

APPENDICES - K to P
Oswego River Remedial Action Plan Stage 3 Delisting
(part 2 - continued from main document)

K.	Remedial Activity Updates	133
	• Hazardous Waste Site Remediation	134
	• Contaminated River Sediments	140
	• State Pollution Discharge Elimination System (SPDES) .	147
	• Nonpoint Source Pollution Control	150
	• Air Pollution Control	152
	• Fish and Wildlife Assessments/Actions	158
	• Health and Environmental Assessments/Actions	164
	• RAP Public Participation and Outreach	171
	• Investigations and Monitoring Activities	174
L.	Use Impairment Indicator Strategy Management Forms	184
M.	Marsh Monitoring Program Methods and Results	196
N.	Watershed Restoration and Protection Action Strategies (WRAPS)	202
O.	Addressing Upstream Contaminated Sediments	204
P.	Power Point Presentation: Stage 3 - Delisting	206

APPENDIX K

REMEDIAL ACTIVITY UPDATES

Since 1991, the Remedial Action Plan (RAP) process has identified and encouraged many of the remedial activities that have been conducted to address the use impairment indicators for the RAP. Ongoing environmental protection laws, regulations, and policies, by New York Department of Environmental Conservation (NYSDEC) and other agency environmental program activities have benefitted the RAP program. The RAP planning and implementation effort has worked to identify the needed sequence of events and then to influence those actions to address local area, watershed, and ecosystem concerns. As a result, these activities have contributed to and supported progress towards achieving the RAP goal. The RAP strategies have therefore made use of all resource commitments and related remedial actions and sought to incorporate an ecosystem approach into remedial activities to restore and to protect beneficial uses.

By communicating and implementing the desired RAP process, it has been observed that remedial activities have taken on the ecosystem approach. A main purpose of the Oswego Remedial Action Plan and its Advisory Committee has been and remains to assure that all stakeholders' interests and concerns are satisfactorily investigated and resolved as much as possible and that an forum is provided for opinion expression and discussion. A key to this has been securing commitments to conduct and achieve RAP objectives.

Significant remedial activity progress has occurred in the implementation of the Oswego River RAP. Details of current programs and remedial activity progress affecting the RAP are described below as they have been linked or directed by remedial action strategies. To facilitate reporting of remedial activity progress, the RAP subject matter has been broken down into nine major program areas or manageable remedial activity reporting topics. More recent program updates of these nine major environmental program areas / remedial activity topics are presented below in the following order:

- ① Hazardous Waste Site Remediation
- ② Contaminated River Sediments
- ③ State Pollution Discharge Elimination System (SPDES)
- ④ Nonpoint Source Pollution Control
- ⑤ Air Pollution Control
- ⑥ Fish and Wildlife Assessments/Actions
- ⑦ Health and Environmental Assessments/Actions
- ⑧ RAP Public Participation and Outreach
- ⑨ Investigations and Monitoring Activities

As appropriate, when the details of a remedial activity description go beyond the scope of one program area to include topics in other program areas, cross-referencing among these nine areas is made in order to avoid duplicate reporting. Reference is also made to other sections in this Stage 3 document as well the 1996 Update, the 1999 Update, and investigative study reports. This nine program area / remedial activity topic breakdown is necessary to present an organized and current report that describes the details of the activities involving RAP progress.

The progress in each of these nine environmental program areas involves various stakeholders, issues, and concerns that contribute to and affect the implementation of remedial activities. The Remedial Advisory Committee has defined a strategy (Appendix B), endpoints (Appendix C), and criteria (Appendix E and F) to assist in addressing the indicators and the RAP delisting. Members agreed there are certain activities the RAP can and cannot address. As delineated in Section IV.A, the delisting principles and guidelines support this approach. Further, Appendix L presents the “Use Impairment Restoration and Protection Strategy management forms” used to list the remedial activities implemented to resolve each of the use impairment indicators originally rated as impaired or requiring further investigation. Below, the details of these remedial activities are reported on under each of the nine bullet points representing the nine major areas of program reporting:

❶ **Hazardous Waste Site Remediation (Land-Based):**

As experience and expertise have grown in remediation work, a goal of shortening the time and lessening the costs of implementing a remedial program without sacrificing the protection of public health and the environment has been achieved. Steps have been taken to rapidly clean up sites by using Interim Remedial Measures (IRMs) which are actions that can be taken without long, formal investigations. The result has been that the site investigation process has undergone major changes: the former time-consuming Phase I and Phase II Investigations are now combined into a single, condensed, comprehensive Preliminary Site Assessment (PSA). Built into a PSA are decision points which allow the classification or delisting of a site as soon as enough information exists to evaluate the situation against the state's criteria for defining an inactive hazardous waste site. The number of class “2a” sites (those requiring more information) has been dramatically reduced and of those sites remaining, most are currently under investigation. NYSDEC’s priority ranking system, for inactive hazardous waste sites listed as class “2” (those requiring remedial action), contains a RAP component that can raise the priority of implementing remediation based on the relationship to a Remedial Action Plan. Improvements in public interaction have been enhanced by state regulation requiring a citizen participation plan for every hazardous waste site undergoing remediation. Public comment opportunities are also provided prior to a site’s class change. Useful fact sheets are available that describe the stages of the remediation process.

NYSDEC has issued various Administrative Orders requiring land-based hazardous waste site remediation in the Oswego River drainage basin. Implementation of these orders has been a key to watershed area rehabilitation and protection. Completion and settlement of these remediation activities includes Natural Resource Damage Claims that address recovery for damages and injury to the natural resources. Land-based remedial actions have been required at several large industrial facility sites in the Syracuse area. Many sites are completed; others are in different phases of implementation such as Onondaga Lake. Remediation has resulted in significant progress in drainage basin cleanup which in turn has contributed to the restoration and protection of the Area of Concern. Because of the large 5,100 square mile watershed, and based on water quality and sediment surveys, the impact of remediation activities at most local hazardous waste sites within the watershed is limited to the local area. Sites do not present a significant threat of impact to the Area of Concern.

Although there are no sites specifically within the AOC, details of a number of site remedial activities that are in closer proximity to the AOC are described below. These sites are land-based remediation projects only and were high priorities thought to have been possible sources of contaminants that could have had an impact on the use impairment indicators in the AOC and Lake Ontario.

1. Columbia Mills

This abandoned manufacturing facility site is located in Minetto, Oswego Co. Columbia Mills was a factory that manufactured vinyl window shades and coverlets. The company closed in 1977, and the buildings on the property fell to ruin. Organic contamination from buried tanks and high levels of heavy metal contamination were confirmed on the plant property. Several underground storage tanks were removed in 1988. Asbestos was found on site and the USEPA initiated an emergency response to remove it. The EPA also took down the huge on-site chimney which was structurally unsound. Following the completion of the Remedial Investigation/ Feasibility Study (RI/FS), the 1992 Record of Decision (ROD) required the consolidation and capping of wastes and site sediments in the drum disposal area, the removal of sediments in the plant sewers, and the treatment of groundwater in a contaminated hot spot area near a former underground storage tank. The three parts of the Interim Remedial Measure (IRM) involving contaminated soil remediation have been completed. A Consent Order for a Remedial Design/Remedial Action (RD/RA) was signed and has been completed. Construction activities addressing sewer and underground storage tanks have been completed and the landfill has been capped. As a result, the site boundaries have been reduced to encompass only the landfill. Monitoring and maintenance of the landfill is presently underway. The environmental threats posed by this site have been eliminated by the remedial program; however, the site continues to be monitored.

2. Ley Creek PCB Dredge Material

The Ley Creek PCB Dredge Material sub-site of the Onondaga Lake site consists of PCB-contaminated dredged materials on an approximately 4,300-foot section on the banks of Ley Creek. The PCBs were discharged at the site of the former Inland Fisher Guide Division of a General Motors facility along Factory Avenue west of Town Line Road in Salina, Onondaga County. Groundwater contamination resulted. A Consent Order was issued requiring a remedial investigation and feasibility study (RI/FS) that was completed in 1993. As part of an Interim Remedial Measure, contaminated materials were removed from an area where a new municipal sewer line was being installed. A Record of Decision (ROD) was signed in 1997, requiring the off-site disposal of the PCB-contaminated dredge material and the grading of the remaining dredge material out of the creek flood way area. Construction activities were performed from 1999 through 2001. Groundwater underlying the Ley Creek PCB Dredging site is being investigated under an RI/FS for the Former Inland Fisher Guide Facility and Ley Creek Deferred Media site.

3. Miller Brewing

A 1991 Consent Order requires Miller to develop, construct, and contribute to the operation of a long-term treatment system for a major portion of the City of Fulton's (Oswego Co.) water supply. Earlier enforcement orders required site remediation work. Contamination resulted when organic solvents leaked from a concrete spill containment tank and from drum storage areas in the 1970's. The site is about 1400 feet upgradient of the City of Fulton's municipal drinking water wells. Several monitoring wells have been impacted. NYSDOH analytical results revealed low levels of contamination. There is a hydraulic connection with the Oswego River. An investigation revealed a plume of contaminants about 1300 feet in length. Recovery wells and an air stripper were put in operation in an attempt to impede the migration of contaminants in the groundwater. Portions of the contaminant plume needed to be addressed by further remedial measures. A Proposed Remedial Action Plan (PRAP) for this site was completed, and a Record of Decision (ROD) was signed 1995. The ROD specifies a remedy consisting of a groundwater collection system, soil vapor extraction (SVE) and treatment of the collected groundwater. Remedial design activities have been completed. Construction of the SVE was completed in late 1996 and operation of it began in 1997. Operation and maintenance of the system is ongoing. The discovery of the soil and groundwater contamination lead to the installation of the recovery wells and the air stripper to slow the migration of contaminants. Monthly monitoring reports show the public water treatment system provided for the City of Fulton public water supply wells is of satisfactory quality. Exposure potentials have been eliminated. The remedy removes additional quantities of contaminants from the aquifer. Since this time Miller has ceased manufacturing at the site.

4. Onondaga Lake

The Onondaga Lake site includes the Lake itself, seven major and other minor tributaries, and upland sources of contamination to the Lake (sub-sites). The Lake has an areal extent of about 4.5 square miles, with a drainage basin of approximately 233 square miles. Effluent from the Metropolitan Syracuse Sewage Treatment Plant discharges into the southeastern end of the Lake. The Lake flows to the northwest into the Seneca River. Historically, industrial processing plants and municipal wastewater treatment plants routinely discharged their wastes into the Lake. The availability of salt and limestone led to the location of the Solvay Process Company, the predecessor to Allied Signal, Inc. (Honeywell International, Inc. is a successor corporation of the former Allied Signal, Inc.), on the west shore of the Lake for the production of soda ash. Today, vast areas on the western shoreline are occupied by the "Solvay waste beds" which contain years of by-products of the company's soda ash production. In 1946, Allied Signal initiated a mercury cell process which produced chlorine, sodium hydroxide, and potassium hydroxide at its facility on Willis Avenue, and later expanded to include a facility on Bridge Street. Waste streams containing mercury and other heavy metals were discharged by these facilities. Honeywell's Semet Residue Ponds, which contain volatile organic compounds (VOCs) from facilities associated with the production of benzene and chlorinated benzene, are another source of contamination to the Lake. Other industrial and manufacturing facilities are also located along the shore or tributaries

to the Lake and may be sources of contamination to the Lake. Onondaga Lake adjoins park lands owned by Onondaga County. A 1992 Federal Consent Decree with Allied Signal required the development of an RI/FS to determine the best method of lake remediation. Field work for the ongoing RI, which began in 1992, is largely complete. The Lake was added to the federal National Priority List (NPL) in late 1994. The restoration of Onondaga Lake is a long-term project that many interested parties are striving to achieve. Resolving the Syracuse Metropolitan Wastewater Treatment Facility and associated combined sewer overflow discharges to the lake is fundamental to the project to restore this valuable resource. Onondaga County is subject to a Federal Consent Decree to complete upgrades to meet strict discharge limits. The contaminated sediments are a potential source of exposure through direct contact. Public fishing was banned from the Lake in 1970, but the Lake was opened to allow catch-and-release fishing in 1986. There are no swimming facilities open to the public on the lake. Surface water from the lake is not used for drinking water. USEPA and New York's Environmental Bond Act are both supplying funding to complete treatment plant upgrades and infrastructure improvements.

5. Volney Landfill

The 85-acre Volney Landfill site is located in a rural area of the Town of Volney, New York. A ROD was issued in 1987. The selected remedy, as modified by a 1989 Post-Decision Document, a 1997 Explanation of Significant Differences (ESD), and a 2001 ESD consisted of the installation of a supplemental side-slope landfill cap (the top of the landfill was capped in the early 1980s), intermittent groundwater extraction and treatment on an as-needed basis (the levels of the contaminants in the groundwater downgradient from the landfill only intermittently exceed standards), and long-term groundwater monitoring. The implemented remedy will be reviewed no less often than each five years after its initiation. A leachate collection system was installed in the early 1980s. Areas encompassing the landfill are fenced. The Oswego County Health Department continues to monitor nearby private water supplies and site contaminants have not been detected. Oswego County has purchased adjacent property to serve as a buffer. The remedy was completed in late May 2002.

6. Clay Town Landfill

In the early 1990's, this 38 acre site was evaluated as not closed nor capped properly. Citizens sued the Town for possible health risks due to the landfill. Subsequently, NYSDEC approved the prepared RI/FS reports; the ROD was issued in late 1994; the final plans were approved in 1995; and the work on the landfill capping system was completed in the fall of 1996. Quarterly monitoring was started in June of 1997 and is ongoing. The groundwater in this area was once used as a drinking water source. The Oneida River is located near this landfill, and a protected wetland is located across the road. There is documented groundwater contamination in monitoring wells at the site; however public water was extended to the area and residences are connected. The site has since been determined remediated.

7. Clothier

The Clothier Disposal site, located in the Town of Granby, Oswego County, New York, is a 15-acre parcel of land, of which six acres were used for waste disposal. During 1986, drums were moved to a centralized on-site location. A number of potentially responsible parties removed 1,858 drums of waste. In 1987 and 1988, EPA removed the remaining drums and visibly-contaminated soil and debris associated with the drums. In 1989, a ROD was signed, selecting a remedy for the site. The selected remedy called for regrading and placement of a one foot deep soil cover over the residually-contaminated areas and re-vegetation of the site, installation of erosion control devices on the embankment sloping toward Ox Creek, implementation of institutional controls to prevent the use of the underlying ground water or any land use involving significant disturbance of the soil cover, and long-term groundwater, soil, sediment, and surface-water monitoring. During grading activities for the soil cover, seven additional drums were uncovered. The drums and soil surrounding them were removed from the site in October 1992. Long-term monitoring and inspection of the site, which commenced in April 1994, led to the discovery of three more buried drums. These drums were excavated, overpacked, and removed from the site. As a precaution, a limited-area geophysical investigation was undertaken to determine the possible presence of other buried drums. This investigation led to the discovery of buried metallic debris, which was subsequently removed from the site. Since the site no longer poses a threat to public health and the environment, it was deleted from the NPL list in 1996.

8. Fulton Terminals

Millions of gallons of waste oils and sludges were stored in tanks at this one and one-half acre Fulton Terminals site. Actions conducted in 1986 by EPA and the Potentially Responsible Parties (PRPs) consisted of constructing a 7-foot perimeter fence around the site and posting warning signs, removing two above ground tanks and two underground tanks, removing approximately 300 cubic yards of visibly-contaminated soil and tar-like wastes, and excavating storm drains that were acting as a conduit for contaminated runoff entering the Oswego River during storms. An additional removal action in 1990 involved the construction of earthen barriers for the prevention of surface runoff from the contaminated portion of the site. In 1989, a ROD was signed, selecting a remedy for the site which included low temperature thermal extraction to remove volatile organic compounds from the soils and ground water extraction and treatment, followed by the reinjection of the treated water. The cleanup of 16,500 tons of contaminated soil was performed from April 1995 through March 1996. Full-scale pumping and treatment of the ground water was performed through a temporary treatment system from February 1997 through May 1997. Subsequent geophysical investigations indicated that the freeze wall (a construction process whereby the ground was frozen at depth to allow the dry excavation of contaminated soils below the water table) remained intact in one downgradient location. Following the forced thaw of the freeze wall (via steam injection) by the potentially responsible parties (PRPs) in May 1998, the temperature of the ground water and the concentrations of contaminants were monitored. Ground water samples collected in March 1999 indicated that the freeze wall was no longer intact (i.e., monitoring wells were free of ice) and that the contamination in this location continued to show a decreasing trend.

