river by fishermen has increased (e.g. walleye fishing good).

G. Neal: The City of Oswego has completed the west side CSO abatement and phase 1 of the east side. Phases 2 and 3 of the east side are being worked on and Phases 4 and 5 remain to be done. Funding for CSO correction is being partially financed by the 1996 Clean Water/Clean Air Environmental Bond Act. (Note: phases 2 and 3 essentially complete in 2001; 4 and 5 ongoing)

J. Haynes: We have concluded that there is a relatively small number of impairments in the Area of Concern that can be acted upon by local organizations or that we can actually do something about. Applying the watershed and ecosystem approaches further expands the scope of work for a RAP. For example, human health issues are involved with and influenced by much more than just the Area of Concern. In this sense, it is extremely difficult to have the RAP act on human health effects. Except for specific site remediation, we are not even sure the Lakewide Management Plans (LaMPs) can adequately address the human health issues. (i.e. may need larger regional approach)

B. Lange: We need to question, that after 12 years of collecting fish data, where do we expect closure of the RAP to be. In the process of trying to prove an area is unimpaired, the next data point may be a smoking gun. The alternative is to establish the null hypothesis (i.e. there is no impairment) and then study the area. Failure to reject the null hypothesis would maintain that environmental goals are intact. (i.e. either way a not impaired conclusion is reached)

L. Wedge: The FERC relicensing for the power dams is the process that is needed to address and resolve the fish habitat and population use impairments in the Area of Concern. Primarily, we need to solve the fish habitat problem. A release flow of 400 cubic feet per second (cfs) is needed; we currently estimate a leakage of 15 cfs. (note: the FERC license fully addresses this concern)

2. Public Participation and Next Steps Comments:

J. Allerton: On the subject of expanding the Remedial Advisory Committee's membership: We need to answer these questions first ourselves before going public.

H. Domske: We need to sell our successes and communicate the trends in the process. Let the public know we have accomplished something and that steps have been taken to address the use impairments in the AOC. The overall strategy and results do not have to be all sorted out; however, the public needs to know the status of the RAP and the problems in order to "buy into" the process and maintain active participation.

M. Goldych: Apply the “White Hypothesis” which is to say that we pursue remedial activities on the one known fish habitat impairment for which we can cause improvement. This one issue, and the defined remedial activities, should be communicated to the public as progress is made as an indication of RAP success.

G.Neal: We would need direction from the International Joint Commission (IJC) to apply the White Hypothesis. It has to do with choosing a path of selecting direct and/or indirect impact effects of the RAP. We do not desire to be accused of “delisting by definition”.

H. Domske: Get the information we know out to the public. Establish a confidence in what we know to advance the RAP process.

L. Monostory: We need to look at our role and responsibility. What is there we can really do as a RAP committee. We need to look at the Oswego River as a watershed. A lakewide watershed approach is needed. The proper organization to address this is the Finger Lakes - Lake Ontario Watershed Protection Alliance (FL-LOWPA). There is a unique weed problem to the AOC.

D. Draper: The Oswego RAP should not try to deal with comprehensive watershed planning as some other RAPs may do; the RAP can however clarify that there is a need for good planning. The “white hypothesis” is not suggesting we go forward without a strategy and restoration actions. The weed problem needs to be added to the RAP.

B. Lange: The weed problem may not be permanent at the level we have now; harvesting and composting contribute to reductions.

J. Ferrante: We need a watershed approach. There is a lot we are not sure of. The workshop has raised questions on the interpretation of study results.

J. Haynes: There are chemicals of concern identified in Remedial Action Plans. There is no significant evidence of tumors in the Oswego River RAP, nor in the nearby Rochester Embayment RAP caused by chemicals of concern. Overall, the effects level at which we provide protection for aquatic life is much lower (i.e. more protective) than the effects level for humans. We need to communicate this protective level to the public.

APPENDIX E

Table 5 - Use Impairment Delisting Criteria Summary

Oswego River Remedial Action Plan
(See Appendix F for Criteria Details)

Impairment Indicator	DELISTING CRITERIA	STATUS
1. Fish Consumption Restrictions	<ul style="list-style-type: none"> * No AOC restrictions due to in-place sources. * Compliance with lakewide fish tissue standards. * Contaminant sources addressed by other Mgt. Plan (e.g. LaMP). * Attain sediment criteria and waste site standards for AOC. (not applicable to AOC; achieved for non-AOC sites) 	<ul style="list-style-type: none"> * Not Impaired * LaMP to Address * LaMP to Address * Not Impaired
2. Degradation of Fish Populations	<ul style="list-style-type: none"> * Conditions provide for healthy and self-sustaining communities. * AOC consistent with other Great Lakes ecosystem objectives. * Attain quantitative fishery targets (biomass, percent, richness) * In the absence of community structure data, bioassays confirm no significant toxicity from AOC water column or sediments. 	<ul style="list-style-type: none"> * FERC to Address * FERC to Address * FERC to Address * Data Supports
3. Loss of Fish Habitat	<ul style="list-style-type: none"> * Habitat (amount and quality) provided below Varick Dam. * FERC relicensing requirements accomplished; habitat protected. * Management plans are established to restore and to protect habitat. * Amount and types of AOC wetlands and other riparian vegetation are adequate and protected. 	<ul style="list-style-type: none"> * FERC to Address * FERC to Address * Completed * Not Impaired
4. Eutrophication or Undesirable Algae	<ul style="list-style-type: none"> * No persistent water quality issue due to cultural eutrophication. * Ambient water quality standards, criteria, guidelines attained. * Beneficial goals are achieved and maintained (boating, fishing) * Weed growth controlled to a non-nuisance level 	<ul style="list-style-type: none"> * Not Impaired * Not Impaired * Data Supports * Data Supports
5. Degradation of Benthos	<ul style="list-style-type: none"> * Macroinvertebrate structure similar to unimpacted control sites. * Mesotrophic species present where suitable substrates are located * Absent community data, toxicity of sediments parallels controls. * Resident fauna do not have elevated contaminants. 	<ul style="list-style-type: none"> * Data Supports * Data Supports * Data Supports * Data Supports
6. Fish Tumors or Other Deformities	<ul style="list-style-type: none"> * Incidence rates do not exceed rates in unimpacted control sites. * No neoplastic or preneoplastic liver tumors in bullheads/suckers. * Attain IJC, state, and federal tissue standards/objectives. 	<ul style="list-style-type: none"> * Study Supports * Study Supports * Study Supports
7. Bird or Animal Deformities or Reproductive Problems	<ul style="list-style-type: none"> * Attain IJC, state, and federal tissue standards/objectives. * Attain appropriate AOC sediment quality criteria. * Deformity or reproductive incident rates less than inland controls * Wetlands support healthy communities of significant species. * Biomonitoring results better than unimpacted control sites. 	<ul style="list-style-type: none"> * Data Supports * Data Supports * Data Supports * Data Supports * Data Supports

Impairment Indicator	DELISTING CRITERIA	STATUS
8. Degradation of Aesthetics	<ul style="list-style-type: none"> * AOC waters devoid of substances producing aesthetic problems. * No increase in turbidity causing a visible contrast to natural. * No visible residue of oil or floating substances. * Acceptable response to spills with preventive measures. 	<ul style="list-style-type: none"> * Study Supports * Not Impaired * Not Impaired * Not Impaired
9. Degradation of Plankton Populations	<ul style="list-style-type: none"> * Plankton community structure similar to unimpacted control sites * Absent community data, no plankton bioassay toxicity impact. * Healthy fish communities present in the AOC. 	<ul style="list-style-type: none"> * Study Supports * Study Supports * Study Supports
10. Restrictions on Dredging Activities	<ul style="list-style-type: none"> * AOC sediments (metals, organics, nutrients) meet stds./criteria. * Restrictions not due to AOC sources; beneficial use protected. * Dredge material disposal does not contribute to use impairments, activities registered and approved, beneficial uses protected. 	<ul style="list-style-type: none"> * Data Supports * Not Impaired * Not Impaired; Data Supports
11. Beach Closings	<ul style="list-style-type: none"> * Waters do not exceed standards, guidelines, or objectives of use. * For beaches: no toxic irritants, numerical and clarity standards attained, and free from public health advisories. * For beaches: daily geometric mean for fecal coli < 100 colonies. * Attain ambient water quality standards for total and fecal coli. * Demonstrate stormwater and CSO areas present no threat. 	<ul style="list-style-type: none"> * Not Impaired * Not Impaired * Not Impaired * Data Supports * Data Supports
12. Tainting of Fish and Wildlife Flavor	<ul style="list-style-type: none"> * No complaints about fish tainting. * Survey results confirm no tainting. * Ambient water quality standards and criteria not exceeded. 	<ul style="list-style-type: none"> * Not Impaired * Not Impaired * Not Impaired
13. Drinking Water Restrictions, Taste and Odor Problems	<ul style="list-style-type: none"> * No taste and odor problems for treated drinking water supplies. * Attain treated drinking water health standards and criteria. * Drinking water treatment requirements not excessive. 	<ul style="list-style-type: none"> * Not Impaired * Not Impaired * Not Impaired
14. Added Costs to Agriculture or Industry	<ul style="list-style-type: none"> * No additional costs to treat water due to AOC or spill conditions. * No treatment impact due to watershed / AOC contamination. 	<ul style="list-style-type: none"> * Not Impaired * Not Impaired

APPENDIX F

Use Impairment Delisting (Restoration and Protection) Criteria

A detailed description of the delisting (restoration and protection) criteria for each use impairment indicator is provided below. The indicators are divided into three groupings based on the Stage 1 evaluation of the impairment status for each indicator. The Group 1 use impairment indicators had a status of impaired; the Group 2 indicators had a status of needing further study; and, the Group 3 indicators had a status of not impaired. A description of the rationale and supporting data needed to address the use impairment is included for each indicator's restoration and protection criteria. The objective, of course, is to achieve each criteria as much as practicable so that the beneficial uses can be evaluated as restored and protected.

[Note: for reference, examples of quantitative objectives and targets for delisting were developed at the Water Environment Federation's 1994 Conference. These are build on with International Joint Commission qualitative guidance criteria for listing and delisting AOCs. This table is reproduced as Appendix E in the 1996 Oswego RAP Update on page 155 of that report.]

Below, the specific narrative standards and guidelines have been developed as the delisting criteria for the Oswego RAP. The desired endpoints and supporting data needed to declare a use impairment indicator as resolved are included. The delisting criteria are presented in three rating groups based on the original indicator's identification as impaired, needing further study, or not impaired. In this Stage 3 document, Table 4 (shown just above as Appendix E) provides a summary of the delisting criteria bullets listed below for use each use impairment indicator for the Oswego River Area of Concern. Table 4 also shows the resolution status of each of these criteria.

Use Impairments rated as IMPAIRED (from Stage 1): Four use impairment indicators for the Oswego AOC were originally identified as impaired. These are discussed below as indicators 1 to 4. The numbering of the indicators is kept consistent throughout the Stage 3 document. Each restoration and protection criteria starts with a "★" point. Wildlife impairments were not identified in the original Stage 1 document and are therefore not addressed in the delisting criteria. Each indicator will be considered resolved and its beneficial use protected by addressing each of the criteria, achieving the needs of the endpoints, and providing supporting data.

1. Fish Consumption Restrictions -

- ★ Restrictions on fish consumption in the Area of Concern due to in-place contaminants are absent. Contaminant levels created by anthropogenic chemicals do not exceed current standards, objectives, or guidelines in all non-migratory fish (none found in AOC).
- ★ From IJC criteria: a short term target based on U.S. Food and Drug Administration (FDA) Action Level of 2 mg/kg PCBs in the edible portion of the fish; and, a long-term target of 0.05 mg/kg in fish tissue. For the AOC, no NYSDOH public health advisories are in effect for human consumption. The Lakewide health advisory applies to the AOC.

★ Any remaining restrictions on fish consumption are due to upstream or downstream sources that are addressed by or are part of other management plans such as the Lake Ontario Lakewide Management Plan (LaMP).

★ Site specific cleanup standards have been accomplished both in contaminated river sediments and land-based hazardous waste sites of the AOC (none as sources in the AOC).

Endpoints: Delisting criteria are satisfied with the absence of fish consumption advisories due to sources in the AOC. The lakewide fish consumption advisory is addressed under the Lake Ontario Lakewide Management Plan (LaMP). State and federal fish standards and objectives addressing chemical contamination in fish flesh are monitored and reported on under the LaMP.

Supporting Data: The fish advisory is not specific to the AOC; it is part of Lake Ontario. The fish consumption restrictions are addressed as a lakewide impairment under the Lake Ontario LaMP which applies to the Oswego AOC. There are no AOC causes or sources.

2. Degradation of Fish Populations -

★ Environmental conditions exist to support healthy, self-sustaining communities of desired fish at predetermined levels of abundance that would be expected from the amount and quality of suitable physical and biological habitat present.

★ In general, fish objectives for the AOC are consistent with other Great Lakes ecosystem objectives (e.g. Annex 2 GLWQA and Great Lakes Fishery Commission goals).

★ Quantitative fishery targets are achieved indicating a self-sustaining community. References: NYSDEC Fisheries Enhancement Plan and other IJC targets which include: kg/ha units of biomass of fish, percent of native species, and species richness.

★ In the absence of community structure data, fish bioassays confirm no significant toxicity from water column or sediment contaminants.

Endpoints: Delisting criteria are satisfied for fish populations when the fish community is determined to be healthy and self-sustaining under the “run-of-river” flow and fish assess is achieved. The environmental impairments to all species are addressed by compliance with the FERC license provisions and are consistent with the GLWQA, Great Lakes Fishery Commission goals, ecosystem objectives, and the NYSDEC Fisheries Enhancement Plan.

Supporting Data: Fish community structure data (number and balance) supports conclusions; abundance and composition is not impaired based on historical data. Desired levels within a statistical range achieved. Sediment bioassays with fish confirm no significant toxicity. Surveys indicate healthy, reproducing populations of benthivores and piscivores. Goals are to have a catch rate ranging from 0.1 to 0.5 fish per hour of legal size, and 150,000 annual fishing trips (70% salmonid, 25% gamefish, 5% panfish).

3. **Loss of Fish Habitat -**

- ★ Amounts and quality of physical, chemical, and biological habitat required to meet fishery management plans has been provided below Varick Dam
- ★ Federal Energy Regulatory Commission (FERC) relicensing requirements are accomplished to enhance and protect habitat.
- ★ Fisheries enhancement management plan and/or local plans established to restore and to protect habitat in the AOC.
- ★ Amount and type of AOC wetlands and other riparian vegetation adequate with beneficial uses protected.

Endpoints: Delisting criteria are satisfied when there is no restricted use of fish habitat from flow or contamination below the Varick Dam. By employing “run-of-river” flow, proper dam operation assures fish access and restored conditions such that the fish community is dependent of Lake Ontario. The goal is to achieve the fisheries enhancement plan objectives. The habitat creation will be based on compatibility with other use goals having an acceptable balance among habitat, fishing, and boating interests. The post-power dam construction habitat requires a minimum flow to prevent dewatering below the dam during fish spawning. Stakeholders, Remedial Advisory Committee members, and biological habitat assessment professionals have identified minimum flows are required to produce acceptable habitat levels and restore and protect fish populations.

Supporting Data: The desired habitat and fishery objectives are described in the NYSDEC Fisheries Enhancement Plan. The restoration of a modified “run-of-river” flow will provide the necessary conditions for habitat rehabilitation and protection. Supporting information documents that the end result of restoring the habitat below the Varick Dam will address the fishery impairment (i.e. adequate habitat will be present with no additional loss attributable to water or sediment quality). The FERC relicensing provisions address the impairment. The goals include accommodating 1000 smelt fishing trips with a mean harvest of 50/ trip.

4. **Eutrophication or Undesirable Algae -**

- ★ No persistent water quality problems attributed to cultural eutrophication (e.g. none of the following present: dissolved oxygen depletion of bottom waters, nuisance algal blooms or accumulation, decreased water clarity).
- ★ Ambient water quality survey data consistently equal to or better than standards, criteria, or guidelines.
- ★ Beneficial goals are achieved and maintained including boating, fishing, sightseeing, nature observation, aesthetics, passive and active recreational activities.
- ★ Undesirable weed growth has emerged as a problem. Ongoing weed harvesting is performed to combat weed growth. Maintenance of weed harvesting must achieve weed control to a non-nuisance level.

Endpoints: Delisting criteria are satisfied when survey results indicate phosphorus concentrations and loadings, chlorophyll, ammonia, water clarity, dissolved oxygen and other ambient water quality levels are consistently better than standards, criteria, and guidelines. The observation of algal blooms in the AOC or downstream needs to be evaluated as to the cause, the undesirable nature and any proposed remedial action.

Supporting Data: Suggested thresholds for ambient water quality comparisons in the AOC include lake parameters and values: phosphorus concentration < 20 ug/l (lake), Secchi disc transparency > 1.2 meters, dissolved oxygen > 6 mg/l, unionized NH₃ < 0.02 mg/l.

Use Impairments rated as NEEDING FURTHER STUDY (from Stage 1): Five use impairment indicators had an impairment status of likely, unknown, or under expanded review. Further investigation and evaluation was identified and conducted to certain degrees. With sufficient information to address the restoration and protection criteria, the status of each indicator was reassessed by the Remedial Advisory Committee and NYSDEC to indicate not impaired. The revised status shows the indicator as resolved by the RAP process, with the RAP goals satisfied, and the beneficial use(s) restored and protected. [Note: the Stage 1 indicators resolved by further study are numbered from 5 to 9. Each restoration and protection criteria starts with a “★” point. The desired endpoints and description of the supporting data are included.]

5. Degradation of Benthos -

- ★ Benthic macroinvertebrate community structure does not significantly diverge from unimpacted control sites of comparable physical and chemical characteristics.
- ★ In the absence of community structure data, the toxicity of sediment-associated contaminants is not significantly higher than unimpacted control sites.
- ★ Populations of mesotrophic species are present in the benthos where suitable substrates are located (i.e. waters with moderate nutrients have species diversity).
- ★ Resident fauna do not have elevated levels of contaminants.

Endpoints: Delisting criteria are satisfied when benthic surveys demonstrate a healthy community. In the absence of community data, sediment quality criteria are to be achieved such that no threat is evident. Because of boating and shipping, the emphasis is placed on demonstrating the absence of acute and chronic toxic effects of sediment associated contaminants and on demonstrating bioassay results comparable to controls.

Supporting Data: Results from the benthic macroinvertebrate community structure surveys conducted under the 1997 Oswego River Sediment Study and the Rotating Intensive Basins Survey (RIBS) document a healthy benthic community in the AOC. Water quality studies reinforce the conclusion and further support the AOC as comparable to unimpacted control site composition. To assure protection an expanded biological screening network is being sample by NYSDEC.