Following the collection of ground water quality samples in early September 1999, EPA determined that the ROD requirements for the ground water remedy had been substantially met, and no further response, other than long-term ground water monitoring, was anticipated. Ground water long-term monitoring began in March 2000. Three years of monitoring, as required by the ROD, which will conclude in September 2002. At that time, EPA will assess the groundwater cleanup of the site. To date, the on-site well that monitors the core of the former plume area has been consistently clean, and the low levels of contamination detected in one downgradient location continues to decrease. The area is served by public water and exposure to groundwater contamination is unlikely. The site is fenced and access is limited.

9. Pollution Abatement Services - Main Plant

Pollution Abatement Services (PAS), Inc. was originally built to serve as a high temperature liquid chemical waste incinerator. The site is located near the eastern border of the City of Oswego. It is within one half mile of Lake Ontario. It is partially surrounded by wetlands. During the time the facility was in business, it continuously had serious operational problems. There were numerous air and water quality violations and area residents mounted public opposition. A large number of drums of chemicals were collected and stored on site. Liquid chemical wastes were dumped into several on-site lagoons. In 1977, the entire business was abandoned with the large quantities of waste left uncovered on the property. Shortly thereafter, a number of emergency remedial actions were implemented to limit site access and contain and remove materials. In 1982, EPA removed the site's superstructures and approximately 10,000 drums of contaminants from the site. A ROD was signed on July 6, 1984. The selected remedy included limited excavations and removal of contaminated soil; removal of subsurface tanks and remaining drums to an EPA-approved landfill; containment of the wastes through the construction of an impermeable cap; perimeter slurry wall and leachate collection; on-site treatment of the leachate and contaminated groundwater; and, groundwater monitoring. These remedial activities were conducted by NYSDEC and, with the exception of the on-site treatment system, were completed in 1986. 500,000 gallons of contaminated groundwater were pumped from the site and sent off-site for treatment in 1987.

In September 1991, EPA and a group of PRPs entered into an interim leachate and groundwater removal administrative consent order. This order requires the routine removal of leachate and groundwater from within the containment system until a permanent treatment system is constructed. The extracted leachate and ground water (approximately 15,000 gallons every two weeks) is currently transported to an EPA-approved treatment and disposal facility.

Since the construction of the containment system, various post-closure investigations indicated the presence of VOCs in the ground water outside of the containment system. Under EPA supervision, the PRPs completed an RI/FS to determine the nature and extent of this groundwater contamination and to identify remedial alternatives. The investigation was completed in the fall of 1993. A ROD was signed in December 1993. The selected remedy to address this contamination problem includes, enhancing the present source control

system by optimizing operating parameters, bedrock groundwater extraction and treatment, and connecting downgradient residents in the Smith's Beach area (who are using residential wells) to the public water supply to ensure that potential future exposure to contaminants in the bedrock groundwater does not occur. A Phase I Supplemental Pre-Remedial Design Study to evaluate the potential effectiveness of bedrock pumping to contain impacted groundwater in the bedrock outside the containment system, and to determine potential impacts of bedrock groundwater pumping on the existing containment system and the creeks and wetlands was completed in 1994. This study determined that pumping of the bedrock groundwater was not necessary and perhaps not even possible without impacting the adjacent wetlands. A Phase II Supplemental Pre-Remedial Design Study, completed in September 1996, concluded that the Pollution Abatement Services site is not the source of pesticides in the surface water of Wine Creek and is not presently a source of PCB contamination in the sediments in the adjacent wetlands and Wine and White Creeks (although it was a likely source of PCB contamination before the construction of the containment facility in 1986).

The Phase II Supplemental Pre-Remedial Design Study also identified two additional potential sources of PCBs in the sediments in the wetlands and creeks in the vicinity of the Pollution Abatement Services site. The findings of the Phase I and II Supplemental Pre-Remedial Design Studies were documented in a September 1996 Explanation of Significant Differences. Since residual PCBs from the Pollution Abatement Services site may remain in the sediments in the vicinity of the site and, therefore, may act as a continuing source of contamination, a focused feasibility study was completed in August 1997. The purpose of this study was to identify and evaluate remedial alternatives to address the PCB contaminated sediments. A ROD addressing the PCB contaminated sediments was signed on September 30, 1997. The selected remedy requires no further remedial action; however, it does require long-term monitoring of the PCB-contaminated sediments at the site (which is ongoing).

② Contaminated River Sediments:

Contaminated sediments are not an issue in the Area of Concern. In 1999, the United States Army Corps of Engineers performed a maintenance navigational dredging in the Oswego Harbor AOC and determined that open lake disposal of dredged materials was acceptable. NYSDEC issued a water quality certification for this dredging. To certain degrees, we know that contaminated sediments are present in the watershed, upstream of the AOC in parts of the Oswego River, and in Onondaga Lake. Hazardous waste site remediation surrounding Onondaga Lake is well underway to clean up sources of contamination. In the lower Oswego River, further investigation has been conducted to identify the threat of any in-stream contamination and its potential downstream threat. If a significant source is identified, classification as a hazardous waste site would occur with follow-up action required.

Sediment studies show that some contaminated sediments are present upstream of the AOC that have raised water quality concerns; however, additional study and assessment has not determined a remedial need. Also, water quality studies have not identified a problem. In 1994, sediment cores and surficial sediment samples were collected at six sites on the Oswego and Seneca Rivers. The broad sediment study was designed to evaluate trace metals and organic chemical concentrations in Oswego River sediments. This project also included some toxicity testing and benthic study and was funded by a grant from USEPA's Great Lakes Nation Program Office (GLNPO). Details of the study and results are contained in the referenced report with a Quality Assurance Project Plan. A summary is provided below:

The **Oswego River Sediment Study** (Summary Results from 1994 Sampling) was published by NYSDEC in April 1997. All sediment samples (cores and surficial) were collected from depositional areas located outside of navigational channels which are normally dredged. Station #1 is in the harbor, station #2 is above the Varick Dam, station #3 is adjacent to Battle Island which is downstream of the Armstrong World Industries facility, station #4 is at Big Island closer to Armstrong, station #5 is at the Phoenix Dam to define the upstream conditions of the Oswego River, and station #6 is in the Seneca River two miles downstream from the Onondaga Lake outlet. The reference is listed in Appendix H item 28. The report conclusions are presented below in a listing of ten study result discussions:

1. Metals

Trace metals exceeded NYSDEC guidance values for cadmium, copper, lead, and mercury. These exceedences occurred with greatest frequency and magnitude at stations #2 and #3. Chromium, nickel, silver, and zinc concentrations also exceeded NYSDEC sediment guidance values, but with less frequency and lower magnitude. The highest concentrations of most metals were encountered at station #3 (Battle Island). Peak concentrations were measured near the middle of the core collected at most of the stations. The pattern suggests that the current levels of trace metal contamination to the Oswego River, as represented by the recently deposited surficial sediments is lower than the historical levels. However, when surface and near surface sediment results are compared to the oldest (deepest) sediments, the most recent sediments were almost always higher than the deepest core sections.

In order to better understand the period in which peak trace metals concentrations occurred in depositional sediments, radionuclide dating was employed. Results indicate that the current rate of sediment accumulation at station #3 is very rapid; on the order of a few cm. per year. There is an observed major depositional event of old sediments (pre-1950s) at the 28 to 48 cm. core depth. It is estimated this event occurred between the mid-1960s and the mid-1980s. Some of the highest concentrations of trace metal observed in the Oswego River occurred above station #3 (Battle Island). The radiodating analysis suggests this peak discharge period occurred in the 1950s.

2. Pesticides

All sediment core samples and surficial samples at stations #1 and #2 were evaluated for PCBs and pesticides. 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 problem.

3. PCBs

Two independent sediment assessment protocols were used: 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 and 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.

PCB concentrations were detected in the upper sections of all core sample stations except #6. Larger concentrations were detected in stations #1, #2 and #3 with the highest being at station #3 in the 25-61 cm. section. A detailed discussion with sample results and tables is presented on pages 62 through 64 in the report. Of concern is the presence of PCBs in the top section samples of the lower river and in the surficial samples from the harbor. The report recommended additional sampling to better define the depth, breadth, and biological impacts of the PCB concentrations. As a result, a focused sediment study on the Battle Island area was conducted in 2000 and reported on in the 2002 Final Draft Battle Island Sediment Assessment. The study concluded upstream sediments are not causing use impairments in the AOC. Unrestricted navigational dredging last occurred in the harbor area in 1999.

4. Dioxins and Furans

- 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 station #3 likely warrant further investigation to delineate the depths and breadth of the dioxin and furan contamination.

- Toxic Equivalents

Toxic equivalency is a methodology that quantifies the toxicity of 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 evaluate these values, they were compared to human health and wildlife bioaccumulation sediment guidance values present in the 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 problem 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. The dioxins are dominated by OCDD and the furans by the HpCDF and OCDF. The homolog ratios show the furans are more abundant in the lower chlorinated homologs while the dioxins dominate the higher chlorinated. The findings at station #3 suggest additional sampling is needed to delineate the depth and breadth of contamination.

5. PAHs (Polynuclear Aromatic Hydrocarbons)

The most apparent pattern observed is the major spike in concentration for most PAH compounds 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. This may have been caused by a limited historical oil spill. The harbor sediment core sample indicated a slight surface or near-surface presence of PAHs. Station #6 (upstream near the Onondaga Lake Outlet) indicated a PAH presence throughout the core sample.

6. Mirex

The highest concentrations of mirex encountered were found in the sub-surface sections (20-74 cm.) of the sediment core collected at station #3 at Battle Island. No mirex was detected in the sample collected immediately upstream of the Armstrong World Industries facility. Mirex was also measured in the surface samples at station #2 collected immediately upstream of Lock 6 on the Oswego River. As a source of potential contamination to Lake Ontario, a more focused study of the Battle Island area was further planned and conducted in 2001. Results indicate no significant threat to the environment exists from this area. To demonstrate environmental impact, an upstream out-of-AOC food uptake study has been proposed by academia.

7. Octachlorostyrene

Octachlorostyrene (OCS) was not detected in any of the samples performed by the independent lab in this study (limit range: 0.27-0.75 ug/kg). The NYSDOH lab reported similar results with some exceptions where only trace amounts of the compound were detected at station #3. These amounts were not quantifiable as only a presence at less than the detection level of 0.5 ng/g was indicated.

Independent of the Oswego River Sediment Study, technical assessment and discussion involving Lake Ontario and the Lakewide Management Plan (LaMP) indicate that analyzing for OCS has been difficult due to the lack of analytical standards over the years, and the fact that other contaminants such as PCBs and pesticides can in some cases give the same instrument response as OCS.

OCS was identified as a contaminant in the Lake Ontario Toxics Management Plan (LOTMP) that exceeded the piscivorous fish standard for wildlife. This result was based on applying piscivorous fish criteria (Newell, A.J., NYSDEC, 1987) to lake trout samples collected in 1988-1990. USEPA lake trout data (reference #77, Appendix H) for these same years showed fish tissue levels to be below NYSDEC criteria as did chinook salmon, coho salmon, brown trout, white sucker, and smallmouth bass data sets.

Overall, Lake Ontario U.S. and Canadian fish tissue monitoring experts do not regard OCS as a significant problem for Lake Ontario and, as a result, do not include analyses for OCS as part of their routine fish tissue monitoring programs. It should also be noted that lake trout are not considered available as a food source for wildlife. Therefore due to the overall nondetection of OCS in sampling results and the lack of supporting data that raises any research interest involving the detectability of OCS, it is recommended that the concern for OCS as an Oswego River RAP and Lake Ontario contaminant be considered nonsignificant.

8. Sediment Toxicity

Observed results of the acute sediment toxicity testing indicate no statistically significant toxicity to the Daphnia magna (water flea) or Pimephales promelas (flathead minnow). Ten-day solid phase toxicity test 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).

9. Microtox

These 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 could be established. Pore water elicited low toxicity only at station #3 but with unacceptable confidence.

10. **Macroinvertebrate Sampling**

This study was conducted to analyze resident communities and assess possible contaminant impact on organisms. Macroinvertebrates are good indicators of environmental quality because they are sensitive to environmental impacts and are less mobile than fish. In the absence of standardized procedures, several criteria are applied to assess the benthic community. Sample assessment ratings range from no impact to severely impacted. The five criteria selected in this study are:

- * Species richness - the number of species in a sample (group ranges applied).
- * Biotic index - measures an organism's pollution tolerance (uses a scale).
- * Species diversity - combines species richness and community balance (range).
- * Species dominance - measures the community relationship or balance (a high number of few species means an unstable community).
- * Model affinity - measure of similarity in comparison to a model non-impacted community based on a reference using percent abundance (range).

The Oswego Harbor, Battle Island, and Phoenix area benthic community samples were identified as diverse and well balanced and therefore assessed as non-impacted. The lower river and Onondaga Lake outlet samples were assessed as slightly impacted, and the area above Fulton was moderately impacted. Sediment differences (particle size) and the presence of contaminants can also contribute to the identification of impacted areas.

A comprehensive **Contaminated Sediment Management Strategy** has been developed by the United States Environmental Protection Agency (USEPA). The proposed strategy describes specific actions that EPA will take to reduce environmental and human health risks associated with contaminated sediment. The strategy does not propose new regulation. The intent is to implement policies to consistently assess, prevent, and remediate contaminated sediments. EPA has requesting public comment on this strategy.

EPA's proposed Contaminated Sediment Management Strategy describes actions that the agency will take to accomplish the following four strategic goals: 1) prevent further sediment contamination that may cause unacceptable ecological or human health risks; 2) cleanup existing sediment contamination, when practical, that adversely affects the Nation's waterbodies or their uses, or that causes other significant effects on human health or the environment; 3) ensure that sediment dredging and dredged material disposal continue to be managed in an environmentally sound manner; and 4) develop and consistently apply methodologies for analyzing contaminated sediments.

The Strategy is comprised of six component sections: assessment, prevention, remediation, dredged material management, research, and outreach. In each section, EPA describes actions that are to be taken to accomplish the four broad strategic goals:

- **Assessment**

EPA program offices are to use standard sediment toxicity test methods and chemical-specific sediment quality criteria to determine whether sediments are contaminated. A national inventory of sites and sources of sediment contamination (National Sediment Inventory) is proposed to be used to target sites for remedial activities.

- **Prevention**

To prevent the spread of contaminated sediments and regulate the use of pesticides and toxic substances that accumulate in sediment, EPA proposes the use of acute sediment toxicity tests to support registration of chemicals under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Toxic Substances Control Act (TSCA). In the Strategy, EPA also proposes: developing effluent guidelines for industries that discharge sediment contaminants in significant amounts; using pollution prevention policies to reduce or eliminate sediment contamination resulting from noncompliance with permits; preparing guidelines for the design of new chemicals to reduce the bioavailability and the partitioning of toxic chemicals to sediment; and implementing point and nonpoint source controls that will protect sediment quality. Preventive actions are intended to stop further contamination of sediments and to reduce ecological and human health risks.

- **Remediation**

EPA proposes using multiple statutes to require contaminated sediment remediation by parties responsible for pollution. These statutes include the Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), Superfund Amendment and Reauthorization Act (SARA), the Clean Water Act (CWA), the Toxic Substances Control Act (TSCA), the Rivers and Harbors Act, and the Oil Pollution Act (OPA). The proposed strategy states that EPA will not proceed with a cleanup if a combination of pollution prevention and source controls will allow the sediments to recover naturally in an acceptable period of time. EPA's remedial actions are designed to cleanup sediment contamination that adversely affects the Nation's waterbodies.

- **Dredged Material Management**

EPA proposes the development of technical guidance regarding dredged material testing, disposal alternatives consideration, and dredged material disposal site selection to ensure continued disposal of dredged material in an environmentally sound manner. (Note: NYSDEC has developed and is using a July 1994 publication, "Technical Guidance for Screening Contaminated Sediments" listed in Appendix H as reference #47.

- **Research**

EPA proposes a program of investigative research that is needed to: develop and validate new chemical-specific sediment criteria and other sediment assessment methods; improve EPA's understanding of the transfer of sediment contaminants through the food chain; and develop and evaluate a range of technologies for remediating contaminated sediments.

- **Outreach**

Public outreach activities are planned to demonstrate EPA's commitment to, and accountability for, sediment management efforts. Regular status reports on sediment management activities are to be provided.

④ **State Pollution Discharge Elimination System (SPDES):**

With the initiation of the Division of Water's Environmental Benefit Permit Strategy (EBPS) in April 1992, point source discharge permits are now given priority for renewal modifications based on the identification of environmental/water quality benefits. A ranking system has been implemented that provides higher priority for permit modifications based on permit need factors and their impact towards environmental improvements. A Great Lakes Area of Concern (AOC) component based on bioaccumulation and persistent toxic chemicals is one element of this priority system. An identification with an AOC based on this bioaccumulative/persistence factor will therefore provide additional weight in the priority ranking system for working on a point source discharge permit renewal/modification. The EBPS is proving to be very successful. Aspects of priority industrial and municipal SPDES permit renewals and modifications in the Oswego River area that are likely to have an impact on the restoration and protection of beneficial uses are discussed below.

In addition, as part of EPA's Contaminated Sediment Management Strategy described above, EPA is developing a sediment quality criteria user's guide to assist in interpreting sediment chemistry. The goal is to apply this EPA technical guidance in evaluating dredged material testing, dredged material disposal site selection, and disposal alternatives to ensure continued disposal of dredged material in an environmentally sound manner. At the same time,

NYSDEC has developed and is using guidance from a July 1994 publication entitled: “Technical Guidance for Screening Contaminated Sediments”. The application of sediment quality criteria can be very useful in making hazardous waste site assessments and proposed sediment dredging and disposal decisions. The criteria could also be adopted as part of state water quality standards and applied to help establish water permit discharge limits.

A significant reduction in the mass of PCBs and other contaminants discharged within the Oswego River drainage basin by area industries (primarily stormwater/site related) has been achieved by the installation of improved wastewater treatment systems, correction of combined sewer overflows (CSOs), implementation of best management practices (BMPs), and hazardous waste site remediation activities. The permit renewal process involving major industrial companies and municipal facilities has the goal of achieving non-detectable discharge levels of PCBs, as well as reduced discharges of other contaminants for each water discharge. Resolving the issues concerning PCBs that involve the sampling method and the level of detection are a priority for NYSDEC (current policy uses a detection level of .065 ug/l). Although PCBs are no longer used, past waste disposal practices had so contaminated some facility sites such that stormwater runoff was contaminated. In such cases, site remediation is required to cleanup PCB contamination. Priority concerns for industrial and municipal permits are:

1. Industrial Point Source Permits

The major industries in the Oswego River watershed drainage basin are in various stages of the SPDES permit renewal/modification process (based on a five year cycle). Overall, with the focus on toxic substances and with consideration for the requirements proposed under the Great Lakes Water Quality Guidance, we can expect to see continued additionally stringent permit discharge limits with the primary emphasis on parameters identified as bioaccumulative chemicals of concern (BCCs). Process and pretreatment discharge controls as well as stormwater discharge management practices require industries to comply with best available technology (BAT) and water quality based effluent limits.

2. Municipal point source permits

The City of Oswego operates two wastewater treatment facilities: the East Side and West Side plants. Implementing extensive sewer rehabilitation and separation projects began on the system in 1996. Addressing wet weather, eliminating stormwater, inflows, and overflows were priorities. The Environmental Facilities Corporation (EFC) provided important funding through low interest loans. The discharge permits at both facilities were modified to include a Long Term Control Plan (LTCP) and Best Management Practices (BMP) plan for the collection systems.

Although the municipal permits in the Oswego area tend to not score high on the EBPS ranking system for environmental benefits of permit modifications, there are issues that are forefront in the concern of these discharge permits. These include the combined sewer overflow (CSO) controls, stormwater management, and pretreatment program activities. For the City of Oswego, the two SPDES discharge permits have been reviewed and modified to include additional work for both the City of Oswego East Side (#NY-0029114) and City of Oswego West Side (#NY-0029106). The renewals are to address CSO, stormwater, and pollution prevention measures embodied in a compliance schedule which may include an administrative order. These point source SPDES permits contain provisions to address: monitoring and discharge limits for phenols, cyanide and metals; approved pretreatment program requirements to control industrial users; mitigation of storm water runoff from new development; best management practices for further CSO reductions; long term control plans for CSOs; and, additional recording and reporting requirements.

USEPA and NYSDEC have developed CSO strategies through regulatory negotiation that require the implementation of minimum controls for CSO system operation and maintenance, minimization of overflows, construction of new infrastructure, pollution prevention, prohibition of dry weather discharges, public notification, and monitoring. In many instances, special attention is being provided to sensitive issues such as endangered species habitat and public drinking water intakes.

3. Oswego Combined Sewer Overflows (CSOs)

The lower Oswego River is potentially stressed by combined sewer overflows (CSOs) from Oswego which affects aesthetics. Although this use impairment is not rated as impaired, some additional abatement work remains. Significant progress has been achieved in restoring aesthetics to the area which are currently considered “pleasing to encourage active and passive recreation”. Further abatement of CSOs is a continuation of DEC and Oswego’s responsibility to meet State and Federal goals.

The major work elements of the five-phase project addressing overflows have been completed. At the West Side plant, a swirl concentrator has been installed to remove floatables. At the East Side plant, two overflow retention facilities (ORFs) have been installed including disinfection. These actions to abate stormwater and overflows have had significant results and will be continued in phases 4-5 involving sewer separation. The further implementation of BMPs, the LTCP, sewer separation, and more restrictive water quality based limitations for total residual chlorine will meet long term goals. Upstream, combined sewer overflow and discharge improvements have been addressed by Onondaga County under an enforcement action involving municipal discharges to Onondaga Lake.

④ **Nonpoint Source Pollution Control:**

Excessive nutrients (phosphorus) and sedimentation (erosion) from agriculture have been identified to be the main nonpoint sources of pollution causing impacts in the Oswego River Drainage Basin. County Water Quality Management Strategies have been developed to address nonpoint source pollution. Implementation of these County Water Quality Management Strategies and related Best Management Practices (BMPs), including improvements to stormwater management, are ongoing and progressing in the watershed. Various funding programs (grants) now support and assist in the implementation of these nonpoint source pollution control efforts.

Nonpoint sources have been identified as the primary source of water quality problems in more than 1,300 water body segments (90+%) included on New York's Priority Waterbody List (PWL). NYSDEC maintains descriptive data on each on these priority waterbody segments. There are over 40 subcategories of sources that are considered nonpoint sources contributing to water quality problems. These range from sources such as atmospheric deposition and contaminated sediments, that will have to be addressed by state and/or federal level programs, to categories such as on-site wastewater treatment systems and agricultural runoff that are best addressed through local implementation efforts and involve land use decisions and management practices.

Nonpoint source pollutants include pathogens, sediments, nutrients, toxics, thermal energy, and oxygen-demanding organics. For example, pathogens have been identified as responsible for the closing of shellfish beds and bathing beaches on Long Island. Sediment can destroy fish habitat through the blanketing of fish spawning and feeding areas and the elimination of certain food organisms. Nutrients contribute to eutrophication in lakes, reservoirs and marine waters. Animal feeding and agriculture have an impact.

Within the Oswego River watershed, which drains an area of over 5,100 square miles, continued vigilance in addressing nonpoint source causes of use impairments is maintained through federal, state, local, and private environmental interests. Physical disturbances, contaminated sediment causes, land-based hazardous waste sites, and watershed practices concerning fertilizer and pesticide use are examples of sources of nonpoint source pollution that are monitored and regulated. The result of addressing these nonpoint sources and causes in the Oswego River drainage basin has provided significant improvement to the ambient river water quality as well as protection to move ahead with the resolution of the use impairment indicators for the Area of Concern.

Passage of the federal Water Quality Act of 1987 led New York State to take a more active role in dealing with nonpoint source pollution problems. As required by Section 319 of the Act, NYSDEC coordinated the preparation of a Nonpoint Source Assessment Report and a Nonpoint Source Management Program. In the years since 1989, NYSDEC has: developed guidance materials on source categories and public outreach; joined forces with the USDA Natural Resources Conservation Service (formerly the USDA Soil Conservation Service)

to provide technical training; formed cooperative agreements with the Natural Resources Conservation Service and the NYS Soil and Water Conservation Committee; funded aspects of County Water Quality Coordinating Committees efforts; funded specific county-based implementation projects in the Great Lakes Basin; and, supported various other nonpoint source pollution projects including groundwater protection across the state. Since 1994, NYSDEC has been identifying projects to address water quality problems in New York State and funding some of these activities using federal funds appropriated under Sections 319 and 604(b) of the Clean Water Act. Several million dollars has been made available for locally-based nonpoint source pollution control activities.

Working in conjunction with the NYS Soil and Water Conservation Committee, DEC has encouraged the development of county water quality strategies. Grants have been made available to each county that completed a strategy; in fact, almost all NYS counties developed strategies. These strategies therefore have become a part of RAP strategies and provide blueprints for actions to address nonpoint source pollution in a particular watershed. In applying the RAP Process to provide an ecosystem approach to protect and to restore beneficial uses, a watershed approach is necessary to track down sources and to implement remedial and preventive measures. Nonpoint source pollution control is essential to remedial strategies. Significant work has been accomplished in the development and implementation of nonpoint source pollution projects and management. Remedial action is continuing based on implementing the plans and guidance that have been established.

Federal guidance has established some fundamental elements that form the basis for the application of best management practices used in a nonpoint source pollution control program. These elements have been incorporated into an EPA guidance document entitled **“The Stream Protection Approach”**. The Stream Protection Approach incorporates the integration of six elements into a cyclic development, planning, implementation and review process. This guidance document provides us with a model that can be applied to New York State nonpoint source pollution control efforts. The six broad elements encompass the following protection strategies:

- Protect key resource area from development (these include wetlands, floodplains, steep slopes, streams, forests, habitat, and open space).
- Establish buffers to protect resource areas (includes aspects of delineation, construction, and management).
- Provide sediment and erosion control (address clearing, grading, sediments, construction sequence, disturbance limit, and revegetation).
- Reduce site imperviousness (use cluster development, provide infiltration and design requirements such as porous pavement and concrete grid).
- Provide stormwater management (address quantity and quality of runoff, treatment, controls, protection, and BMPs).
- Provide watershed maintenance (employ inspections, enforcement, maintenance, assistance, and restoration activities).

NYSDEC's Division of Water has developed nine guidance document sections for the Management Practices Catalogue for Nonpoint Source Pollution Prevention and Water Quality Protection in New York State. All of the nine parts of this Management Practices Catalogue have been finalized that deal with: stormwater runoff, agriculture, construction practices, roadway maintenance practices, on-site wastewater treatment systems, silviculture, spills, resource extraction, and hydrologic/habitat modification.

Implementation of the initiatives outlined in the Nonpoint Source Management Program includes many elements and is an ongoing effort of nonpoint source control. Local involvement is essential and Best Management Practices establish fundamental strategies. The cooperative agreements with county districts and the State Soil and Water Conservation Committees are key factors to implementation. Education and training are promoted by these organizations.

⑤ **Air Pollution Control:**

The remedial strategy calls for the reduction of contaminant emissions from the major industrial facilities in the AOC. The Clean Air Act Amendments of 1990 require air discharges to comply with Maximum Achievable Control Technology (MACT) limits. When further developed, NYS Air Standards may require treatment beyond MACT to be phased in over a period of time. The Oswego County and Onondaga County waste incinerators are two facilities that will involve further investigation concerning their air discharges involving dioxin. Air toxics discharges are discussed further in item #2 below.

New York State has put together a comprehensive program to improve air quality and to bring the State into compliance with the 1990 federal Clean Air Act Amendments (CAAA). The amendments address chronic air pollution and require states to bring their air quality into compliance with federal standards by specific dates. Substantial new obligations to control urban smog, acid rain, toxic pollution, and pollution from smokestacks are required to be implemented under meaningful, and often rigorous timetables. States that fail to meet these obligations will be subject to federally-imposed economic sanctions. Major provisions of the 1990 CAAA include:

Title I: Nonattainment - This title classifies geographic areas that do not meet federal standards for particulate matter, nitrogen dioxide, carbon monoxide, lead, sulfur dioxide, and ozone (VOCs and NOx). It also sets acceptable air quality limits, progress requirements, and emissions control guidelines for both mobile sources (cars, trucks) and stationary sources (utilities, industries).

Title II: Mobile Sources - For all types of motor vehicles, this title sets standards for emissions testing, certification, and warranties. It also directs the federal Environmental Protection Agency (EPA) to develop regulations for formulating motor fuels and to set standards for clean alternative fuels.

Title III: Air Toxics - This program lists 189 chemicals to be regulated and includes a procedure for EPA to add and delete chemicals from this list. It directs EPA to identify toxic source categories and to establish emissions limits and siting requirements for municipal waste incinerators.

Title IV: Acid Rain - This title describes plans for reducing emissions of sulfur dioxide and oxides of nitrogen, and it directs EPA to establish limits on electric utility plant emissions of these pollutants.

Title V: Permits for Stationary Sources - States are directed to adopt and implement an air pollution permit program that includes emissions limits and standards, compliance schedules, and reporting requirements. Provisions are made for assistance to small businesses to help them comply. Fees are required to be established and collected for the support of the program. Amendments to NYSDEC air pollution regulations are described below under initiatives item #4.

1. Source Strategies for Air Pollution Control

In order to meet the goals of the CAAA, New York State's air pollution control program will concentrate on mobile sources (cars and trucks), stationary sources (utilities and industries), and area sources (consumer products). Strategies for the implementation of these three air pollution control activities are:

- **Mobile Sources**

For vehicles, increase the amount of oxygen contained in gasoline sold in areas with carbon monoxide pollution problems; adopt strict emissions standards for new passenger vehicles; enhance the State's motor vehicle inspection and maintenance programs; and, require motor vehicle trip reduction plans for companies that have 100 or more employees and are located in areas with severe air quality problems.

- **Stationary Sources**

For companies, require the installation of basic air pollution controls that use reasonably available control technologies (RACT). These requirements include offsets for major new sources of air pollution at a ratio which is greater than 1.15 to 1, or 1.3 to 1 in areas of severe nonattainment.

- Area Sources

For products, regulate the amount of solvent in paints, inks, and other consumer products such as hair spray.

2. Air Pollution Programs Affecting RAP Strategies

There are three areas of the air pollution control program that, through improved requirements, can assist in further restoring and protecting beneficial uses in the Area of Concern:

- Air Toxics

The air toxics program is required to set emissions limits for 189 hazardous air pollutants that affect the public health. Provisions call for the use of maximum achievable control technologies (MACT). EPA is required to develop, implement, and enforce regulations establishing requirements for air pollution control technology, pollutant trading, and the assessment of residual health risks caused by pollutants in the air. These requirements apply to stationary sources which discharge specific amounts or types of air pollutants. For major and area sources, the CAAA lists 189 hazardous air pollutants that take into account toxicity, reaction with other substances, and persistence in the environment.