6. Fish Tumors or Other Deformities -

- ★ Incidence rates of fish tumors or other deformities do not exceed rates at unimpacted control sites.
- ★ Survey data confirm the absence of neoplastic or preneoplastic liver tumors in bullheads or suckers.
- ★ Compliance with IJC, state and federal biological tissue standards or objectives.
- ★ No reproductive deformities in observed resident species.

Endpoints: Delisting criteria are satisfied when survey results are consistent with expert opinion on tumors and there are no reports of tumors or other deformities based on acknowledged background incidence.

Supporting Data: The 1994 Fish Pathology Study results confirm the absence of tumors and demonstrate no significant difference from control sites. Other studies document that the AOC and watershed sources are not the cause of any reported incidence specific to the Area of Concern. Fishing and nature observation goals are met.

7. Bird or Animal Deformities or Reproductive Problems -

- ★ Compliance with IJC, state and federal biological tissue standards or objectives.
- ★ Compliance with the establishment of appropriate sediment quality criteria.
- ★ Incidence rates of deformities (e.g. cross-bill syndrome) or other reproductive problems (e.g. egg-shell thinning) in sentinel wildlife species do not exceed background levels of inland control populations.
- ★ Wetlands support healthy communities of significant species.
- ★ When conducted, biomonitoring study results are better than standards or objectives when compared to unimpacted control sites.

Endpoints: Delisting criteria are satisfied when studies demonstrate compliance with tissue standards or objectives which indicates healthy communities; this protection level serves to prevent the initiation of tumors and deformities in species and their consumers. Incidence rates should not exceed control sites. Without sufficient evidence to suggest further study, an extensive biomonitoring program is not warranted.

Supporting Data: Survey results from the Canadian Marsh Monitoring Program show that bird, animal, and amphibian populations confirm the absence of deformities or reproductive problems and demonstrate no significant difference from control sites. AOC and watershed sources are not the cause of any incidence. Measurements verify a healthy community and population balance. Habitat and nature observation goals are achieved.

8. Degradation of Aesthetics -

- ★ AOC waters are devoid of any substance which produces a persistent objectionable deposit, unnatural color, or turbidity, or unnatural odor (e.g. oil slick, surface scum).
- ★ No increase in turbidity that would cause a visible contrast from natural conditions.
- ★ No visible residue of oil or floating substances.
- ★ Any sightings of oil, scum, floating objects, or reports of objectionable odors are spill related and at a frequency of occurrence and cleanup response acceptable to the public (instances of repeated spills require improved response and prevention measures).

Endpoints: Delisting criteria are satisfied when the narrative standards for ambient water quality parameters such as suspended solids, oil, and color are achieved. These require no presence that would adversely affect the waters best use or interfere with achieving the beneficial use goals.

Supporting Data: Document that the quantitative targets established for dischargers having the potential to cause such conditions are achieved: 3 mg/l for suspended solids, 15 mg/l for oil and no floating substances. Verify that water clarity data, bioassay, and bacteria survey data support aesthetic use goals. Document that the implementation of remedial measures involving physical construction provide protection of beneficial uses and improve AOC aesthetics. Apply the Priority Waterbody List (PWL) to characterize conditions.

9. Degradation of Plankton Populations -

- ★ Phytoplankton or zooplankton community structure does not significantly diverge from unimpacted control sites of comparable physical and chemical characteristics.
- ★ In the absence of community structure data, plankton bioassays confirm no toxicity impact in ambient waters (i.e. no growth inhibition).
- ★ Healthy fish communities are present in the Area of Concern which indicates a viable plankton community.

Endpoints: Delisting criteria are satisfied when plankton community information support no significant impact. A healthy fish community can assist in demonstrating healthy plankton. Bioassay data should confirm no significant toxicity in ambient waters in accordance with AOC beneficial use goals.

Supporting Data: Plankton community structure data and bioassay toxicity data (from the 1994 Oswego Harbor Survey) support the observation of no significant impact to the plankton community structure. This favorable conclusion is reached when comparing the AOC to unimpacted sites in population, composition, and statistical variability and considering the flow through environment of the lower Oswego River and harbor.

Use Impairments rated as NOT IMPAIRED: From the Stage 1 document, five use impairment indicators have a status of not impaired. Upon confirming that all defined restoration and protection delisting criteria have been achieved, these five use impairment indicators have been further verified as not impaired with beneficial use protected. [Note: the Stage 1 indicators identified as not impaired are numbered below from 10 to 14. Each restoration and protection criteria starts with a “★” point. The desired endpoints and description of the supporting data are included.]

10. Restrictions on Dredging Activities -

★ Concentrations of metals, trace organic compounds and nutrients in the sediment within the AOC (located within the actual or potentially expanded areas of shipping and maintenance dredging) do not exceed the sediment quality standards, criteria, or guidelines for acceptable dredge and disposal material (lowest effect levels), except where background concentrations exceed levels.

★ When sediment criteria are exceeded, any restrictions on dredging are specific to in-place conditions located within the actual or potential shipping routes and are not attributable to current AOC watershed contributions. Restricted dredging activities are registered with and have appropriate authority approval. Restrictions do not contribute to other use impairments and assure beneficial use protection.

★ When restricted dredging is approved, sediment disposal activities are also registered and approved by appropriate authority. These disposal activities do not contribute to other use impairments and assure beneficial use protection.

Endpoints: Delisting criteria are satisfied when contaminants in sediments do not exceed standards, criteria, or guidelines such that they are not causing restrictions on the dredging. In cases where restrictions exist, dredging and disposal activities are approved such that activities do not contribute to other use impairments while use protection is provided. Restricted dredging areas can only be due to in-place conditions and can not be the result of a currently active AOC source or other watershed source.

Supporting Data: For the AOC, the 1997 Oswego River Sediment Study core sample results show compliance with sediment quality standards, criteria and guidelines. No dredging restrictions exist. Data reported for various sites along the river indicates certain upstream local sites may be contaminated. Further sampling and assessment was conducted which determined no significant threat to the environment. Additional upstream local non-AOC biological research is under consideration. Maintenance dredging and disposal activities for the AOC are permitted and monitored which assures beneficial use protection. Toxicity testing supports the not impaired status.

11. Beach Closings -

★ When waters, which are commonly used for total body contact or partial body contact recreation, do not exceed standards, objectives, or guidelines for such beneficial use.

★ For public swimming beaches, the waters must be free of chemical substances capable of creating toxic reactions or irritations to skin/membranes, must achieve numerical and clarity standards for safety, and must be free of public health advisories.

★ Beaches are considered safe for swimming when the daily geometric mean of a minimum of five fecal coliform samples collected from different sites within the beach area is less than 100 colonies per 100 ml. based on standardized sampling protocols.

★ Ambient water quality standards are not exceeded: The monthly median value for total coliforms per 100 ml., and more than 20 percent of the samples, from a minimum of five samples, does not exceed 2,400 and 5,000 respectively. The monthly geometric mean of fecal coliforms per 100 ml. from a minimum of five samples, does not exceed 200.

★ Exceptions apply to stormwater events in non-bathing beach areas located downstream below combined sewer overflows. Monitoring may indicate some standards and guideline exceedences; however, these non-bathing partial body contact areas must present no threat to downstream designated bathing areas.

Endpoints: Delisting criteria are satisfied when bathing beach and partial body contact water standards and guidelines are met. Concentrations of fecal coliform and E. coli should be consistently below 100 colonies per 100 ml. sampled.

Supporting Data: Since there are no bathing beaches in the AOC, this indicator is not applicable. AOC open water quality surveys indicate the beneficial use of partial body contact in the non-bathing area of the lower river and harbor is not impaired. In fact primary contact uses are known to be supported. Compliance with water quality regulations is documented and therefore protection against health threats is assured.

12. Tainting of Fish and Wildlife Flavor -

★ There are no complaints about fish tainting.

★ Survey results confirm no tainting of fish and wildlife flavor.

★ The presence of tainting contaminants (such as phenols) in the water column do not exceed ambient water quality standards and criteria.

Endpoints: Delisting criteria are satisfied when there is an absence of reports of fish tainting and surveys support this conclusion. Compliance with ambient water quality standards, objectives, and guidelines indicates no tainting problem.

Supporting Data: Documented reports and ambient water quality data support beneficial use goals for the AOC. No tainting is reported by sporting interests.

13. **Drinking Water Restrictions, Taste and Odor Problems -**

- ★ The absence of taste and odor problems for treated drinking water supplies.
- ★ No exceedence of human health standards, guidelines, or objectives for treated drinking water supplies for densities of disease causing organisms or concentrations of hazardous or toxic chemicals or radioactive substances.
- ★ For treated drinking water, the treatment needed to make raw water suitable for drinking does not exceed the standard treatment used in other comparable portions of the Great Lakes which are known not to be degraded (e.g. settling, coagulation, and disinfection treatment is standard).

Endpoints: Delisting criteria are satisfied when standard drinking water treatment practices are employed and human health standards and guidelines are achieved. Contaminants from the Area of Concern watershed and the AOC should not be causing drinking water quality problems in the AOC or contributing to impacts on drinking water quality in areas outside of the AOC.

Supporting Data: The AOC is not a source of drinking water, therefore the indicator use is not applicable to the AOC. If it were, ambient water quality and treated drinking water quality survey data for the AOC waters would confirm compliance with the New York State standards and guidelines. Further, we know that there is no significant health impact from the area surrounding the Area of Concern.

14. **Added Costs to Agriculture or Industry -**

- ★ No additional costs are required to treat water prior to use due to contamination or spills within the Area of Concern.
- ★ No downstream impact due to watershed or AOC contamination.

Rationale: Delisting criteria are satisfied when there are no additional costs required to treat the water prior to use for agricultural or industrial purposes (e.g. livestock watering, irrigation, crop-spraying, non-contact food processing, industrial application).

Supporting Data: There are no reports of increased costs to agriculture or industrial business due to spills or in-place contamination affecting water use in the AOC. No known added costs are identified.

APPENDIX G

Responsiveness Summary on Comments

Note: The Comments and Responses are grouped into common topics. Each group starts with the symbol “▶” and is identified under the following six topics: RAP Process and Document, AOC and Sources, Delisting Considerations, Fish Impairments, Upstream Contaminated Sediments, and Eutrophication, Algae and Water Quality.

▶ RAP Process and Document:

1. Comment - Section II.E; Synopsis - “... progress has been achieved in documenting the resolution of the use impairment indicators.” What would a simple list be of what we have changed?

Response - The RAP Process has involved the public for over ten years in the awareness of activities affecting Oswego and in taking positions and making recommendations on these activities and surrounding issues. By representing stakeholder interests in the Oswego River/ Harbor area, the Remedial Advisory Committee (RAC) accomplished the recognition of the importance of this area as a natural resource and thereby encouraged others to act responsibly. For example, the City of Oswego has revitalized the downtown area, the Port Authority has made many improvements, boating and fishing interests have grown, and water quality has improved. The RAC stakeholders have identified, influenced, and observed the implementation of many corrective actions in the Oswego watershed. Upstream hazardous waste site remedial decisions and clean up actions (see Appendix K, first bullet, for 9 sites) have taken into consideration downstream impacts including effects on the Oswego River AOC. The sediment and water quality investigative studies (Appendix H.28 and H.35 respectively) were conducted and concluded no impairments are present in the AOC. The academic community has received research funding based on the AOC designation and is concerned about upstream watershed contamination. The major phases of combined sewer overflow correction by the City of Oswego have been accomplish (reference Appendix K, third bullet, under item #2 on municipal point source permits and item #3 CSOs) partly because of the committee’s emphasis on restoring beneficial uses to the AOC. Recreational interests have been protected by the AOC designation and responsible agencies’ oversight.

As a result of contamination concern, State and Federal health agencies conducted a “Health Consultation” involving the Armstrong Cork Landfills to address Mirex and PCBs. This action lead to further contaminated sediment investigation activities upstream in the Oswego River. More recent sediment studies have identified contaminated sediments in the Battle Island area of the Oswego River and downstream of the Armstrong site. The academic community remains concerned about the existence of any environmental impact regarding upstream out-of-AOC contamination. Currently, the contamination amount, concentration, and threat as assessed by DEC do not warrant any action. A Health Consultation report was developed in 1996 by NYSDOH in cooperation with the US Agency for Toxics Substances and Disease Registry (Appendix H.61) to assess concerns about the Armstrong landfill remediation, the impact on the Oswego River, and how information on the fish consumption advisories is distributed. The report did not identify any significant issue or follow-up action. Previous landfill remediation at the Armstrong site included draining, filling, and capping a lagoon as well as capping two site landfills.

Progress has been documented in the reduction of pollutants into the watershed and AOC through the following activities: hazardous waste site remediation (Appendix K), contaminated river sediment study (Section III.B.10), fish population and habitat study (Section III.B.2&3), related Lake Ontario LaMP study (Appendix H.27), Bird Studies and Marsh Monitoring from Canada (Section III.B.7 and Appendix M), point source discharge control, municipal wastewater treatment and combined sewer overflow reductions (all Appendix G, third bullet), air pollution control implementation (Appendix K, fifth bullet), environmental and human health assessments (Appendix K, seventh bullet), water quality and benthic studies (Section III.B.4&5), fish pathology study (Section III.B.6), public participation, newsletters, workshop, and committee meetings (Appendix K, eighth bullet). Each of these topics is addressed under one of the nine major bullet points contained in Appendix K or in the identified Section in the Stage 3 document.

What the RAC has performed is the application of the body of knowledge, through an ecosystem approach, to the Area of Concern. In so doing, the RAC has resolved the status of the use impairment indicators with the understanding that a significant impairment and/or threat to the AOC environment no longer exists, and therefore no longer warrants the AOC designation. In addition, we now understand better that the long term conditions in the larger watershed and Lake Ontario settings are more appropriately addressed under existing framework watershed activities including the Lake Ontario LaMP and the FERC Oswego River dam licensing processes.

2. Comment - It is difficult to try to get the public to understand the significant improvements in water quality for the Oswego River AOC between 1985 and 2002. Early on in the RAP Process, there existed a visual presence of garbage and sewage in the area. I can attest to the changes (RAC member Les Monostory).

Response - It is rewarding to document the restoration and protection of beneficial uses in the Oswego River AOC. The visual changes have been tremendous; even the harbor and lower river shoreline are markedly improved to accommodate public use. The City of Oswego has accomplished much through the implementation of their Waterfront Revitalization Program. Fishing and boating uses are great resources currently enjoyed by numerous persons in the lower Oswego River and Harbor area.

3. Comment - How can I be assured that the RAP and Remedial Advisory Committee are not leaving something undone (RAC member Joe Allerton).

Response - Through the RAP Process we can be assured that the identified concerns and issues have been addressed or are to be addressed by identified responsible parties. The RAP Process is comprehensive in that it takes on an ecosystem approach and involves the public. Backing up the confidence that this process has been successful are the ongoing environmental program protection laws and regulatory presence exerted by DEC and EPA. The existence of environmental groups and citizens providing a protective mechanism further support assurance of beneficial uses remaining intact. Core environmental protection program activities as well as newer program initiatives and response capabilities reinforce confidence in maintaining goals for the Oswego River AOC.

Section IV.C has been further developed to identify the responsible parties and actions to address the four expressed concerns regarding the long term sustainability of the AOC which include:

- 1) the lakewide fish consumption advisory,
- 2) fish habitat and populations below the Varick Dam,
- 3) upstream out-of-AOC Battle Island area contaminated sediments, and
- 4) the weed and algae nuisance.

4. Comment - Will the RAP group be “reactivated” to ensure that comments are addressed and work to produce a final delisting document.

Response - The Remedial Advisory Committee conducted its last formal meeting leading to the preparation of the delisting proposal document on Sept 6, 2002. Committee members have agreed to provide further comments on document revisions and to facilitate the delisting process. It is not anticipated the committee will need to reconvene; however, members are willing to assist as necessary and will reorganize if warranted.

5. Comment - Three out of four impairments are still impaired; the RAP successfully corrected one impairment. This leaves the impression that the RAP did not do much; add some details about what the RAP did.

Response - Wording has been added to describe that in addition to the four indicators identified as impaired there were five other indicators identified with possible or unknown impairment and therefore needing additional study. After nearly fourteen years of conducting studies and influencing remedial measures affecting the AOC, its watershed, and the Lake Ontario region, the RAP participants recognize the results of an AOC “rebirth” and have worked to resolve the use impairment indicators. The local government and community has dramatically rehabilitated the AOC shoreline. The clean up efforts by ongoing management plan activities has restored and now protects the beneficial uses. The Oswego River AOC is no longer on a remediation “to do” list. What the RAP did is further described in the document starting on page 8 under the heading “The Remedial Action Plan Process”.

6. Comment - In the Appendix, the sub-groups are identified by a mix of letters and numbers.

Response - The Appendices now has all letters headings, and the use of numbers for added detail has been deleted. The Appendices has been expanded, updated, and includes copies of the Power Point presentation used in the stakeholder consultation meetings. The Appendices are so large that Appendices K to P are now contained in a separate document.

➡ **AOC and Sources:**

7. Comment - Introduction, top paragraph: "...the area is no longer an Area of Concern contributing to Great Lakes use impairments ." How about PCBs?

Response - The AOC is not a source of PCB contamination presenting an environmental threat to Lake Ontario. The Stage 1 document states this as a possibility; however, investigative studies do not identify the AOC as a problem source of contamination to the lake or to itself. Historically, the upstream Oswego River watershed was a significant source of contamination; however, remediation has eliminated and mitigated sources to a great degree. As the AOC use impairment indicators have been redesignated as not impaired or identified as resolved by larger management plan activities under the Stage 3 - Delisting document, any upstream sources of contamination are to be addressed as possible remedial sites independent of the RAP.

8. Comment - Introduction, third paragraph, last sentence - "Focusing on the AOC has been a challenge" Meaning not clear.

Response - Statement to be omitted; however, the meaning is that in adopting an ecosystem approach in the RAP process, Great Lakes RAP committees have undertaken a more watershed approach to problem identification and remedial activity. The resolution of the impairment indicators for the RAP requires one to focus on the boundaries of the AOC. Some Great Lake's RAP committees have struggled with drawing geographic boundaries to environmental problems; hence the challenge. Committee members and government representatives both share an improved understanding of the need to address the watershed and larger drainage basin concerns and issues through existing watershed management and new basin initiatives.

9. Comment - What about Mirex being a point source or cause of a use impairment in the AOC. If a point source still exists upstream of the physical AOC why the delisting? We know that contaminated sediments are present at Battle Island.