Major sources are any stationary source or group of stationary sources that emit 10 tons per year or more of any single hazardous air pollutant, or 25 tons per year or more of any combination of hazardous air pollutants. Area sources are smaller sources which emit less than either the 10 or 25 tons per year thresholds.

Changes to the hazardous air pollutant list can be made. EPA is required to establish separate standards for municipal waste incinerators that provide maximum reductions in air emissions, taking into account cost, health/environmental impacts, and energy requirements. It is expected that the new control standards will require additional emissions reductions of 75-90 percent below current levels.

After the control technologies are in place, New York State must assess the public health risk which remains and oversee the permit, program modification, and offset programs as required by the CAAA. New facilities are subject to emissions standards that are tighter than those applicable to existing facilities.

NYSDEC has a comprehensive air toxics program that accommodates the 1990 CAAA. State air regulation Part 212 and New York's Air Guide-1 provide the foundation. Air Guide-1 contains specific chemical control guidance for over 240 chemicals categorized as either high, moderate, or low toxicity air contaminants. Stack testing to assure compliance is provided.

EPA intends to apply the data obtained from the studies on toxic air pollutants to Lake Ontario to the Lake Ontario Mass Balance Model for the lake. This model will be used as a tool for NYSDEC to develop TMDL's for the lake. The model contains factors such as air pollution, point and non-point sources, sediment loadings, inputs and outputs from the lake.

- Ozone Transport

Recognizing that a combined and coordinated effort among states would be needed to solve the ozone transport problem in the Northeast, Congress established the Ozone Transport Commission (OTC) as part of the 1990 CAAA. The OTC addresses the regionwide transport of ground-level ozone and its precursor emissions of volatile organic compounds (VOCs) and nitrogen oxides (NO_x). The OTC includes members from Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and Washington, D.C.

Under the CAAA, the following control measures are required by the OTC states: an enhanced vehicle emissions inspection program in all areas with populations greater than 100,000; basic controls on most stationary sources; new source review for offsets of major stationary sources; and, cleaner fuels.

- Small Business Assistance Program

The Small Business Assistance Program is an opportunity for businesses to obtain the information and technical assistance necessary for compliance with the CAAA. In order to meet the many new air quality standards and to control toxic emissions, which requires installation of air pollution controls and knowledge of complex regulations, Congress ordered EPA and the states to help small businesses by providing technical assistance and compliance information. The three key components of the program are an Ombudsman's Office, a Technical Assistance Program, and a Compliance Advisory Panel.

The Ombudsman Office will serve as the representative of small businesses. The office will be located at the New York State Department of Economic Development. The office will handle complaints, provide outreach and help small businesses gain access to program services.

The Technical Assistance Program, located within the New York State Environmental Facilities Corporation, will work independently from NYSDEC. This program will aid small businesses in understanding federal and state requirements, assist in filling out permit applications, and provide technical advice on compliance with the regulations.

A Compliance Advisory Panel will be established to render advisory opinions, determine the overall effectiveness of the technical assistance program, and review information to assure it is easily understood.

Any business which is independently owned and employs less than 100 people and is not a major source of air pollution (as defined by appropriate regulations) will qualify for assistance.

3. Air Pollution Program Investigations

There are several types of investigations involved in the air pollution program that can involve Great Lakes program activities:

- Ambient Air Monitoring Networks

NYSDEC Division of Air conducts routine air monitoring through two statewide air monitoring networks: air toxics and acidic deposition. The networks provide data to identify New York State air quality in terms of heavy metals and volatile and semivolatile organics. Transport and conversion mechanisms are also better understood from the networks data. In addition a mobile air laboratory, that operates a Trace Atmospheric Gas Analyzer (TAGA), is used to monitor ambient air. Compiling ambient air study results and assessment of this data needs further development.

- Fugitive Emissions

Air discharges that are not captured by a pollution control system and thus are released to the atmosphere at the source rather than a stack are fugitive emissions. In some cases such emissions may be a significant source of atmospheric pollution. Therefore, NYSDEC is promulgating a fugitive emission regulation which calls for a 50 percent reduction of all unregulated air releases from a 1987 baseline emission inventory.

- Atmospheric Deposition

USEPA intends to apply the results of studies on toxic pollution of the Great Lakes resulting from atmospheric deposition to develop a control strategy and regulations (if necessary) to combat the air toxics problem.

The Great Waters Report (May 1994) provides a discussion of the problems and recommendations relative to the deposition of air pollutants to the Great Lakes. Atmospheric deposition has been further recognized as a significant nonpoint source of pollution to the Great Lakes basin; however, direct evidence of the sources and

impacts needs further study. Such work is beyond the scope of the Oswego River RAP Area of Concern.

4. Air Pollution Program Initiatives

There are a number of initiatives concerning the air pollution program that can involve Great Lakes program activities:

- National Urban Air Toxics Strategy

USEPA is responsible to propose a national urban air toxics strategy which contains specific actions designated to reduce cancer risks from urban sources by 75 percent. Although development of the strategy is behind schedule, full implementation has been called for. Because the Oswego area is not in a designated national urban area, New York State regulations under the maximum achievable control technology (MACT) requirements will apply.

- Source Category Regulation

USEPA is responsible to list sufficient area source categories of air pollution to regulate 90 percent of emissions of the 30 most hazardous area source pollutants. Regulations requiring generally available control technology for the sources must be adopted. Maximum achievable control technology (MACT) requirements are also being developed for various source categories.

- Source Discharge Air Permits Program

The CAAA Title V requires that individual facilities whose emissions of certain contaminants exceed specified thresholds or that are subject to specific federal New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), or other federal standards, obtain facility operating permits under Title V. Individual emission point permits (as currently administered by NYSDEC) are not required, although there are provisions for the control of emissions from individual process operations within a facility. The intent is to incorporate the federal facility discharge permit strategy into NYSDEC's permitting program while maintaining the state's already enhanced discharge controls. Facilities not required to obtain a facility permit will be regulated by the current emission point program with some major improvements: separate construction permits will not be needed and long term permits will be provided for unchanged processes.

A separate category of facility permit, referred to as a general permit, will also be available for certain facilities through the proposed permit revisions that are intended to integrate the two programs (i.e. facility permit and emission point permits). Under this system, a single permit will be issued to cover a category of operation after the fulfillment of public participation requirements. Facilities within that category

wishing to operate under the general permit must submit an application similar to that required for conventional facility permits, but are not required to undergo further public review in most cases. The elimination of this step will simplify the permitting process for these facilities, and relieve some of the administrative burden.

- Facility Specific Air Permits

Some facility permits require an identification, trackdown, minimization, and elimination program for discharge contaminants. Determinations are based on the design of the new air discharge permit to meet Clean Air Act Amendments and NYSDEC implementation strategy. Some facilities need to develop a fugitive emissions plan that outlines best management practices (BMPs) to control fugitive emissions. BMP requirements are expected to be incorporated as special permit conditions in the facility's air discharge permit.

- Amendments to NYSDEC Air Pollution Regulations

In order to meet the requirements of Title V of the federal Clean Air Act Amendments of 1990, NYSDEC will modify its Environmental Conservation regulations parts 200, 201, 231, and 621. These changes are necessary to establish an operating permit program for sources of air pollution as required by USEPA regulations. A number of important reforms to the State air permitting program are in the making: establishment of a registration program, the combining of both construction and operation approval requirements under one permit, and the ability to issue permits with no set expiration date.

Facilities subject to air emissions permitting under Title V are to obtain a "Title V facility permit" while others will need to register or obtain a "state facility permit". A general permit provision is included for source categories subject to common emission control.

⑥ Fish and Wildlife Assessments/Actions:

Several of the use impairment indicators are based on the status of fish conditions and considerations. Wildlife impairments are not identified in the AOC for the Oswego RAP. Sufficient fish investigative information has been reported to assess the indicators. The 1995 Fish Pathology Study conducted by Jan Spitsbergen of Cornell University (Appendix H.68) found little evidence of impairment of fish health by contaminants in the Oswego River harbor. Lakewide fish consumption advisories and fish habitat impairments are identified; however, contaminant levels are below those causing an increase in fish tumors or other abnormalities. Conducting further fish reproduction rate evaluations could be an area for further investigative funding. The provisions of the Federal Energy Regulatory Commission

(FERC) relicensing process involving the Oswego River are to address the fish habitat use impairment concern immediately below the Varick Dam.

Results of fish investigation, environmental monitoring, and habitat restoration requirements and protection activities involving the Oswego River, the AOC, and Lake Ontario have been generated as part of remedial activities. Studies have been and, on a limited basis, are continuing to be performed/funded by USEPA, NYSDEC, NYSDOH, Cornell University and other interested organizations such as the Long Point Bird Observatory in Canada. The benefit of conducting further investigative studies concerning deformity and population diversity has been questioned. Habitat assessment also requires closer examination as to the real impairment versus the overall habitat available in a given regional area. The IJC water level study may provide information applicable to the Oswego AOC. Some low summer water levels in the harbor area do present a concern for boating interests. Lake levels have limited impact on the habitat area below the Varick Dam that the FERC license will address through modified Oswego River flows. Below are details of the progress in implementing current fish assessment activities. Protection of fish and wildlife habitat is also noted.

1. Investigations

- **Fish Pathology**

Fish tumor and lesion studies were reported on by Jan Spitsbergen in the 1995 Fish Pathology Study (Appendix H.68) for the Oswego Harbor. Results indicate that Oswego Harbor fish have not been significantly affected when compared to control groups from uncontaminated areas. Because contaminant levels in the fish were found to be below those causing an increase in tumors or other deformities, little evidence of the impairment of fish health was found. Details of this investigation are further discussed under use impairment indicator # 6 in Section III.B, page 44.

- **Young-of-the-Year (YOY) Fish Studies**

YOY fish data was sampled in 1992 and published by DEC in August 1994 in a document entitled "Identification of and Changes in Chemical Contaminant Levels in Young-of-the-Year Fish from New York's Great Lakes Basin" (Appendix H.67). This monitoring was expanded in scope in the 1997 sampling and is reported in the 2002 YOY report by DEC (Appendix H.31). Several factors contributed to the final report delay. Because of the expanded number of sampling sites, expanded parameter list, and extensive evaluation and report writing needs, the final 2002 involved significant preparation work; however, interim summary information requests were fulfilled. As a result, improved data management and reporting methods have been learned. Assessment of the YOY data for the Oswego site (located in a Lake Ontario nearshore area west of the harbor outlet) shows a continued downtrend in the level and detection of contaminants in fish. Although these fish are not directly sampled

from the Oswego harbor, they are considered associated with the Oswego River tributary flow. The YOY sampling is reviewed under the Lake Ontario Lakewide Management Plan (LaMP) as related to the status of fish consumption use impairment indicator and the lakewide health advisory established by NYSDOH. Since the AOC does not have a specific health advisory and is addressed by the larger lakewide advisory, it is appropriate to have the advisory resolution addressed under the Lake Ontario LaMP. The LaMP's role to take action to further decrease the loadings of critical pollutants to the lake are expected to continue to be observed in trends that indicate improvements.

- Fish Flesh Chemical Residue Analyses

a. Alewives and Rainbow Smelt - As part of the special Great Lakes fish contaminant program, supplemental collections of two forage fish species were requested to help provide chemical residue linkages in food web dynamics for salmonids. Data for composites of whole alewives and rainbow smelt collected in Lake Ontario off Oswego in the Spring of 1993 were produced. Results indicate that none of the samples exceed a federal limit (2000 ng/g) for PCB or organo-chlorine pesticides (although these limits do not strictly apply to whole fish data, unless the fish is eaten whole). Mercury was not analyzed in this test. The PCB data do however exceed the PCB value for the protection of sensitive piscivorous wildlife of 100 ng/g. For the fish in Lake Ontario in the vicinity of the Oswego tributary PCBs in fish flesh ranged from 100 to 1300 ng/g. For open Lake Ontario and nearshore areas, it is apparent that certain species may contribute to the impairment of the well being of sensitive wildlife if certain fish are significant part of the diet. For humans, the federal limit for PCBs is being achieved near Oswego; however, the lakewide human health advisories remain in effect as applying to migratory fish entering the Oswego area.

b. Channel Catfish - Catfish analyses in the Oswego River (the segment upstream of the AOC) were performed in 1986 and 1993. In 1988, a health advisory (eat no more than one meal per month; women of childbearing age and children under 15 years should eat none) was implemented for channel catfish in the Oswego River between the Varick power dam and the upper dam at Fulton. This action was based on Summer 1986 collections of channel catfish which contained mean concentrations of PCB substantially in excess of the US Food and Drug Administration (USFDA) tolerance of 2000 ng/g. The 1993 data indicates that average values for each class of chemical contaminants are significantly below respective guidelines for human consumption of channel catfish. Only two fish (10%) contained PCB values greater than the 2000 ng/g tolerance whereas only one fish contained total mirex concentrations in excess of the 100 ng/g wildlife protection value. Comparing fish size and samples with the 1993 we observe the total PCB (wet

weight basis) concentrations are significantly lower in 1993; however, the apparent decline appears to be solely due to the significantly lower lipid values in the fish flesh of the more recent samples. At this time, apparent declines in total PCBs are a false indicator of the changes in chemical residue concentrations over time. In this case, a return to higher lipid values, based on the availability of forage fish, is likely to produce a concurrent increase in total PCB residue concentrations and therefore a more extensive contravention of the Federal tolerance limit. This data was provided to the NYSDOH for evaluation in the human health advisory deliberations, where it has been determined to keep the channel catfish advisory in effect for the 2001-2002 health advisory bulletin.

c. American Eels - Samples were collected in Lake Ontario outside the Oswego AOC and in Chaumont Bay during the Spring of 1994. Commercial fisheries in the eastern basin desire a market for eels that includes foreign trade. Results indicate that total mirex concentrations continue to exceed the federal action level of 100 ng/g. Fifty percent of the thirty fish analyzed had excessive total mirex. Six fish exceeded the Federal tolerance for PCBs of 2000 ng/g. Unfortunately, the data suggests it would be inappropriate to reopen the commercial fishery for American Eels at this time. Although this data does not relate directly to the Oswego AOC, it is provided here as historic reference and follow-up under the Lake Ontario LaMP. The issue with the American Eel population decline is due to harvesting. The female “elvers” migrate back to their spawning area and are harvested. Eels are a fatty bottom dweller fish and are more subject to benthic contamination.

- Deformity and Populations

There is no identified deformity impairment for birds, amphibians, fish and wildlife. Some population data is reported along with the fish analyses noted above. Specific deformity data is difficult to acquire. Routine deformity observation notes are now made as part of other investigations and evaluations. The need and funding for more extensive data is not established. Under the Marsh Monitoring Program, Bird Studies Canada has provided useful information for the AOC that is described under the discussion of use impairment indicator #7 on page 46.

- Fisheries Enhancement Plan

This DEC approved plan establishes the conditions needed to restore the fish habitat and populations impairments identified in the RAP for the Varick power dam and Oswego River. The Fisheries Enhancement Plan is listed in Appendix H as item# 59. Concerns for the fishery conditions along the Oswego River are not simply focused on fish species composition and abundance, but also on the physical, chemical, and biological factors affecting fish habitat. In general, hydropower

facilities pose a threat to fishery resources due to increased water temperatures, decreased dissolved oxygen concentration, and drastic fluctuations in flow regime. These factors result in a reduction of aquatic vegetation and limited species composition which are tolerant only to these conditions. Upstream fish migration is hindered by dams. In addition, downstream migration is affected by entrainment at hydropower facilities which can cause mortality of young-of-the-year and juvenile fish species.