Response - Because of past Mirex discharge to the Oswego River (and the Niagara River), Mirex is an identified contributor cause to the fish consumption advisory in Lake Ontario. It is not part of the fish advisory in the Oswego River segment upstream of the AOC in the vicinity of Battle Island. Mirex is not (and has not been) a contaminant causing a use impairment specific to the Area of Concern. Two years of water column monitoring by NYSDEC did not identify an active upstream source; however, an academic study has concluded an upstream source of Mirex to Lake Ontario is likely to exist based on mass balance relationships. In any event, any upstream source of Mirex to Lake Ontario is to be addressed by the Lake Ontario Lakewide Management Plan (LaMP) as a critical pollutant load.

Further, remedial measures at upstream sources are defined by DEC's Division of Environmental Remediation independent of any Area of Concern designation. This is consistent with the Oswego River RAP Stage 1 statement "Mirex has been identified (with low confidence) as having a small net export to Lake Ontario. The Lake Ontario Toxics Management Plan (now the Lake Ontario LaMP) lists Mirex as causing an impairment in Lake Ontario." This is also consistent with the Delisting Principles and Guidelines as developed by USEPA. In the interim, a study to assess environmental impact from the presence of contaminated sediments (upstream out of the AOC) is in the planning stage. A food chain uptake investigation has been proposed for consideration.

➤ **Delisting Considerations:**

10. Comment - Part IV.C, Post Delisting Responsibilities - The agencies and responsibilities identified are not specific enough. Weed and algae problems should be specifically mentioned under the County Soil and Water Conservation District. The County Water Quality Advisory Committee and Environmental Management Council are too general. What RAP responsibilities will they be taking? Sorry to repeat, but I think a most important part of the Stage 3 report is to state exactly and clearly just what responsibilities are being transferred and to whom.

Response - The entire Part IV.C has been rewritten based on the identification of the remaining concerns and specifically lists the strategy and the responsibilities to address each. The concerns correlate with the four originally designated impaired indicators and include the fate of contaminated sediments upstream in the Battle Island area. The weed and algae oversight has been identified as partly the responsible activities for the Soil and Water Conservation District. The Priority Waterbody Listing (PWL) for the lower Oswego River and Harbor area is identified as "stressed for aesthetics due to phosphorus". This classification does not define an impaired or precluded beneficial use in the AOC. The environmental oversight provided by existing program activities and initiatives at DEC along with Oswego County government and area environmental groups will cause responsibly actions in the Oswego River corridor. As noted above, this is reinforced by the WRAP Strategies, the PWL for the Oswego River, the Fish Consumption Advisory, the 303(d) listing requiring TMDL development, and potential investigations by the USACE and SUNY at Oswego. We know that the Lakewide Management Plan (LaMP) for Lake Ontario as well as the FERC licensing process and resulting provisions contribute to further improvements in the quality of the Area of Concern waters and towards maintaining beneficial uses. The response to comment #26 addresses what has changed regarding the sources and causes of eutrophication to warrant a use impairment status change.

11. Comment - I am concerned by what NYSDEC means with delisting the Oswego River as related to water quality standards. Will delisting the AOC drive a Clean Water act action; for example, a TMDL or variance in classification, etc?

Response - The "delisting" of the Oswego River Area of Concern (AOC), under the Great Lakes Program activities, is separate and unrelated to any "delisting" of the Oswego River from the CWA 303(d) list, because of the following:

Under Great Lakes Program activities, the geographical focus of the Oswego River AOC is from Oswego's Varick power dam downstream and including the Oswego Harbor. The CWA 303(d) listing for the Oswego River is from Oswego's Varick power dam upstream to the upper Fulton power dam in Fulton. Despite using the same terminology, the "delisting" of an area from the International Joint Commission's (IJC) list of AOCs is a separate process with different criteria from that of any "delisting" of a water segment from the state's list of impaired waters that require TMDLs under CWA Section 303(d). The key differences from a 303(d) point of view are the following:

A CWA 303(d)-listed water can be delisted when data show that water quality standards have been met. An AOC can be delisted when all reasonable remedies have been applied to correct local sources that were impairing beneficial uses (not necessarily limited to water quality standards). The decision on what remedies are "reasonable" can be based on the availability of resources. If there are sources outside of the AOC causing impairments within the AOC (which is not the case in the Oswego RAP), the AOC could hand the problem off to an outside remedial plan and then propose delisting. In the case of the Oswego River AOC, the lakewide fish consumption advisories still apply to migratory fish that may enter the AOC. The impairment therefore is related to and is to be resolved by the Lake Ontario LaMP (the advisory is a lakewide advisory and not specific to the AOC) because the sources of the restrictions are Lake Ontario-wide problems.

12. Comment - The following addition to the Stage 3 AOC delisting document would make the distinction between TMDL and AOC delisting clearer: In Section IV, Part C ("Post-Delisting Responsibilities"), the requirement for a TMDL to address the CWA 303(d) listing of the Oswego River upstream of the AOC should be added to NYSDEC's responsibilities, because implementation of the TMDL will result in reductions of priority organics that will help restore the AOC long after it is delisted from the IJC's programs.

Response - The requirement to conduct a review of the Oswego River (upstream of the AOC) regarding the 303(d) listing will be added. The fish consumption restriction upstream to Fulton is for Channel Catfish and is PCB related most likely due to contaminated sediments. Water quality monitoring has not indicated an active PCB source in this area. If there were an active source of priority organics, it is true that the implementation of a TMDL would likely result in further reductions of priority organics subject to allocation in the watershed and that this would further benefit the lower Oswego River and Lake Ontario waters. However, the need to implement a TMDL is not certain based on the fish advisory for Channel Catfish caused by local in-place organics involving contaminated sediments. NYSDEC is responsible to monitor the environment upstream of the AOC to determine if remedial measures are warranted. Pollutants of concern have not been determined to be present in significant amounts nor do they present a significant threat to the environment for remedial action.

13. Comment - In Section IV "Delisting Follow-Up", the following statement is made that is too broad: "The RAP has provided the data to show that the Area of Concern is not impaired." My understanding is that the AOC is still impaired, because Section III of the document states that concentrations of priority organics in fish tissue still exceed US FDA criteria and Great Lakes Water Quality Agreement objectives, such that (lakewide) fish consumption advisories are still in effect in the AOC.

Response - This sentence in Section IV has been deleted in the updated version of the document. The fact that the advisory is lakewide and is not specific to the Area of Concern allows for the delisting by having the Lakewide Management Plan address this impairment. This assumption of responsibility by the LaMP is consistent with the USEPA delisting principles addressing the source of impairment which also provides for a beneficial use not being fully restored for justifiable reasons. In the case of Oswego, achieving the ultimate endpoints for fish consumption and fish habitat impairments are to be addressed respectively under the Lake Ontario LaMP and by the FERC power dam relicensing process. Under the Lake Ontario LaMP, the fish consumption advisory is established by NYSDOH based on fish data provided by NYSDEC. In addition, the responsible agencies and tasks are identified in the post delisting section to document that the ultimate resolution of these specific use impairment indicators are now part of these larger management plan activities.

14. Comment - The Stage 3 Delisting Proposal for the Oswego RAP will not help in terms of continuing research associated with the Area of Concern and may be viewed as even contributing to the lose of research dollars involving the RAP.

Response - The fact is that the larger regional concerns involving the focused Oswego River Area of Concern are better addressed by the larger regional Great Lakes program initiatives involving Lake Ontario and its tributary watersheds. The concern about the loss of identity in association with the Area of Concern for research funding for RAP activities is to be addressed by identification with the larger watershed and Great Lakes Program lake activities and issues so that nothing is “lost”.

As funding priorities are adjusted each year, the link for the Oswego River corridor to Great Lakes funding will now need to be made through the Lake Ontario LaMP, Watershed (WRAPS) priorities, PWL priorities, and Fish Consumption Advisories involving the larger Lake Ontario Region of which the Oswego Harbor is a part of the Lake environment and related impairments.

The delisting of the Oswego Area of Concern is to document the restoration and protection of beneficial uses in the geography of the AOC. The Great Lakes community, including its funding mechanisms, must recognize the focus on the AOC and the context of the success story for the Oswego River AOC being communicated. The RAP was not designed to resolve specific lakewide and drainage basin issues. Contamination sources in the Great Lakes, Lake Ontario, lake drainage basins, and respective watersheds maintain a continuing link for funding and research support under Great Lakes program activities as well as other environmental priority clean-up activities.

15. Comment - Does delisting mean that things are OK?

Response - Yes, in the Area of Concern things are OK. Delisting means that the beneficial uses are not impaired for the geographic AOC. Specifically, this means that causes and sources of use impairments within the AOC have been addressed and that remaining concerns are addressed by larger watershed or Lake Ontario regional program activities. Responsibilities for these larger program activities have been identified.

16. Comment - Discuss the pros and cons of delisting with consideration for designation as an “Area of Recovery”.

Response - The fish consumption advisory is tied to the Lake Ontario advisory and not under the control of the AOC nor specific to the AOC. The FERC license will resolve the fish habitat and population impairments. The issue becomes one of: “is the issuance of the license, with the provisions to be implemented over a period of time, sufficient to provide for delisting now?”. The FERC license and Settlement Agreement were issued in November 2004 thus providing the necessary provisions and conditions to address the fish population and habitat concerns.