The loss of species is of particular concern to natural resource managers. Reasons for loss of species could be the result of habitat degradation due to land use practices and pollution, competition among species, introduction of aquatic nuisance species, overharvest, or a combination of all of these. Challenges to enhancing fisheries include assessing current information gaps and setting ecosystem requirements to improve and to protect the fishery. Enhancement requirements include maintaining minimum instream flow and minimum water quantity criteria, and assuring that adequate habitat and riparian vegetation are available. Corrective actions involving the implementation of measures to address minimum river flow for habitat areas or “modified run-of-river” flows , as well as fish protection and passage provisions are all required in the FERC relicensing process involving the Varick Dam just above the Oswego River and Harbor AOC. These provisions are to resolve the concern regarding the fish habitat and populations use impairment indicators. This is further discussed in Section III.B under indicators #2 and #3.

2. Environmental Monitoring

As part of implementing remedial activities in the AOC watershed, responsible parties are to be required to perform various monitoring activities. For example, the power dam operator is required to monitor and sample according to the FERC license requirements. NYSDEC monitors water quality and sediments. The USACE monitors sediments for maintenance dredging. Aspects of this monitoring include:

- River sediment sampling/survey
- Water column sampling (local and fixed)
- Biota sampling (resident and caged fish, benthic community)
- Bioaccumulation
- Corrective action analysis (turbidity and visual)

Other monitoring activities are being conducted by interested parties and volunteers, some of which is supported by grant funding:

- Environmental impact and health assessment by SUNY campuses
- Special studies by the Finger Lake - Lake Ontario Watershed Protection

Alliance (FL-LOWPA)

- Point source discharges by industries and municipalities (water)
- The Long Point Bird Observatory Marsh Monitoring Program

The Marsh Monitoring Program is a cooperative project of the Long Point Bird Observatory and Environment Canada, with the support USEPA and the Great Lakes Protection Fund. The objective of the program is to monitor the health of marshes by surveying indicator species that utilize these habitats during the breeding season. Two groups of vertebrates, birds and amphibians, are used as target groups because they are susceptible to environmental deterioration and easily surveyed. Data collected in the Oswego area is reported on in Appendix M and discussed under use impairment indicator #7 in Section III.B.

3. Habitat

Habitat protection is a high priority for the New York State Department of Environmental Conservation. Habitat protection includes the implementation of natural resource protection objectives and Best Management Practices involving all environmental quality programs. Localized habitat impairment within the AOC has been identified as part of fish and wildlife management programs. Remedial activities completed and ongoing to address hazardous waste sites in the Oswego River watershed have contributed to the removal of significant amounts of contamination so that contributions to the AOC and Lake Ontario have essentially been eliminated. Achieving the requirements of the power dam relicensing is to restore and protect fish access while providing productive fish habitat conditions.

Historically, the construction of dams along the Oswego River altered fish and wildlife habitat. As a result, alternate habitats were established. We know this to be true although it is not well documented. For example, in the larger Lake Ontario drainage basin, as development occurred, new and modified habitat areas (outside the AOC) were identified to provide an additional remedy to address and improve upon any stressed habitat areas within the basin. Some of these projects may receive federal funding support. The creation and maintenance of the Montezuma National Wildlife Refuge provides over 6,000 acres of habitat for the Lake Ontario basin. Efforts to restore and to preserve this marsh habitat continue today in cooperation with NYSDEC, corporate sponsors, conservation organizations, and private landowners. An example of partnership agreement, known as the Northern Montezuma Wetlands Project, involves an international agreement among the US, Canada, and Mexico. This agreement project provides for the restoration, conservation, and enhancement of wetland habitat and waterfowl populations on over 36,000 acres. Therefore stewardship and cooperation among different interests are very important to establishing and maintaining habitat areas. Such a partnership agreement forms the basis of the FERC relicensing provisions to restore fish habitat to the Oswego River and its AOC.

4. Guidance

The EPA reference document entitled "Wildlife Exposure Factors Handbook" provides guidance, data, and references for conducting exposure assessments for wildlife species exposed to toxic chemicals in their environment. A consistent approach to wildlife exposure and risk assessments is fostered. This USEPA Wildlife Exposure Factors Handbook was produced in 1993 as EPA document 600/R-93/187a, in volumes I and II, by the Office of Research and Development.

⑦ Health and Environmental Assessments/Actions:

Maintaining current and useful contaminated fish consumption advisory information serves to reduce exposure of user groups. Over the years, NYSDEC in conjunction with NYSDOH, has prepared and distributed updated fish consumption advisory pamphlets and/or leaflets to assist with public outreach and education. Funding is needed to assist in the continuation and enhancement of this outreach effort to address the implementation of the fish consumption advisory and the continuation of necessary research to monitor long-term trends in regard to the Lake Ontario advisory.

Human health and environmental risk assessments and actions have been pursued that address the concerns of the Oswego RAP. These involve fish, wildlife, and humans. The academic community at SUNY Oswego has undertaken human health studies with follow-up for longer term assessment of the study group. These issues are to be addressed more appropriately by the larger Lakewide Management Plans (LaMPs) for the Great Lakes. Some ongoing initiatives, results, and risk assessment considerations are discussed below:

1. Fish Consumption Advisories

NYSDEC and NYSDOH continue to conduct annual fish flesh sampling and analyses to evaluate fish consumption advisories. Fish study results are reported under the bullet topic heading #6 for Fish and Wildlife Assessments/Action in the section above starting on page 158. References are also noted therein.

2. Remediation Assessments

Several health/environmental studies and assessments related to remedial actions have been accomplished in the watershed upstream of the AOC (e.g. the Armstrong Cork Landfill Health Consultation and the installation of public water supply near

the Miller Brewery site in Fulton). Health considerations and evaluations are an ongoing part of all remedial activities. In the AOC watershed, specific studies and assessments have been conducted to address environmental protection and health concerns as part of hazardous waste site remediation. These activities assure contamination is no longer a threat to the following:

- Area Water Wells
- Site Groundwater
- Site Surface
- Site Soil

3. USEPA Health Study

USEPA has made the protection of human health one of the cornerstones of its environmental protection activities and has incorporated this into all of its programs. The Agency is particularly concerned with the potential health effects of consuming Great Lakes fish. To address this, a study mandated by Congress is being conducted by USEPA and the Agency for Toxic Substances and Disease Registry (ATSDR) in the Great Lakes basin. This study will identify human populations residing in the Great Lakes who may be at risk due to contact with chemical contaminants and what to do to prevent adverse health effects. Some of the studies are being conducted in Great Lakes Areas of Concern and the findings are to be disseminated throughout the basin. More recent discussion concerning this topic focus on the development of a “Human Health Network” for the Great Lakes.

4. NYSDOH Health Consultation

The Health Consultation for the Armstrong Cork Landfills was finalized January 12, 1996. The purpose of the health consultation was to evaluate the potential human exposure to contaminants from the landfills. The document was developed by the NYSDOH in cooperation with the US Agency for Toxic Substances and Disease Registry. The main concerns expressed about the landfills were regarding the impact of the site on the Oswego River and how information on the fish consumption advisory is distributed.

The contaminant of concern in fish from the Oswego River is PCBs. Because the past remedial actions involving the Armstrong landfills have addressed possible exposures, and the fish advisory on channel catfish is in place and is believed to be effective, the site poses no apparent public health hazard. More recent contaminated sediment investigation results indicate the presence of PCBs, mirex, and some metals in core samples in the vicinity of Battle Island upstream of the AOC. A historic association with the Armstrong site is suspected; however, the present concentration and hazardous waste site guidance, do not warrant further remedial action at this time. Further study involving environmental impact assessment by food uptake study has been proposed as part of a USACE project study.

5. Other Health Studies/Assessments

- Inactive Hazardous Waste Sites

Direct contact and inhalation concerns arise involving remedial activities at these sites. Measures are taken to minimize exposure before, during, and after remediation. Concerns involve the contamination of surface and groundwater as well as the integrity of the remedial actions. An example of these crucial decisions is the extent of requiring the dredging of contaminated river sediments versus the approval of in-place remedial capping with follow-up monitoring and assessment. For the Oswego River, an academic mass balance study identified mirex loading to Lake Ontario; however, follow up by NYSDEC water quality assessments indicates no ongoing downstream AOC or Lake Ontario loadings or impacts.

- The Oswego Newborn and Infant Development Project

Preliminary results of a three-year ongoing study by Helen Daly et.al. at the State University of New York (SUNY) at Oswego indicated that a newborn child's behavior is affected by mothers who regularly consume Lake Ontario fish contaminated with a wide range of persistent toxic chemicals including PCBs. Based on a sample group on nearly 700 newborns, it was reported that the greater number of abnormal reflexes, less mature autonomic responses (startles and tremors) and less developed attention to visual and auditory stimuli distinguished babies born to mothers who had eaten high amounts of Lake Ontario fish. These babies also appeared to be over-reactive to stimulation. It is premature to predict whether these babies will continue to show behavioral differences (reference Appendix H.1).

The Great Lakes community was saddened to learn of the passing of Dr. Helen Daly on November 23, 1995 after a long struggle with cancer. Dr. Daly presented a keynote address on her research at the IJC Biennial Meeting on Great Lakes Water Quality in Duluth, Minnesota in September 1995. Paul Stewart et.al. has continued the study of PCB effects on maternal woman and their children in several studies. The 1999 Assessment of Prenatal Exposure to PCBs from Maternal Consumption of Great Lakes Fish: An Analysis of PCB Pattern and Concentration. Environmental Research Section is referenced in Appendix H.69.

- Research Initiatives

Descriptions of research initiatives are contained in the 1996 RAP Update. These include "Virtual Elimination", the Great Lakes Information Network, the "Great Lakes Research Review" publication, and human health considerations in RAPs.

6. Comparative Risk

The New York State Department of Environment Conservation is undertaking a “Comparative Risk Project” to assist in pollution prevention management decisions. The environmental release of harmful substances poses some degree of risk to human health, ecosystems, or the quality of life. The substances that are released to the environment can be thought of as stressors on the environment. The New York State Comparative Risk Project is a planning tool that will identify, evaluate, and compare the risks posed by these stressors, and will develop a strategy to reduce the risks. This project will only look at pollution prevention as a means of reducing the risks they pose. Phase I will identify potential risks to human health, ecosystems, and quality of life that result from releases to the environment. Once these risks are evaluated, Phase II will develop pollution prevention strategies to reduce those risks. Those pollution prevention measures determined to be the most worthwhile will be recommended to the DEC Commissioner for implementation. This project is coordinated by the Pollution Prevention Unit at the DEC, and will be used to provide a sound basis for prioritizing pollution prevention activities.

The Comparative Risk Project will help to identify those problem areas where current regulatory and pollution prevention efforts have so far failed to adequately reduce risk to human health, ecosystems, and quality of life for New Yorkers. Only problem areas that can be addressed through pollution prevention will be considered in this project. The problem areas will be characterized and compared based on "residual risk," that is, the risk that remains given current levels of regulation and control. Each of the problem areas, but especially those determined to be higher risk, will be closely examined for pollution prevention opportunities that will reduce the risks. All identified pollution prevention measures will be evaluated on the basis of cost, expected effectiveness, practicality, and fairness; and those that are determined to be most worthwhile will be recommended to the Commissioner for implementation.

Comparative Risk will serve as one of the agency's primary mechanisms for building better understanding, positive relationships, and support for DEC's mission and goals by soliciting broad public input throughout the project. It will assist in providing education to increase public awareness and understanding of agency programs and will create partnerships among those groups and agencies that participate in the project. The project will involve many people both within and outside of DEC, and will seek to achieve consensus from a broad range of viewpoints.

PROJECT ORGANIZATION: The New York State Comparative Risk Project is broken into two phases. Phase I will identify the most significant threats to human health, ecosystems, and quality of life that result from toxic releases to the environment. Phase II begins once these risks are characterized. In Phase II, management strategies that incorporate pollution prevention methods will be developed and prioritized for implementation. The project will be led by a Steering

Committee, which will oversee all aspects of the project. Their work is to be supported by four technical work groups, which are to focus on: human health, ecosystems, quality of life, and public participation. The NYSDEC Pollution Prevention Unit is to have lead responsibility for the project and is to provide management and logistical support.

Work Group descriptions:

a. Human Health Work Group - The Human Health Work Group is to evaluate for each problem area all of the known health risks, including both the cancer and non-cancer effects. The socio-economic and hardship impacts of health effects are to be evaluated by the Quality of Life Work Group. The Human Health Work Group is to evaluate health risks for each group of stressors. The analysis is to include risks caused by acute and chronic exposure.

b. Ecosystems Work Group - The Ecosystems Work Group is to evaluate risks to the ecosystems that exist throughout New York State. The health and preservation of the plants, animals, and aquatic and terrestrial landscapes that make up the ecosystem, as well as ecosystem processes, will be considered. Use of the ecosystem by humans and risk to human health that results from ecosystem damage will not be part of the analysis.

c. Quality of Life Work Group - The Quality of Life Work Group is to evaluate risks or damages resulting from the problem areas that are not considered by the Human Health or Ecosystems Work Groups. The Quality of Life Work Group will strive to incorporate the values of New York State residents into its analysis through cooperative efforts with the Public Participation Work Group. The Quality of Life Work Group is to evaluate factors including, but not limited to, individual and societal costs (such as the cost of health care), recreational opportunities, the unequal distribution of risks among New Yorkers, peace of mind, and impacts on future generations.

d. Public Participation Work Group - The Public Participation Work Group is to provide advice and identify appropriate strategies to disseminate information and solicit input from the public. It will serve as a resource to the technical work groups. The Public Participation Work Group is to work with the Steering Committee and other work groups to develop processes and to select and carry out activities to facilitate a dialogue between the public and the Project participants.

e. Risk Reduction Strategies Work Group - The Risk Reduction Strategies Work Group is to evaluate the sources associated with the stressors that are characterized by the other work groups, and is to develop a comprehensive list of pollution prevention policies, programs, and strategies that can be taken to reduce the risks identified by the other work groups and the Steering Committee. These strategies may include a variety of specific measures for reducing risk at the generator, local,

or State level. Each proposed strategy is to be evaluated by a set of criteria developed by the work group. The Risk Reduction Strategies Work Group is to use the risk comparisons developed by the other work groups to recommend a list of potential risk reduction strategies that DEC can use in its pollution prevention efforts.

STRESSORS To Be EVALUATED: Stressors that are released into the environment, grouped into chemical categories as follows:

- 1) Acidic and alkaline substances - This category includes substances that have a pH less than 2 or greater than 12.5. It does not include substances that react once in the environment to form acids or bases or to cause acid rain.
- 2) Atmospheric gases (NO_x, SO₂, CO, CO₂, and CH₄) - This category includes nitrogen oxides and sulphur dioxide, which are common by-products of combustion and which contribute to acid rain. They are also precursors to ambient ozone, which is considered in this category. Greenhouse gases, except for CFCs, are also included in this category. CO and CO₂ are combustion by-products and CH₄ is emitted from various sources, including landfills.
- 3) Halogens - This category includes elemental halogens, such as chlorine and bromine. Drinking water chlorination by-products and waste water disinfection by-products, such as trihalomethanes, are included in this category.
- 4) Metals and cyanide - This category includes both elemental and organic forms of metals. Lead, mercury, and cadmium are the three that are most often cited as posing environmental risk. Other metals, such as silver, nickel, chromium, and manganese, have sometimes been implicated as causing harm and may be considered as well. In addition, cyanide will be considered here because of its similar properties. These substances enter the environment through a wide variety of sources, including combustion, wastewater discharges, and manufacturing facilities.
- 5) Non-volatile halogenated organic compounds - This category includes dioxin, certain pesticides, PCB's, and a variety of other compounds that are generally of high molecular weight and contain at least one halogen atom. These compounds are likely to be both highly bioaccumulative and toxic.
- 6) Non-volatile and semi-volatile organic compounds - This category includes phthalates, alkylphenols, and glycol ethers, among other compounds, that may produce harmful effects such as endocrine disruption. This category includes all non- and semi- volatile organic compounds that are not halogenated.