Fishery staff fully agree that the modified run-of-river flow provisions provide the needed water flow for full term spawning and incubation in the area below the dam. Further, the recruitment and population development are more dependent on Lake Ontario conditions than the AOC. The answer then is to determine what constitutes the necessary observation and level of success in reporting on the recovery of fish habitat and populations. With no sources of impairment in the AOC, one could argue that the delisting criteria are met (i.e. the river flow affecting the habitat and the contaminants affecting the advisory are both from “out of AOC” sources). A consensus opinion has formed that by providing the needed conditions and fish access, the FERC license resolves the historically identified use impairments.

Overall, the most likely threshold for recovery could be defined as the observation that the habitat area is restored and adequate spawning conditions now exist in the AOC. Although NYSDEC’s position is that the issuance of the FERC license provides the conditions and meets the delisting criteria, stakeholders are likely to insist that the actual observation of the conditions be verified. The RAP process has accomplished all in can in the resolution of the impairments and has further identified the responsible parties to address sources outside the Area of Concern. In conclusion, the AOC does not fit the intent of an Area of Recovery, nor is it immediately ready for delisting at this time (2002); therefore, the delisting will most likely be dependent on some degree of observation of recovery for fish habitat.

17. Comment - Emphasis on post-listing monitoring should be built into the document.

Response - The post-listing monitoring is defined in the 1991 Stage 2 document and updated in the 1992, 1996, and 1999 RAP Update documents. Post-delisting responsibilities are defined in Section IV.C of the Stage 3 document and address the remaining concerns of the RAP. Monitoring activities related to the responsible parties are identified as they address the remaining concerns. With delisting, the monitoring and reporting on these remaining concerns is not intended to be conducted under the RAP. This monitoring, compliance surveillance, regulatory oversight, and reporting are provided on the part of FERC and various DEC divisions and will be supported by other government agencies and fishing interests. Together these activities become the means to achieve the goals and objectives of the Fisheries Enhancement Plan.

18. Comment - Explain Mr. Lange's statement involving additional data and the null hypothesis.

Response - This statement refers to addressing the question of how much investigation is necessary to state (prove) that an area is not impaired. If investigation is never-ending, a single data point can raise concern (the smoking gun) to continue investigation. Significance therefore becomes important. Mr. Lange goes on to state that after 12 years of collecting fish data, where do we expect closure of the RAP to be. We are still trying to "find a problem like a witch hunt". The alternative would be to establish the null hypothesis (there is no impairment) and then study the area for 12 years. In summary, Mr. Lange is stating that in either approach of studying an area for 12 years, the same conclusion should be reached. By stating that "failure to reject the null hypothesis would maintain that environmental goals are intact" the conclusion should be there is no impairment. In other words, in both cases the same conclusion is reached that goals are intact and that there is no need to study the area further to define a problem.

19. Comment - Are you considering the White Hypothesis - what is it?

Response - The White hypothesis comes from Mr. Dave White's statement while participating in the RAP Workshop in 1998 that RAC members need to focus on taking actions on what they can affect or have an effect on (and essentially defer the remainder to other responsible parties and existing framework organizations). This statement established a fundamental strategy in the RAP process by workshop participants and RAC members that when implemented was and is now consistent with DEC and EPA delisting criteria and has led to the Stage 3 delisting proposal.

➤ **Fish Impairments:**

20. Comment - For the fish consumption advisories, the document should explain why the original impairment was imposed on the AOC. The advisory needs to be explained such that it is clear that it is a lakewide fish consumption advisory that applies to migratory fish entering the AOC. The fish consumption advisory is not specific to the AOC as to its source. Has the endpoint of "removal of fish consumption advisory" therefore been achieved?

Response - Table 1 summarizing the use impairment resolution has been revised and rewording to clarify that the identified impairment involves only fish and that the fish health advisory is for a lakewide Lake Ontario impairment that applies to the AOC but is not specific to the AOC due to sources. The narrative under indicator #1 has also been revised to clarify the applicability of the impairment to the migratory fish from Lake Ontario and the sources. The endpoint for removal of the *lakewide* advisory still applies and will ultimately be addressed under the Lake Ontario LaMP. For the RAP and AOC, the fish consumption advisory is therefore resolved.

21. Comment - Add an Appendix to detail how the FERC dam relicensing process will resolve the fish impairments; when it will be effective; the wording in the agreement; how subsequent monitoring will be done.

Response - Appendix J has been added to provide details on the FERC license provisions. These are contained in the Settlement Agreement which was embodied into the issued FERC license on 11/30/04 having a final compliance date of 5/30/06. Flow and water level monitoring with gaging and ancillary equipment are required.

22. Comment - Since there are no fish advisories for the AOC, this impairment should be considered resolved, without having to make a statement that it is being passed onto the LaMP.

Response - Although there are no fish consumption advisories specific to the AOC, the lakewide advisories for Lake Ontario apply to the migratory fish that enter the AOC. The link is the basis for the original identification of this use impairment in the AOC in the Stage 1 document.

23. Comment - In the course of document review, some concern has been expressed that certain verification of fish populations (and fish habitat) restoration is needed to assure restored beneficial uses. The question is: to what extent is this verification needed, if at all.

Response - The required compliance with the FERC license provisions (in May 2006) assures restoration of fish habitat conditions. The “run-of-river” flow provides for restoration to the maximum extent practicable based on the improving health and fish populations of Lake Ontario. The level of recovery is therefore based on Lake Ontario because the desired conditions are present.

Remedial measures and wet weather contribute to the observance of a restored minimum flow located in the Varick power dam by-pass in both the Springs of 2005 and 2006. NYSDEC and RAP process participants know that the provisions of the FERC license and Settlement Agreement provide for the restoration and protection of fish populations and habitat in the AOC. We also know that the Lake Ontario fishery has a dominant influence on the Oswego AOC, and that fish populations will reach a level consistent with the natural conditions provided by Lake Ontario. Because the Oswego AOC does not have its own identified resident fish population and because the desired conditions and access for fish habitat and population restoration are to be verified as in-place (including spawning use), a further formal fish population study has been determined not essential, nor the best use of limited resources, to the verification or to the delisting of the AOC.

The Oswego State 3 document describes the desired endpoints and their achievement in great detail under the fish populations indicator #2 starting on page 25 and the fish habitat indicator starting on page 28. In addition, the Fish Pathology Study described on page 44, under the fish tumor indicator, clearly established that the ideal condition of studying resident fish in the Oswego Harbor is not a reality. Ideally, species of fish that have a relatively small home range, are easy to collect, and that are sensitive to environmental conditions are best for a fish population study. Unfortunately for

study purposes, and because of the influence of Lake Ontario, a species of fish that is resident solely to the AOC for its entire life is not the case.

As a result of this sampled and observed characteristic in the Oswego AOC (no resident fish), the Fish Pathology Study had to be continued into a second year and was instead based on observation of 40 + species. Brown bullhead and white sucker were identified as best for observing tumors due to their environmental sensitivity and bottom feeding characteristics. No impairment was identified in the study. The study report notes that such factors as diet, genetics, age, viruses, and other conditions of the fish in the environment of Lake Ontario play a dominant role in fish health and population development. In addition, because of the influence of Lake Ontario, the report notes that there is not an ideal candidate fish species that could be linked solely to the lower Oswego River on which to base a study and that any future study should instead focus on the fish health of the variety of fish that enter the AOC from Lake Ontario.

We also know that from the Stage 1 document that the original identification of the fish populations impairment was identified with “low confidence”. The report also states that based on the observed populations, there is no direct evidence and it is unlikely that water quality has adversely affecting fish populations in the AOC. The fish population in the AOC is known to be closely linked to Lake Ontario and consists of American eels, and naturally reproducing lake sturgeon, trout, Atlantic Salmon, smallmouth bass, and other warm water species. For the fish habitat concern, the Stage 1 document simply states that the habitat impairment (caused by the low flow in the spawning area) is considered a cause for the identification of the fish population impairment.

To address the restoration of fish habitat and related fish populations, NYSDEC staff have observed the river at a flow magnitude of 800 cfs as significant flow for successful walleye spawning in the bypass reach. This bypass area is located just below the Varick power dam and is the focus of improving the beneficial use for fish habitat. (Note: the Oswego River Fisheries Enhancement Plan identifies this restored flow condition as necessary for spawning and also as the one need for fish population restoration. The Settlement Agreement / FERC license requires that this flow condition be met for spawning). NYSDEC fishery staff have observed this 800 cfs level of flow in the past and note this flow as a dramatic improvement over status quo during the entire spawning season which will assure adequate habitat conditions for complete spawning.

In summary, a lot of water comes down the Oswego River in the spring, and it is maintaining this minimum flow after eggs are deposited (in the bypass reach just below the dam) that is critical to successful spawning. With the restoration of the river flow and resulting conditions for fish habitat improvement during the entire spawning season, the beneficial use for the fish habitat and populations in the AOC are addressed to the maximum extent possible for the RAP process. There is no doubt that this flow will provide walleye with adequate spawning habitat and full term incubation. The recruitment of the resulting fry is closely linked to the conditions in the AOC as a whole and therefore dependent on the influence(s) of Lake Ontario. The AOC is known to be closely linked to the fish populations of Lake Ontario. Therefore, these supporting position statements made by fishery experts as well as the river flow restoration actions taken by the power dam operations together serve as the verification that restored conditions for fish populations and habitat are in place.

➡ **Upstream Contaminated Sediments:**

23. Comment - There is a real concern regarding the follow-up on Battle Island “being lost” or not maintaining an identification as a priority for remedial consideration at DEC with the delisting (i.e. the upstream area at Battle Island will lose its identity as a contaminated sediment site without the link to the Great Lakes Program and the RAP).