7) Nutrients - This category includes substances containing various elements, such as phosphorous, potassium, and nitrogen, that act to promote the growth of certain unwanted aquatic species, often to the detriment of other beneficial species. These primarily reach the environment through non-point sources, including agricultural activities.

8) Particulates - This category includes dust, soot, and other small air particles (PM-10) that become suspended. Asbestos will be considered as well. Combustion is the primary source of particulates. Toxic substances that are associated with particulates, such as benzo(a)pyrene, are not included here.

9) Pesticides - This category includes all pesticides, including insecticides, herbicides, fungicides, and others, that are not included in other categories on this list. Certain pesticides are found in the non-volatile halogenated organic compounds and heavy metals categories. This category includes carbamates and organophosphates.

10) Petroleum products - This category includes petroleum product mixtures such as oil, gasoline, and diesel fuel. It does not include the substances that are released when these products are burned or the individual components such as benzene, toluene, and xylene which are considered in the VOC category.

11) Polynuclear aromatic hydrocarbons (PAHs) - This category includes aromatic compounds that contain three or more closed rings. A typical example is benzo(a)pyrene, which is a potent carcinogen. The primary source of these compounds in the environment is combustion.

12) Radionuclides - This category includes radiation released by human activities, but not radon or other naturally-occurring radiation.

13) Suspended and settleable solids - This category includes nontoxic solid particles, such as silt, that have the ability to cause physical or mechanical damage to surface waters.

14) Volatile organic compounds (VOCs) - This category includes many low molecular weight solvents used in a variety of commercial processes, such as dry cleaning, degreasing, manufacturing, painting, and printing. Common solvents include perchloroethylene, TCE, and benzene.

8 RAP Public Participation and Outreach:

Regular meetings (minimum quarterly) of the Remedial Advisory Committee (RAC) throughout the implementation of the Stage 2 and documentation of the Stage 3 Remedial Action Plan process have continued to keep stakeholders informed and involved in the remedial activities, progress, and strategy to address the use impairment indicators. Presentations of planning actions and study results were provided at these meetings. Field trips were organized to learn more about the specifics of a remedial activity and to respond to committee members interests as necessary. An informational slide show describing the Oswego River Area of Concern was prepared to increase public awareness about the restoration and protection activities and needs of this important geographic area. A newsletter, promotional brochure, RAP display, and Power Point presentation are other examples of outreach activities that have been incorporated into the public participation activities involving the Oswego River AOC. The Remedial Advisory Committee has continued to provide advice and consultation on all activities involving the RAP.

During Stage 3, the Oswego Remedial Advisory Committee advised NYSDEC on investigative needs, study results, and endpoint planning to complete implementation of Remedial Action Plan recommendations and resolution of use impairments. The RAC committee met with DEC staff to discuss RAP related issues and activities. NYSDEC and the Oswego Remedial Advisory Committee have continued the commitment to public participation and public outreach for the Oswego River RAP. Below are examples of the public outreach and public participation activities undertaken for the Oswego River Remedial Action Plan. For additional information, contact Robert Townsend at NYSDEC, Division of Water, Bureau of Water Assessment and Management, 625 Broadway, Albany, New York 12233-3502, phone (518) 402-8284.

1. Slide Show

A slide show was produced for the Oswego River RAP during Stage 1 and Stage 2 development and implementation. The purposes of the slide show were to provide information about the Oswego River Area of Concern, local industries, and the cultural diversity of the area, and also, to increase public awareness and involvement in the Oswego River Remedial Action Plan. The slide show is approximately 15 minutes in length and is suitable for community groups, high school classes and other interested organizations and individuals that want to learn more about the Oswego River RAP, what the potential stressors are on the river and how to get involved to make a difference in caring for the Oswego River.

2. New York State RAP Display

NYSDEC's Public Participation staff produced a New York State RAP display. The purpose of the exhibit is to introduce the public to Remedial Action Plans in New

York State and to illustrate what actions are needed and are currently underway to effectively clean up New York's RAP Areas of Concern. The display has been useful to Great Lakes and Remedial Action Plan functions across the Lake Ontario drainage basin.

3. **RAP Promotional Publications**

- The brochure entitled, *RAPs in Action*, was developed to augment the message of the New York State RAP Display. The brochure provides more detailed information on remedial activities that are being implemented to restore and to protect beneficial uses in New York State's RAP Areas of Concern. This publication was most useful during the development of the Stage 1 and Stage 2 documents and subsequent implementation.
- A promotional brochure entitled, *Getting the Word Out*, was also developed to provide a description of public outreach and educational materials (audiovisuals, brochures, fact sheets, etc.) produced by and/or for the RAPs or the Lake Ontario Lakewide Management Plan (LaMP). The brochure is targeted at RAP coordinators, educators, environmental/advocacy groups and community groups in New York State so they are able to choose among diverse materials when promoting New York State RAPs, the Lake Ontario LaMP, and general Great Lakes issues. This publication was most useful during the development of the Stage 1 and Stage 2 documents and subsequent implementation.
- The brochure entitled, *The Oswego River Remedial Action Plan - Past Present and Future*, was developed to summarize the RAP process as it is being implemented in the Oswego River Area of Concern. The role of citizen committees and public participation activities are provided as well as the status of the Oswego RAP prior to the delisting proposal.

4. **Watershed Watch Newsletter**

The *Watershed Watch* is an annual newsletter that is dedicated to increasing awareness about water quality and RAP issues in the Oswego River Area of Concern. To keep people informed, the *Watershed Watch* articles address the plans and progress of remedial activities, local economic development projects, and stewardship initiatives. The newsletter is produced by the New York Department of Environmental Conservation and the Oswego River Remedial Advisory Committee. The annual Oswego newsletter has been replaced by the less frequent periodic progress or status update reports that are produced for each Area of Concern.

5. Fish Consumption Advisory Brochure

NYSDEC in cooperation with NYSDOH has produced an informational handout advising specific limits and prohibitions concerning eating certain Lake Ontario fish. Child bearing women have been identified as a high risk group and should particularly heed these warnings. This advisory is now published on the web at: <http://www.health.state.ny.us/nysdoh/environ/fish.htm> .

6. Remedial Advisory Committee (RAC) Meetings

NYSDEC and the Remedial Advisory Committee hold quarterly meetings to provide updates and gain input on current and planned RAP activities. The meetings also provide an opportunity for the committee to address local concerns as related to remedial activities being implemented in the Area of Concern. Field trips and investigative study presentations, to learn more about ongoing remedial activities in the river basin, are often planned in conjunction with regular committee meetings.

7. Keeping up on RAP Information and Progress

If you would like to inquire about Remedial Action Plan documents try the NYSDEC, Division of Water website at: www.dec.state.ny.us/website/dow or please send your name, address and specific request to: NYSDEC, Division of Water, Bureau of Water Assessment and Management, 625 Broadway, Albany, NY 12233-3502, Attn. Great Lakes RAPs.

8. Power Point Presentation

A 39 slide Power Point Presentation was developed by the NYSDEC in consultation with the Remedial Advisory Committee to convey the message of the Stage 3-delisting document to the public. During 2002, this presentation was delivered to the RAC committee, the Great Lakes Basin Advisory Council, the Oswego County Water Quality Coordinating Committee, the Oswego County Soil and Water Conservation District, and members of the Oswego County Environmental Management Council. In 2005, it was presented at the IJC Biennial Meeting. A copy of the PDF file (readable in Adobe Acrobat) is now available as Appendix P in the Stage 3 document. This is to be posted on DEC's Division of Water website along with the entire delisting document. A formal comment period is planned to be conducted in early 2006 by use of the website and announcement in New York State's Environmental Notice Bulletin (ENB).

⑨ **Investigations and Monitoring Activities:**

The results of conducting various investigations and monitoring activities have been instrumental in making progress towards resolving the Oswego River Area of Concern use impairments. Some monitoring plans are part of planned hazardous waste site remediation projects; others are part of ongoing environmental program oversight; and a number have been project specific to the Oswego River because of the RAP. The development and implementation of investigations and monitoring plans are subject to regulatory review and approval. Where use impairments have been directly caused by specific sources, chemicals and/or sites, the investigative activities have been closely monitored for the RAP. A focus of environmental monitoring involving hazardous waste site remediation is to minimize the local and downstream impacts resulting from these activities and to comply with cleanup criteria. Some remedial site monitoring may be so specific to the site that it does not encompass the larger RAP beneficial use indicator perspective. Although the goal is to encourage the ecosystem approach, project money may very well have specific requirements attached that limit the benefits to the Remedial Action Plan. The RAP then needs to “go that extra step” to conduct additional monitoring and assessment activities.

For the Oswego RAP, in addition to the monitoring activities required from industries conducting remediation at upstream sites within the watershed, other environmental assessments have been conducted in the downstream receiving waters to evaluate the impact on use impairments and the effect that restoration activities have on the beneficial uses in the local Area of Concern. These further investigations have involved health, fish, wildlife, plankton, macroinvertebrate, water quality, and sediment studies and have been utilized to better define a change in status of use impairment indicators under the RAP process. Funding for these additional investigations and assessments has also been limited and subject to specific priorities which has resulted in the RAP not always being able to accomplish all the monitoring goals of all the stakeholders. Overall however, the monitoring results tell us that significant progress has been accomplished in restoring and protecting the beneficial uses in the AOC. Summary results of these more recent investigative and monitoring studies that do contribute towards resolving use impairment are presented below:

1. Oswego Harbor Fish Pathology Report

This study was conducted by Jan Spitsbergen, a veterinary pathologist from Cornell University, during 1993 and 1994 (Appendix H.68). Brown bullhead, white sucker, and rock bass were selected to study lesions. Very few pollution-associated lesions were observed. This tumor study for the Oswego AOC did not indicate exposure of the studied fish populations to potent anthropogenic carcinogens. For tumors that were observed, their occurrence was not statistically significant when compared to reference sites. This study was peer reviewed by Dr. Paul Bower, also of Cornell, who came to the same conclusion for the Oswego AOC.

Results of the study for tumors and other lesions found little evidence of impairment of fish health by contaminants in the Oswego River AOC. Although fish from the Area of Concern and Lake Ontario contain contaminant levels sufficient to warrant an advisory limiting human consumption of fish, these contaminant levels are below those causing an increase in tumors or other abnormalities in the fish.

A variety of factors other than toxicants are known to influence rates of neoplasia in mammals and fish; such factors include diet, genetics, age of the animals studied, natural carcinogens such as radon, metals from bedrock, or naturally-formed cancer-causing agents such as nitrosamines which can occur in rotting plant material in watersheds. Further tumor study was not recommended; however, if funds were available, more sophisticated tests involving the reproductive health of fish would be appropriate. Specialized studies of reproductive hormones, egg and sperm production and quality, and embryo and larval viability would be required in order to properly assess the reproductive health of fish entering the AOC.

For the AOC, toxicity testing involving reproduction of indicator organisms, indicated no impairment and water quality testing shows good quality. With the restoration of spawning habitat below the Varick Dam under the FERC license, the fish habitat and population impairments will cease. Based on the Cornell pathology study, the Remedial Advisory Committee has reassessed the status of the fish tumor use impairment indicator in the AOC as “not impaired”. Further discussion of deformity or reproduction occurs under the resolution of the bird and animal deformity or reproduction use impairment indicator #7.

2. **Oswego Harbor (Water Quality) Survey**

NYSDEC conducted the **Oswego Harbor Survey** for the AOC which was funded by an EPA grant and published in 1994 (Appendix H.35). The main objectives were to investigate the causes and status of several use impairment indicators. Eutrophication or undesirable algae, beach closings, and degradation of plankton populations were the main conditions investigated. Data indicates that there are no problems concerning dissolved oxygen, eutrophication, nutrients, coliforms, pathogens, or phytoplankton/ zooplankton. All measurements were indicative of a healthy environment; however, toxic effects did occur when conducting BOD and biological toxicity tests.

Follow-up toxicity sampling was conducted using the *Ceriodaphnia dubia* mortality and reproductive toxicity testing. Results showed no statistically significant reproductive or survival effects. The overall results of the water quality testing are presented under the eutrophication and algae use impairment indicator #4 in the main body of the Stage 3 document on page 31.

3. Lake Ontario Source Contaminant Study

New York State sources of waterborne contaminants to Lake Ontario were studied and reported on by NYSDEC's Simon Litten (Appendix H.17). Water quality sampling conducted during 1992-1994 using the "Passive In Situ Concentration-Extraction Sampler" or PISCES indicates no active sources of contaminants in the water column that are currently contributing to use impairments in the Oswego River AOC. Some sample analyses did detect contaminants at low levels in the water column; however, these are not considered problematic nor are they inconsistent with water quality samples of Lake Ontario. At the locations where the passive sampling results indicate a water column presence, follow-up source study is recommended.

PCB sample results obtained from the Oswego Harbor suggest that normal maritime traffic has far more effect on contributing to whole water PCB contaminant concentration than does dredging. Moderate levels of dissolved phase PCBs (10-25 ng/l) were observed in some of the study samples in the lower Oswego River. There was no evidence for a PCB source from the Armstrong facility site.

Of the four primary sites studied for Mercury, concentrations were the lowest in the Oswego River; however, due to high volume of water flow in the Oswego River, mercury loads to Lake Ontario were identified as highest from the Oswego River. In general, wastewater treatment plant influents were observed as relatively high in mercury concentration; this indicates the need for pretreatment program follow-up and/or additional work on stormwater / nonpoint source reductions. Sediment analysis showed evidence of historical mercury contamination of the Oswego River depicted by a display of a pattern of concentrations that increase with core depth (maximum observed at 29 cm.). These more historical sources of mercury contamination have been greatly reduced. Further mitigation of sources to Lake Ontario via tributaries is to be addressed by the Lake Ontario LaMP.

The discovery of mirex at Lock 6 and off the lower end of Armstrong property was expected. Mirex (pesticides) detection was, however, isolated and at very low levels of concentration and amount; not sufficient for mapping or remedial action.

4. Oswego River Sediment Study

Use impairment indicator #10 addressing "restrictions of dredging activities" in Section III.B contains a summary of the results from the Oswego River Sediment Study published in 1997 (Appendix H.28). Overall, metals and organic contaminants were found in the sediment cores that were mostly attributable to historical practices. Further study of the upstream river area at Battle Island was recommended and subsequently acted upon to determine the presence, extent, and threat of upstream sources. Although PCBs, mirex, and metals were identified by sediment coring and

analyses, assessment did not warrant further action by NYSDEC. Food uptake study is under consideration as a next step research project proposal to determine the presence of an environment impact due to these upstream contaminants. Consistency with delisting criteria is maintained since there is no impact on the AOC beneficial uses.

5. Mirex Study

“A Screening-Level Mass Balance Analysis of Mirex Transport and Fate in the Oswego River” report was published in the Journal of Great Lakes Research in 1995 (Appendix H.2). The abstract reads “A mass balance approach was used to evaluate the fate of mirex in the Oswego River. The objectives of this research were 1) to assess the magnitude and extent of mirex contamination in the Oswego River, 2) to quantify the transport, fate, and distribution of mirex in the river, and 3) to estimate mirex export to Lake Ontario via the Oswego River.

Field data collected as part of a 1990 Oswego River mirex study, in addition to other existing data, were used to develop a water quality model describing the transport and fate of chlorides, total suspended solids, and mirex in the Oswego River from Fulton to Lake Ontario. Long-term and short-term loading scenarios were evaluated to assess the possible magnitude of the initial mirex discharge to the Oswego River in 1965 as well as the subsequent export resulting from a given loading. Field data and model results suggest that a short-term mirex discharge occurring in the mid-1960s cannot account for the water column concentrations observed in 1990 or the mirex mass in Lake Ontario sediments attributable to the Oswego River. Similarly, field data and model results suggest that resuspension of the 1990 in-place mirex mass cannot account for the water column mirex concentrations observed in 1990. This suggests that there may be a continuing mirex source to the Oswego River. Based on the 1990 field data, the estimated Oswego River mirex inventory was 10 kg and export to Lake Ontario averaged 42 g/day.”

The above study conclusions are not consistent with DEC’s Lake Ontario Source Contaminant Studies discussed above in item #3. A recent sediment study completed at Battle Island in 2002 does not indicate an active source nor warrant hazardous waste site remedial measures. This is consistent with NYSDEC not identifying any follow-up involving the RAP or LaMP processes. A worse case scenario for this Battle Island area and historic Armstrong sites may identify further remedial investigation and clean up activity; however, this would be based on a local environmental impact or a change to the considerations (criteria) for in-place wastes triggering remediation. In either case, this would be addressed as a local remedial measure independent of RAP purview.

Appendix L

Use Impairment Strategy Summaries and Management Forms

An integrated strategy system for managing each use impairment indicator was established to identify the sequence of actions that needed to be taken as part of RAP implementation. Management forms were adopted to assure that the steps were adequately identified and to facilitate, influence, and track the actions to the benefit of the Remedial Action Plan and the restoration and protection of beneficial uses. The use of the management forms is described below.

The development of the remedial strategies for each use impairment was initiated by identifying the specific actions and needs that should restore and protect the beneficial uses. Further, the current status of these remedial strategies was noted and where possible a completion date and responsible party were defined. This information for each use impairment indicator was then consolidated on a single page form entitled the “Use Impairment Restoration and Protection Strategy” management form. On the next five pages, use impairment strategy summaries are described. Following these summaries, the strategy management forms are presented which have been updated to document the status of remedial activity progress showing resolution of each indicator to achieve the RAP goals.

Each Use Impairment Restoration and Protection Strategy management form has targeted a specific use impairment indicator and provided impairment descriptive data, a remedial strategy plan with status, and narrative comments. As completed, each use impairment strategy management form now describes its use impairment indicator status as not impaired or resolved by others. There were a total of eleven use impairments indicators for which a strategy management form was applied for the Oswego AOC. These included the nine indicators from the original Stage 1 status of impaired and/or needing further study, and two indicators later considered for an expanded evaluation as determined warranted by interest of members of the Remedial Advisory Committee. These indicators, their Stage 1 status, and their final RAP status determinations are listed below:

<u>Use Impairment Indicator</u>	<u>Earlier Status</u>	<u>Final Status</u>
1. Fish consumption restrictions	impaired	resolved by other
2. Degradation of fish populations	impaired	resolved by other
3. Loss of fish habitat	impaired	resolved by other
4. Eutrophication or Undesirable Algae	impaired	not impaired
5. Degradation of benthos	likely	not impaired
6. Fish tumors or other deformities	unknown	not impaired
7. Bird and animal deformities/reproductive prob.	unknown	not impaired
8. Degradation of Aesthetics	unknown	not impaired
9. Degradation of plankton populations	unknown	not impaired
10. Restrictions on dredging activities	expanded assess.	not impaired
11. Beach closings	expanded assess.	not impaired

Use Impairment Strategy Summaries:

The narrative summaries for each Use Impairment Restoration and Protection Strategy management form for the Oswego River Area of Concern are described below. The eleven use impairment strategy management forms follow. These remedial strategies had the goal to restore and to protect the beneficial uses concerning each of the use impairment indicators.

1. Fish Consumption Restrictions

This use impairment was identified in Stage 1 as caused by PCBs, mirex, and dioxin as part of a Lake Ontario lakewide advisory. The sources are not identified as in the Area of Concern and are attributed to upstream industrial discharges, inactive hazardous waste sites, contaminated sediments, air deposition, and Lake Ontario. 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 this and other beneficial uses in the Area of Concern.

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 advisory. The larger Lake Ontario Lakewide Management Plan (LaMP) is the appropriate responsible environmental program to provide the forum an implementation process for the ultimate resolution of the consumption restrictions impairment in the Lake and the connected Oswego River AOC. There are no known sources or fish and wildlife consumption advisories specific to the AOC. Under these circumstances, resolution of the fish consumption restriction use impairment indicator by the Lake Ontario LaMP is consistent with the federal EPA delisting criteria.

2. Degradation of Fish Populations

This use impairment is predominately due to periodic dry river areas created below the Varick Dam. The resulting decreased fish habitat is considered a cause of the fish population impairment. The physical disturbance created by the presence and operation of the power dam are the main cause of the impairment. The degradation of fish populations use impairment indicator is closely linked to the fish habitat loss use impairment indicator discussed below. Remedial measures associated with the

requirements of relicensing of the Varick Power Dam fully address the fish population use impairment as well as the habitat impairment. The FERC license is the appropriate responsible environmental program initiative that provides the solution and forum for the resolution of the fish population and habitat impairments. The Run-of-River and fish protection and passage requirements under the FERC relicensing process are to protect and restore the beneficial use to fish populations. There are no identified wildlife impairments in the AOC.

3. Loss of Fish Habitat

Closely related to the degradation of fish populations indicator above, this use impairment is also predominately due to periodic dry river areas created below the Varick Dam and the resulting decreased fish habitat and associated fish population loss. The physical disturbance created by the presence and operation of the power dam are the main cause of the impairment. Chemical causes are related to the fish consumption advisories and are not identified as direct causes of the degradation of fish habitat or populations in the AOC. The degradation of the fish habitat use impairment indicator is closely linked to the fish population loss use impairment indicator and the periodic low flow and dry area in the Oswego River below the dam. Remedial actions, including “Run-of-River” requirements associated with the relicensing of the Varick Power Dam fully address the fish habitat use impairment as well as the fish population impairment by providing fish access and suitable conditions. There are no identified wildlife impairments in the AOC.

4. Eutrophication or Undesirable Algae

The remedial actions taken by State and Local government agencies over the past fifteen years have served to limit and address the nutrient input into the Area of Concern and the watershed. The control on nutrient input has resolved the concern of an eutrophic condition in the AOC and provides the protection against further use impairment. Water quality surveys confirm that no eutrophic condition or impairment from undesirable algae is present. Other than completing the remaining activities to address stormwater in 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 have all been accomplished in that no persistent water quality problem exists due to cultural eutrophication, water quality standards are achieved, and the beneficial use goals are met and maintained for the AOC. Although nuisance conditions from nutrients exist in certain areas of the Oswego River, no further remedial action is planned or warranted under specific oversight of the Remedial Action Plan.

5. Degradation of Benthos

The results of the 1997 final report on the 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.

6. Fish Tumors or Other Deformities

Based on the fish pathology study completed in 1994 by Cornell University, no significant occurrence of tumors and little evidence for impairment of fish health was observed in the Oswego River Area of Concern. The results also indicate little evidence for impairment of fish health by anthropogenic contaminants in the AOC. The beneficial use is therefore considered unimpacted and the use impairment indicator status “not impaired”. 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.

7. Bird and Animal Deformities or Reproductive Problems

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 watershed supports this conclusion. The indicator status is therefore not impaired.

8. Degradation of Aesthetics

There was a low confidence of any 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 (water quality) Survey identified no aesthetics impairment. 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. No aesthetics impairment is defined for the AOC.

9. Degradation of Zooplankton and Phytoplankton

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. The preponderance of evidence suggests 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.

Based on the plankton study data in the Oswego Harbor Survey, it is difficult to make a conclusive finding on the status of the plankton population; however, when considering other supporting information a not impaired status for the AOC is concluded. Consideration is given to the tributary river environment associated with the Lake Ontario influence, seasonal changes affecting the region, sample timing, and other local area site characteristics involving the growth of macrophytes. In any event, a remedy for plankton restoration and protection in the AOC would not be directed at AOC sources, but would be focused on upstream watershed and downstream Lake Ontario causes and effects. The upstream actions by the FERC relicensing process to create additional year round “run-of-river” flow in the AOC will most likely 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 and LaMP programs will provide the solution and forum for any additional remediation or resolution regarding the planktonic community in the AOC. This is consistent with delisting criteria. The plankton community is not impaired for the AOC and any further action under the RAP process has therefore been determined not warranted.

10. Restriction on Dredging Activities

Periodic 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 of concern (PCBs, PAHs, mercury, mixex, dioxin and furan) has been detected in the Oswego River; however overall, sediment quality and toxicity are acceptable and USEPA guidelines for dredging and disposal are achieved. The most recent sediment surficial and core sampling results are consistent with this finding. 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 (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 activities in the summer of 1999. 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.

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 no 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 waters 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 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 use for these purposes in a specific area or river segment.

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 (water quality) Survey data supports a not impaired status for partial-body contact. The Beach Closings use impairment indicator (originally determined not impaired) has been reassessed to be not impaired because there are no designated beaches in the AOC. Water quality survey results support this not impaired status.

USE IMPAIRMENT RESTORATION and PROTECTION STRATEGY

REMEDIAL ACTION PLAN: **OSWEGO RIVER**

FORM#: 1

USE IMPAIRMENT INDICATOR: Fish Consumption Restrictions

IJC#: 1

AOC LOCATION: Lower Oswego River, Oswego Harbor, and Lake Ontario

STAGE I IMPAIRMENT STATUS & CAUSES: IMPAIRED - PCBs and Dioxin; Potentially Mirex and Chlordane

POLLUTION SOURCES: Lake Ontario, point and nonpoint source discharges upstream of the AOC (industrial discharges, inactive waste sites, contaminated sediments).

=====

<u>TARGET</u>	<u>RESP.</u>		
<u>DATE:</u>	<u>PARTY</u>	<u>REMEDIAL STRATEGY / ACTION ITEM:</u>	<u>STATUS:</u>
1. 10/94	NYSDEC	Sample Sediment (core & surficial)	C
2. 8/95	DFW	Eel & Catfish Study Results (to NYSDOH)	C
3. 4/97	NYSDEC	Final Report on Sediment Sample Results	C
4. Ongoing	DEC/Ind.	Complete Haz. waste rem. (Watershed)	I
5. Ongoing	DEC/Ind.	Continue BMP implement. (Watershed)	I
6. Ongoing	NYSDEC	Document F & W study contam. levels	I
7. Ongoing	NYSDEC	Establish any add'l F & W management Plans	I
8. 4/02	NYSDEC	Observe no health advisories (AOC caused)	C
9. 4/02	RAC/DEC	Reassess Indicator "LaMP to Address"	C
10. 7/05	DEC/EPA	Liaison/Obtain IJC delisting support	C

=====

COMMENTS: Fish consumption advisory issued by NYSDOH for all of Lake Ontario including streams up to first barrier. No advisories specific to the AOC. PCBs exceed FDA fish consumption guideline and on downtrend; dioxin exceeds State fish guideline; PCBs and mirex exceed FDA wildlife (duck) guideline. No specific data for AOC guidelines. Lake Ontario LaMP identified as appropriate responsible environmental program to address lakewide fish advisory

STATUS KEY: I = Implementation progressing
 C = Completed U = Under development/assessment/investigation
 P = Planned N = Needs development/assessment/investigation
 D = Deferred R = Required by enforcement/permit/agreement

USE IMPAIRMENT RESTORATION and PROTECTION STRATEGY

REMEDIAL ACTION PLAN: **OSWEGO RIVER**

FORM#: 2

USE IMPAIR. INDICATOR: Degradation of Fish Populations

IJC#: 3 AOC LOCATION: Lower Oswego River, Oswego Harbor

STAGE I IMPAIRMENT STATUS & CAUSES: IMPAIRED (for fish) - Periodically dry areas and to a lesser extent chemical causes from watershed and Lake Ontario; no wildlife impairment identified.

POLLUTION SOURCES: Watershed wastewater discharges, inactive hazardous sites, upstream contaminated sediments?, Lake Ontario.

=====

<u>TARGET</u>	<u>RESP.</u>		
<u>DATE:</u>	<u>PARTY</u>	<u>REMEDIAL STRATEGY / ACTION ITEM:</u>	<u>STATUS:</u>
1. _9/94_	NYSDEC	Conduct Water Quality Study Sampling	_ C _
2. _4/95_	CORNELL	Perform Fish Study & Complete Report	_ C _
3. _9/95_	NYSDEC	Water Quality Survey Results Report	_ C _
4. _12/98_	NYSDEC	Population levels based on FERC req'ts	_ C _
5. _12/98_	NYSDEC	Confirm no water quality toxicity	_ C _
6. _4/02_	DFW	Assess Fish numbers and balance goals	_ C _
7. _4/02_	DEC/RAC	Reassess: "FERC provisions fully address"	C
8. _11/04_	PowerCo.	FERC License Issued; fish pop. addressed	_ C _
9. _5/05_	NYSDEC	License Provisions resolve fish conditions	_ I _

=====

COMMENTS: This use impairment was identified by fish management programs; Restoration based on FERC relicensing, fish habitat restoration, and link to Lake Ontario. The fish populations and fish habitat impairments are to be addressed by the FERC license requirements fully incorporated into issued FERC license Nov. 2004; compliance under FERC/LaMP assured by fish access/conditions.

STATUS KEY: I = Implementation progressing
 C = Completed U = Under development/assessment/investigation
 P = Planned N = Needs development/assessment/investigation
 D = Deferred R = Required by enforcement/permit/agreement

USE IMPAIRMENT RESTORATION and PROTECTION STRATEGY

REMEDIAL ACTION PLAN: **OSWEGO RIVER**

FORM#: 3

USE IMPAIRMENT INDICATOR: Loss of Fish Habitat

IJC#: 14 AOC LOCATION: Within AOC

STAGE I IMPAIRMENT STATUS & CAUSES: IMPAIRED (for fish) - Dry area below Varick Dam; physical disturbances, and potential upstream watershed nonpoint pollution sources (under remediation); water levels may contribute. No wildlife impairment identified.

POLLUTION SOURCES: Elevated levels of contaminants in some upstream sediments can impact benthos; natural erosion can add to disturbance. Watershed and LaMP initiatives address.

```

=====
  TARGET      RESP.
  DATE:       PARTY   REMEDIAL STRATEGY / ACTION ITEM:      STATUS:
=====
1. 4/96      NYSDEC  Assess Habitat / Refine Restoration    C_
2. 4/02      NYSDEC  Monitor FERC Relicensing Process       I_
3. 4/02      Local   Define any Needed Land Use Controls    I_
4. 4/02      PowerCo. Obtain/Implement FERC Dam Relicense I_
5. 12/98     DFW     Assess Fish Habitat goals              I_
6. 12/98     NYSDEC  Confirm no water quality toxicity      C_
7. 4/02      DEC/RAC Reassess: "FERC provisions fully address" C
8. 11/04     PowerCo. FERC License Issued; fish hab. addressed C_
9. 5/05      NYSDEC  License Provisions resolve fish access  I_
=====
  
```

COMMENTS: This use impairment was identified by Fish management programs; Restoration based on FERC relicensing, fish habitat restoration, and link to Lake Ontario. The fish habitat and population impairments are to be addressed by the FERC license requirements fully incorporated into issued FERC license Nov. 2004; compliance under FERC/LaMP assured by fish access/conditions.