Response - Results of the 2002 Sediment Study that identifies contaminated sediments in the Battle Island area were referred to DEC’s Environmental Remediation Division for follow-up. This Battle Island area is upstream of the AOC and therefore linked to the RAP area as a concern in the watershed. No link has been established and it is therefore treated independent from the AOC. Discussion with DEC’s Division of Environmental Remediation indicates that the contamination is not present in sufficient amount or concentration and does not present a significant threat to the environment. Demonstration of environmental impact is therefore needed to require site follow up or remedial measure considerations. The path identified by Jim Pagano at SUNY Oswego in pursuing further investigation such as a “food uptake” study is consistent with demonstrating environmental impact. Given an environmental impact, further consideration of active vs. in-place sources would need to be made. DEC has determined no action or further study is warranted at this time. The following ongoing activities will continue to provide environmental oversight to the Battle Island sediment contamination concern:

- The Priority Waterbody Listing (PWL) for the Oswego River segment having contaminated sediments near Battle Island identifies PCBs as the primary pollutant causing the current fish consumption advisory in this upstream segment.
- By definition, this same upstream local river segment is listed on the 303 (d) list for development of a TMDL due to the fish consumption advisory. NYSDEC’s responsibility and need to conduct a TMDL to address the CWA 303(d) listing of this Oswego River segment upstream of the AOC is independent of the AOC designation. Such development would have the goal to result in further watershed reductions of priority organics. This in turn would benefit Lake Ontario and the lower Oswego River even after delisting the AOC.
- The New York State Department of Health (DOH) maintains the identification of the Fish Consumption Advisory due to PCBs for Channel Catfish in this priority waterbody segment of the Oswego River (Segment #0701-0006 which extends from the upper dam at Fulton to the Varick power dam at Oswego).
- The Watershed Restoration and Protection (WRAP) Strategies planning will identify priority goals and objectives for the Oswego River watershed [e.g. as does the Lakewide Management Plan (LaMP) for Lake Ontario.]
- The 2002 Sediment Study that identifies contaminated sediments in the Battle Island area was referred to DEC's Environmental Remediation Division for follow-up. The amount and significant of contamination has been determined not to be a priority. Pending legislative changes dealing with the definition of hazardous waste and State Superfund reauthorization may change the follow-up action in the Battle Island vicinity.
- The United States Army Corp of Engineers (USACE) in conjunction with SUNY Oswego may conduct a study to demonstrate environmental impact in the area of the contaminated sediments. A food uptake study is under consideration by the academic community.

24. Comment - Battle Island is upstream of the AOC and is identified as a concern. Why is this a follow-up concern and what about fish populations?

Response - Battle Island sediment is one of the four concerns identified in Section IV.C by the RAC as a priority that need to be addressed by responsible parties. Additional narrative has been developed in this section to clarify the intent of addressing these four concerns for the RAC. Although these concerns extent beyond the geographic boundary of the AOC, they need to be identified in order to be consistent with the ecosystem approach employed in the RAP Process. The lakewide fish consumption advisory concern is to be addressed by the Lake Ontario LaMP. The fish populations concern is closely related to and in fact dependent on habitat restoration and larger lakewide fish conditions and access. Both of these concerns are linked and addressed by the FERC relicensing provisions for the Oswego AOC. Battle Island sediments are out of the AOC and are not an identified source of impairment to the AOC. Because the RAC members expressed concern regarding these upstream Battle Island contaminated sediments, the responsible parties and possible actions have been identified. This information addresses this concern and serves to assure protection to the Oswego River and downstream areas including Lake Ontario.

➡ **Eutrophication, Algae, and Water Quality:**

25. Comment - Use Impairment Resolution, indicator #4 eutrophication and algae - “I still am uncomfortable walking away from the problem of Eutrophication or Undesirable Algae. I understand the difference between the AOC and the river, but the latter (upstream river) certainly has some very bad spots. I went to the Oswego Harbor specially today to look at the harbor water. At Wrights Landing, the water has no floating algae but does have a greenish appearance and no floating weeds but does have submerged weeds. At the marina on the other side of the harbor (next to Admiral Woolsley), the water is greenish too (as is also the main river stream). The Stage 3 report, I think, should make it very clear that this condition will be monitored and improved by another succeeding agency.”

Response - The eutrophication and algae concerns have been defined by the RAP as not impaired for the Area of Concern. This is consistent with the study findings and the classification of this waterbody on the State’s PWL list as not impaired. Aesthetic concerns associated with weeds (and algae) are of a nuisance condition that is being addressed by weed harvesting and nutrient reduction / control efforts. The algae (greenish color) have been determined to be not overabundant and therefore do not cause an impairment. This discussion for each of these topics has been expanded significantly under two of the use impairment indicators in Section III.B of the Stage 3 document: first under indicator #4 addressing eutrophication and algae, and second under indicator #8 addressing aesthetics.

Environmental monitoring is conducted under DEC’s core environmental quality programs (water, air, hazardous substances, remediation, etc.). Implementation of Oswego River watershed restoration activities (e.g. WRAPS) will compile data, set goals, and measure objectives. Results of upstream contaminated sediment core study in the Oswego River (at Battle Island) are to be addressed by

DEC's Divisions of Environmental Remediation and Solid and Hazardous Materials. The existing PWL listing for this upstream segment identifies the need to address contaminated sediments to assure restoration of local water quality best use.

The State's DOH fish advisory for this segment reinforces the need to reduce contaminants in this Battle Island segment of the river. Further, the Clean Water Act 303(d) listing of this Oswego River segment upstream of the AOC should result in further watershed reductions of priority organics that will benefit Lake Ontario and the lower Oswego River even after delisting the RAP Area of Concern.

26. Comment - What has changed regarding eutrophication to change the status to not impaired?

Response - Stage 1 identified phosphorus as the likely source and algae blooms as the likely cause of the eutrophication impairment. The location of the algae blooms was limited in the Area of Concern (western shallow harbor area) and extended well outside the AOC to include the nearshore of Lake Ontario and upstream river areas (e.g. some stagnate shoreline and upstream canal lock areas). Phytoplankton from a 1981 study were identified as associated with an eutrophic environment. Plankton data from the NYSDEC 1994 Oswego Harbor Survey (Appendix H.35) indicated low abundance and diversity with an overall healthy assessment for a riverine environment. Riverine waters can possess such characteristics and be healthy without indicating impairment, therefore a not impaired status is concluded for the plankton community. Data shows a high dissolved oxygen content and the presence of zebra mussels. Nutrient concentrations are identified as sufficient to support a much larger algal population; however, neither are excessive. The survey concluded that the AOC is not impaired due to eutrophication and algae. This is consistent with the current Priority Waterbody Listing for the AOC as "stressed for aesthetics". Stressed is not impaired because the beneficial uses are intact (i.e. fish survival, water quality, boating, fishing, secondary contact recreation). What has changed is that through the elimination and control of point (municipal, CSO, and industrial) and nonpoint sources of phosphorus, and with the introduction of the zebra mussel, the AOC is not impaired for eutrophication or algae. The concern therefore relates to the quality of the best use as related to aesthetics (i.e. control of floatables, wastewater treatment, and weeds). Through mechanical harvesting in isolated areas of the AOC, weeds are managed to maintain the best use. Nutrient reduction is achieved through point and nonpoint source control measures. Overall, the algae concern is one of aesthetics in shallow areas and is not representative of the AOC or an impairment listing. Therefore, through nutrient controls and aesthetic management practices, eutrophication and algae are not impaired because best uses are intact for the AOC.

27. Comment - Table 1, Eutrophication, Resolution - "NPS watershed control activities", What were they?

Response - NPS activities are those conducted by New York State and the Soil and Water Conservation District and other government and public organizations to reduce nonpoint sources in the watershed. These include monitoring activities, studies, implementation of best management practices (BMPs), stream corridor protection actions, weed harvesting, and input into the FERC relicensing process, and the Lake Ontario Lakewide Management Plan. DEC has implemented

“Combined Animal Feeding Operation” and stormwater control regulations to address nonpoint sources that can contribute to point source problems. Farmers have implemented BMPs in a wide range of farming practices including stream corridor use, barnyard runoff, and fertilizer and pesticide applications. Citizens and local governments have acted to limit erosion in the watershed. Nonpoint sources associated with hazardous waste sites have been remediated as further described in Appendix K (bullets #1 to #4). In addition, Agricultural Environmental Management (AEM) partnership of local, state, and federal agencies work to provide farmers with new opportunities to manage nonpoint source pollution sources and causes. The goal is to reduce pollution and enhance farm viability. The Oswego County Soil & Water Conservation District allocates funds and assists in efforts to protect water quality and natural resources in the public’s interest.

28. Comment - Data should be presented in the document to show, where appropriate, that water quality standards have been met. For example, the text currently indicates that water quality standards are met for DO, nutrients, coliforms, pathogens, and phytoplankton and zooplankton. A few graphs of real data would help make a stronger case.

Response - A description and detailed results of water quality data from the Oswego Harbor (water quality) Survey are presented under the Eutrophication and Undesirable Algae use impairment indicator #4 in Section III.B.4 in the Stage 3 document. Figures and graphs have also been added.

29. Comment - Need to be more clear on whether the plankton community is impaired.

Response - This indicator’s discussion has been reorganized and rewritten to lead up to responding to the impairment. Under this Degradation of Plankton indicator, the “resolution” statement (now following a lengthy introductory discussion) responds directly to the question “are the plankton communities impaired?” The confusion and/ or contradictory concern has been eliminated. Essentially, up-front in the resolution statement, it is now stated: “In conclusion, the preponderance of the evidence indicates that plankton community of the Oswego River AOC is not significantly impacted nor impaired.” The supporting data are then provided to reinforce the conclusion. The rationale statements are made last. In reviewing the consistent method used to address each indicator: an introductory discussion is followed directly by the resolution statement, supporting data, and finally the rationale.

APPENDIX H

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APPENDIX I

LIST OF ACRONYMS

AOC	Area of Concern
ATSDR	Agency for Toxic Substances and Disease Registry
BCC	Bioaccumulative Chemicals of Concern
BMP	Best Management Practice
CAFO	Concentrated Animal Feeding Operation
CAC	Citizen Advisory Committee
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLC	Call Level Code
CSO	Combined Sewer Overflow
CWA	Clean Water Act
DO	Dissolved Oxygen
DOW	Division of Water
DFWMR	Division of Fish, Wildlife and Marine Resources
EMC	Environmental Management Council
EPF	Environmental Protection Fund
FERC	Federal Energy Regulatory Commission
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
GLIN	Great Lakes Information Network
GLBAC	Great Lakes Basin Advisory Council
GLNPO	Great Lakes National Program Office
GLWQA	Great Lakes Water Quality Agreement
GLWQG	Great Lakes Water Quality Guidance
GLWQI	Great Lakes Water Quality Initiative
HRA	Health Risk Assessment
IFIM	In-stream Flow Incremental Methodology
IEP	Industrial Effectiveness Program (DED)
IFM	Integrated Facility Management (M2P2)
IJC	International Joint Commission
IRM	Interim Remedial Measure
LaMP	Lakewide Management Plan
M2P2	Multimedia Pollution Prevention
MACT	Maximum Achievable Control Technology
MDL	Method Detection Limits
MMP	Marsh Monitoring Program (Bird Studies Canada)
NAFTA	North American Free Trade Agreement
NAWMP	North American Waterfowl Management Plan

NESHAP	National Emission Standards for Hazardous Air Pollutants
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
NRA	Natural Resource Damage
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	NYS Department of Health
NYSDOS	NYS Department of State
OCWQCC	Oswego County Water Quality Coordinating Committee
OCSWCD	Oswego County Soil and Water Conservation District
OCS	Octachlorostyrene
PAHs	Polynuclear aromatic hydrocarbons
PCBs	Polychlorinated Biphenyls
PCS	Permits Compliance System
PEC	Probable Effects Concentration (greater than TEC)
PWL	Priority Waterbody List
RAC	Remedial Advisory Committee
RACT	Reasonably Available Control Technologies
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RIBS	Rotating Intensive Basin Studies
ROD	Record of Decision
SARA	Superfund Amendment and Reauthorization Act
SOLEC	State of the Lakes Ecosystem Conference
SPDES	State Pollution Discharge Elimination System
SRF	State Revolving Fund
SUNY	State University of New York
TEC	Threshold Effect Concentration (less than PEC)
TMDL	Total Maximum Daily Load
TRI	Toxic Releases Inventory
TSCA	Toxic Substances Control Act
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFDA	United States Food and Drug Administration
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compounds
WRAPS	Watershed Restoration and Protection Strategies
WQEPP	Water Quality Enhancement & Protection Policy
WWW	World Wide Web
YOY	Young-of-the-Year (fish Study)

APPENDIX J

Provisions for the Varick Dam FERC Relicensing

Provisions that address the resolution of the fish habitat and fish population use impairments in the lower Oswego River and Area of Concern are contained in the Settlement Agreement as part of the Federal Regulatory Energy Commission (FERC) relicensing of the Oswego River Project. This forty year new license (FERC #2474) amends and replaces the existing license (FERC #5984). The Settlement Agreement resolves the outstanding issues for the Oswego River Project and was signed by the eleven parties listed below. The provisions of the Settlement Agreement that follow are effective with the signing of the Agreement and are further incorporated into the FERC power dam license.

- Adirondack Mountain Club (ADK)
- Erie Boulevard Hydropower, L.P. (Erie) and its General Partner, Reliant Energy (Reliant)
- Isaack Walton League
- New York Rivers United (NYRU)
- New York State Canal Corporation (Canal Corp)
- New York State Conservation Council (NYSCC)
- New York State Department of Environmental Conservation (NYSDEC)
- Trout Unlimited (TU)
- U.S. Department of the Interior (DOI), U.S. Fish and Wildlife Service (USFWS)
- U.S. Department of the Interior (DOI), National Park Service (NPS)
- U.S. Department of the Interior (DOI), Bureau of Indian Affairs (BIA)

1.0 Introduction - The comprehensive measures addressing the licensing of the Oswego River Project are described in detail in the Settlement Agreement. These conditions of the agreement and FERC license are the result of extensive discussion and consultation with the involved parties and signatories to the Agreement. The goal is to provide for the continued operation of the projects with appropriate long-term environmental and recreational protection and mitigation measures that meet diverse objectives for maintaining a balance of non-power and power values in the Oswego River. The Settlement Agreement and subject Oswego River Project licensing address the lower Oswego River power developments at Fulton, Minetto., and Varick. The provisions at Varick, specifically address the restoration of beneficial uses for the Oswego River Remedial Action Plan in the Area of Concern. The new requirements for the river flow entering the AOC fully meet the requirements of the Oswego River Fishery Enhancement Plan to restore beneficial uses.

2.0 General Agreements of the Parties - The provisions of the Settlement Agreement become conditions of the new FERC license. The new license is for forty years and is

enforceable by FERC. Further, the parties have agreed to support the issuance of a Section 401 Water-Quality Certification by NYSDEC that is consistent with the provisions of the Settlement Agreement. Modifications to power dam structures and/or lands under the jurisdiction of the New York State Canal Corporation and the subsequent implementation of Settlement Agreement measures are subject to the approval and issuance of work permits by the Canal Corporation. Compliance with the National Historic Preservation Act and Endangered Species Act is included. The licensee is to develop a Cultural Resources Management Plan in consultation with the New York State Office of Parks, Recreation, and Historic Preservation, and Federally recognized Indian tribes.

3.0 Measures Required - Fifteen pages of specific measures required as provisions of the Settlement Agreement are described. These measures are to be incorporated into the FERC license for the Oswego River Project to address a wide range of actions:

- Mode of Operation - Within eighteen months of license issuance and acceptance, the Licensee will begin to operate the Oswego River Project in a “Modified Run-of-River” mode. Compliance with specific water levels and flows is required by 5/30/06.
- Impoundment Fluctuations – Again, within eighteen months, a limit on impoundment fluctuation ranging from one-half to one foot at Fulton, Minetto, and Varick is required based on the crest of the dam and flashboard measurements. Table 3-1 in the Settlement Agreement states these requirements. Conditions are also described in FERC’s Order Modifying and Approving Run-of-River Monitoring Plan. Pond level control is to be further enhanced by the installation of pneumatic flashboards.
- Base Flows - Also within eighteen months, the Licensee is to begin releasing the base flow described in Table 3-2. The base-flow below the Fulton development (above Oswego and the Varick Dam) during the walleye spawning season creates over 9,000 square feet of relatively high quality walleye spawning. The specified cubic feet per second flows are to be maintained in the river immediately downstream of the development’s powerhouse. Together these measures will address the protection of fish habitat, benthic invertebrate production, sustained wetland vegetation, fish spawning, fishing opportunities, and water quality considerations.
- Bypass Flows - Within eighteen months, the Licensee is to release bypass flows as describe in Table 3-3 in the Settlement Agreement. Seasonal minimum bypass flows required to be maintained at Varick will restore fish and wildlife habitat conditions for many species and life stages, increase the benthic population, benefit vegetation, provide spawning area, enhance riffle habitats for fish passage, decrease stranded fish, and promote safe and legal fishing. Significant improvements are to be observed by multiple site visits. The agreement contains a seasonal flow reevaluation provision after 5 years.
- Low-level Flow Diversion Structure - Again within eighteen months, the Licensee is to install a low-level flow diversion structure at the Varick dam. This structure is to assure flow in the lower bypass reach from June through September.

- Fish Passage, and Movement - Specific installation measures with implementation schedules are listed in Table 3-4. Downstream fish movement routes are address by minimum flows through sluice gates. An upstream Eel conveyance system is to be field located and seasonally operated.
- Fish Protection - To protect against fish entrainment and mortality from the power structures, the Licensee is to install seasonally operated overlays in the form of one-inch spaced trashracks or one and one-half inch perforated plates according to an implementation schedule as described in Table 3-5. Compensation for fish mortality is also required.
- Flow and Water Level Monitoring - The Licensee is to develop stream-flow and water-level monitoring within fifteen months of the FERC license issuance and acceptance. The monitoring plan is to include all gages and equipment. The plan is to measure base flow, bypass flow, headpond and tailwater elevations and provide appropriate on-site visual verification of water levels. Monitoring is to be performed as outlined in the “Order Modifying and Approving Run-of-River Monitoring Plan”. Records are to be maintained subject to inspection and the Licensee is to maintain a seven-day-per-week contact person for monitoring verification and emergency action.
- Recreation - Opportunities for recreation are provided by the Settlement Agreement and are to supplement existing public access to and the use of impoundments, bypass reaches, and adjacent lands associated with the Oswego River Project developments.