STATUS KEY:
 C = Completed I = Implementation progressing
 P = Planned U = Under development/assessment/investigation
 D = Deferred N = Needs development/assessment/investigation
 R = Required by enforcement/permit/agreement

USE IMPAIRMENT RESTORATION and PROTECTION STRATEGY

REMEDIAL ACTION PLAN: **OSWEGO RIVER**

FORM#: 4

USE IMPAIRMENT INDICATOR: Eutrophication or Undesirable Algae

IJC#: 8 AOC LOCATION: Lower Oswego River, AOC and Lake Ontario nearshore

STAGE I IMPAIRMENT STATUS & CAUSES: IMPAIRED - Phosphorus

POLLUTION SOURCES: Point and nonpoint watershed sources (Municipal wastewater, combined sewer overflows, runoff)

```

=====
  TARGET      RESP.
  DATE:       PARTY   REMEDIAL STRATEGY / ACTION ITEM:      STATUS:
=====
1. 9/94      NYSDEC  Conduct AOC Water Quality Sampling      C_
2. 9/95      NYSDEC  Water Quality Survey Results Report     C_
3. 12/98     NYSDEC  Confirm no water quality toxicity        C_
4. 5/99      RAC/DEC Define Delisting Crit. ('99 Update)     C_
5. 12/01     NYSDEC  Confirm CSO major phases complete       C_
6. 4/02      RAC/DEC Reassess Use Impairment Status          C_
7. 4/02      RAC/DEC Eutrophication Indicator "not impaired" C_
=====
  
```

COMMENTS: Reports of algal blooms in the AOC and Lake Ontario nearshore areas and lower Oswego River above the AOC. 1994 Water Quality Survey indicates no eutrophication problem in AOC. No observed over abundance of free floating algae in harbor; however, shallow harbor areas do support abundant rooted plants; weed harvesting is used. Other sampling indicates not impaired. Improvements verified in sewage treatment systems (CSO correction). Zebra Mussels contribute to water clarity. Dissolved oxygen in the AOC is not impacted; however, some upstream areas may be. Although nuisance conditions from nutrients exist in certain areas of the Oswego River, no further remedial action is planned or warranted under specific oversight of the Remedial Action Plan.

STATUS KEY: I = Implementation progressing
 C = Completed U = Under development/assessment/investigation
 P = Planned N = Needs development/assessment/investigation
 D = Deferred R = Required by enforcement/permit/agreement

USE IMPAIRMENT RESTORATION and PROTECTION STRATEGY

REMEDIAL ACTION PLAN: OSWEGO RIVER

FORM#: 5

USE IMPAIRMENT INDICATOR: Degradation of Benthos

IJC#: 6 AOC LOCATION: Oswego Harbor and River up to Dam

STAGE I IMPAIRMENT STATUS & CAUSES: LIKELY - unknown

POLLUTION SOURCES: Potentially past industrial discharges, contaminated sediments, inactive hazardous waste sites, and nonpoint sources.

=====

<u>TARGET</u>	<u>RESP.</u>	<u>REMEDIAL STRATEGY / ACTION ITEM:</u>	<u>STATUS:</u>
<u>DATE:</u>	<u>PARTY</u>		
1. 4/97	NYSDEC	Final Report on Sediment Sample Results	C
2. 5/99	RAC/DEC	Define Delisting Crit. ('99 Update)	C
3. 12/01	NYSDEC	Confirm no significant AOC impact	C
4. 4/02	RAC/DEC	Reassess Use Impairment Status	C
5. 4/02	RAC/DEC	Benthos Indicator "not impaired"	C

=====

COMMENTS: Toxicity tests conducted on sediments in 1987 suggest benthic macroinvertebrate populations may be impaired. A survey of macroinvertebrates in 1972 and 1978 found a greater number of species in the AOC than the upper reaches of the river. 1997 Results of the Oswego River Sediment Study indicate the harbor area as not impacted. Lower river (above AOC) assessed as slightly impacted. The AOC 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.

STATUS KEY:

C = Completed	I = Implementation progressing
P = Planned	U = Under development/assessment/investigation
D = Deferred	N = Needs development/assessment/investigation
	R = Required by enforcement/permit/agreement

USE IMPAIRMENT RESTORATION and PROTECTION STRATEGY

REMEDIAL ACTION PLAN: OSWEGO RIVER

FORM#: 6

USE IMPAIRMENT INDICATOR: Fish Tumors or Other Deformities

IJC#: 4 AOC LOCATION: Within AOC

STAGE I IMPAIRMENT STATUS & CAUSES: UNKNOWN - reassessing as not impaired

POLLUTION SOURCES: Potentially contaminated sediments

```

=====
  TARGET   RESP.
  DATE:    PARTY   REMEDIAL STRATEGY / ACTION ITEM:      STATUS:
1. -4/95   CORNELL  Perform Fish Study & Complete Report  C_
2.  8/95   DFW      Eel & Catfish Study Results (to NYSDOH) C_
3.  9/95   NYSDEC   Water Quality Survey Results Report    C_
4.  4/97   NYSDEC   Final Report on Sediment Sample Results C_
5.  6/98   RAC/DEC  Evaluate Sampling & Fish Study Results C_
6.  4/02   RAC/DEC  Reassess Use Impairment Status         C_
7.  4/02   RAC/DEC  Fish Tumor/deform. Indicator "not impaired" C_
=====

```

COMMENTS: Limited initial Stage 1 data and reports indicated rates exceed those in unimpacted areas. Recent study by Cornell indicates little evidence of impairment of fish health by contaminants in the Oswego Harbor. Although fish from the AOC contain contaminant levels sufficient to warrant the fish consumption advisory, these contaminant levels are below those causing any increase in tumors or other abnormalities in the fish. Based on this new tumor data, a use impairment status change to "not impaired" has been recommended by DEC and supported by the Remedial Advisory Committee.

STATUS KEY: I = Implementation progressing
 C = Completed U = Under development/assessment/investigation
 P = Planned N = Needs development/assessment/investigation
 D = Deferred R = Required by enforcement/permit/agreement

USE IMPAIRMENT RESTORATION and PROTECTION STRATEGY

REMEDIAL ACTION PLAN: OSWEGO RIVER

FORM#: 7

USE IMPAIRMENT INDICATOR: Bird and Animal Deformities
or Reproductive Problems

IJC#: 5 AOC LOCATION: Within AOC

STAGE I IMPAIRMENT STATUS & CAUSES: UNKNOWN - Potentially PCBs,
dioxin, and octachlorostyrene; no definitive data reported.

POLLUTION SOURCES: Potentially contaminated sediments

=====

<u>TARGET</u>	<u>RESP.</u>		
<u>DATE:</u>	<u>PARTY</u>	<u>REMEDIAL STRATEGY / ACTION ITEM:</u>	<u>STATUS:</u>
1_12/96	RAC/DEC	Define Restoration (delisting) Criteria	C_
2._6/98	DEC	Workshop: Bird Studies CAN = (no impact)	C_
3._12/01	DEC	Summary Bird Studies Report = no impact	C_
4._12/01	DEC	Confirm incident rates < inland controls	C_
5._12/01	DEC	Confirm wetlands support healthy community	C_
6._4/02	RAC/DEC	Reassess Use Impairment Status	C_
7._4/02	RAC/DEC	Bird/Animal deform.Indicator "not impaired"	C_

=====

COMMENTS: 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 watershed supports this conclusion. Even though certain contaminant levels in fish flesh exceed DEC criteria for protection of fish-eating wildlife, deformities and other problems are not identified. The indicator status is therefore "not impaired". Note: An extensive biomonitoring program is not warranted unless sufficient evidence suggests that deformities or reproductive impairment are probable.

STATUS KEY:
C = Completed
P = Planned
D = Deferred
I = Implementation progressing
U = Under development/assessment/investigation
N = Needs development/assessment/investigation
R = Required by enforcement/permit/agreement

USE IMPAIRMENT RESTORATION and PROTECTION STRATEGY

REMEDIAL ACTION PLAN: OSWEGO RIVER

FORM#: 8

USE IMPAIRMENT INDICATOR: Degradation of Aesthetics

IJC#: 11 AOC LOCATION: AOC

STAGE I IMPAIRMENT STATUS & CAUSES: UNKNOWN - Potentially algae and turbidity

POLLUTION SOURCES: Stormwater, spring runoff

TARGET DATE:	RESP. PARTY	REMEDIAL STRATEGY / ACTION ITEM:	STATUS:
1. 9/94	NYSDEC	Conduct AOC Water Quality Sampling	C
2. 9/95	NYSDEC	Water Quality Survey Results Report	C
3. 9/95	NYSDEC	Study Results: No Harbor Pathogen Problem	C
4. 4/02	RAC/DEC	Reassess Use Impairment Status	C
5. 4/02	RAC/DEC	Aesthetics Indicator "not impaired"	C

COMMENTS: 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. 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.

STATUS KEY:

C = Completed	I = Implementation progressing
P = Planned	U = Under development/assessment/investigation
D = Deferred	N = Needs development/assessment/investigation
	R = Required by enforcement/permit/agreement

USE IMPAIRMENT RESTORATION and PROTECTION STRATEGY

REMEDIAL ACTION PLAN: OSWEGO RIVER

FORM#: 9

USE IMPAIRMENT INDICATOR: Degradation of Plankton Populations

IJC#: 13 AOC LOCATION: AOC

STAGE I IMPAIRMENT STATUS & CAUSES: UNKNOWN - May need add'l investigation

POLLUTION SOURCES: Past hazardous waste disposal areas; physical habitat changes.

=====

<u>TARGET</u>	<u>RESP.</u>		
<u>DATE:</u>	<u>PARTY</u>	<u>REMEDIAL STRATEGY / ACTION ITEM:</u>	<u>STATUS:</u>
1. 9/94	NYSDEC	Conduct AOC Water Quality Sampling	C
2. 9/95	NYSDEC	Water Quality Survey Results Report	C
3. 9/95	NYSDEC	Study Results: No Impact but Inconclusive	C
4. 12/96	RAC/DEC	Define Restoration (delisting) Criteria	C
5. 12/98	NYSDEC	Confirm no water quality toxicity	C
6. 4/02	RAC/DEC	Reassess Use Impairment Status	C
7. 4/02	RAC/DEC	Plankton Indicator "not impaired"	C

=====

COMMENTS: Phytoplankton and zooplankton population data needed to evaluate if plankton community structure significantly diverges from unimpacted control sites. Results of 1994 Water Quality Survey notes phytoplankton of the harbor quite different from that of the open lake. Large population of "Aphanocapsa" (may produce cyanobacteria toxins) was found in the harbor that may account for toxicity that interfered with the BOD tests. Zooplankton in the AOC were low which may reflect river conditions (plankton is usually not abundant in rivers). Water clarity was good and attributed to zebra mussels. 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 suggests that plankton community of the Oswego River AOC is not significantly impacted nor impaired.

STATUS KEY:

I = Implementation progressing	
C = Completed	U = Under development/assessment/investigation
P = Planned	N = Needs development/assessment/investigation
D = Deferred	R = Required by enforcement/permit/agreement

USE IMPAIRMENT RESTORATION and PROTECTION STRATEGY

REMEDIAL ACTION PLAN: OSWEGO RIVER

FORM#: 10

USE IMPAIRMENT INDICATOR: Restrictions on Dredging Activities

IJC#: 7 AOC LOCATION: AOC harbor - expanded area

STAGE I IMPAIRMENT STATUS & CAUSES: NOT IMPAIRED - navigational maintenance dredging only.

EXPANDED REVIEW - for other dredging proposals in the AOC.

POLLUTION SOURCES: Contaminated sediments from upstream hazardous waste sites and point and nonpoint source discharges

```

=====
  TARGET      RESP.
  DATE:       PARTY   REMEDIAL STRATEGY / ACTION ITEM:      STATUS:
1. 4/99      EPA/DEC  Define sediment criteria (narrative)    C
2. 4/99      USACE    Define span of AOC dredge area          C
3. 4/99      ACE/DEC  Conduct sediment analyses and evaluate  C
4. 7/99      ACE/DEC  * Assure dredging restrict. safe/approved C
5. 4/02      RAC/DEC  Reassess Use Impairment Status          C
6. 4/02      RAC/DEC  Dredge Restrict.Indicator "not impaired" C
=====

```

COMMENTS: Shipping channel maintenance dredging is not impaired. Expanded dredging for harbor not applicable. Open Lake disposal of dredged materials reviewed and approved. USACE conducted maintenance dredging in 1999 that included open Lake disposal assessed at no significant impact. 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.

* Delisting could be satisfied when the sediment criteria are achieved and dredging restrictions(if any)are applied and study results confirm that the cause of any restrictions is not the result of currently active AOC sources.

STATUS KEY:

C = Completed	I = Implementation progressing
P = Planned	U = Under development/assessment/investigation
D = Deferred	N = Needs development/assessment/investigation
	R = Required by enforcement/permit/agreement

USE IMPAIRMENT RESTORATION and PROTECTION STRATEGY

REMEDIAL ACTION PLAN: **OSWEGO RIVER**

FORM#: 11

USE IMPAIRMENT INDICATOR: Beach Closings

IJC#: 10

AOC LOCATION: Oswego Harbor AOC

STAGE I IMPAIRMENT STATUS & CAUSES: NOT IMPAIRED - as defined by Stage 1 and Stage 2 documents.

EXPANDED REVIEW - needed for partial body contact in harbor area.

POLLUTION SOURCES: no beaches in the AOC, no sources documented

```

=====
  TARGET      RESP.
  DATE:       PARTY   REMEDIAL STRATEGY / ACTION ITEM:      STATUS:
=====
1. 9/95      NYSDEC   Water Quality Survey Results Report    C
2. 9/95      NYSDEC   Study Results: No Impact                C
3. 12/96     RAC/DEC  Define Restoration (delisting) Criteria C
4. 6/98      RAC/DEC  Define Add'l Study & Implement (None)   C
5. 4/02      RAC/DEC  Reassess Use Impairment Status         C
6. 4/02      RAC/DEC  Beach Closings Indicator "not impaired" C
=====

```

COMMENTS: The 1994 Water Quality Survey bacterial data indicates no partial-body non-bathing contact concern in the harbor AOC. Therefore the "Beach Closings" use impairment indicator status of "Not Impaired" remains unchanged after this additional consideration. 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. (Note: Best Use Classification restricts swimming for safety reasons).

STATUS KEY: I = Implementation progressing
C = Completed U = Under development/assessment/investigation
P = Planned N = Needs development/assessment/investigation
D = Deferred R = Required by enforcement/permit/agreement

Appendix M - Marsh Bird and Amphibian Communities in the Oswego River AOC, 1995-96



Purpose of the MMP

The Marsh Monitoring Program (MMP) was established to provide a baseline survey of marsh bird and amphibian populations and their habitats in marshes within the Areas of Concern (AOCs) in the Great Lakes basin, at sites where rehabilitation and restoration efforts have taken place or are planned in the AOCs, and in many other sites across the Great Lakes basin. Marsh bird surveys were first undertaken in the Canadian and binational AOCs in 1994. In 1995, the program expanded to include surveys of calling amphibians. Over 300 volunteers have surveyed marsh bird and amphibian populations and their habitats under the MMP to date. Information on the abundance and diversity of these species provides useful, and fairly easily obtainable, indicators of habitat quality, structure and areal extent.

MMP Methods

Table 1. Marsh Monitoring Program Survey Methods.

Survey	Time commitment	Skills Required	Survey Duration	Weather Conditions
Birds	2 evenings, 10 days apart, between May 20 and July 5	ability to identify about 50 common birds	10 minutes at each station	warm, dry weather with little or no wind
Amphibians	3 nights, 15 days apart, between April 1 and July 15	ability to learn about 10 frog calls	3 minutes at each station	warm, wet weather with little or no wind

A route, consisting of up to 8 semi-circular stations (100 m radius for marsh birds and unlimited distance for amphibians), is established in each marsh being surveyed. Stations are usually accessed on foot, but can be surveyed by canoe or boat. Marshes must be a minimum of 2 hectares and if very large, may support more than one route. The stations must be 500 m apart for amphibian surveys and 250 m apart for bird surveys. The number of marsh birds heard calling or seen in the station are recorded. At amphibian stations, one of three Call Level Codes is used to record calling intensity of each species; abundance estimates are also made. Each MMP volunteer is provided with a training kit which fully explains the survey methods. The kit also includes a copy of the MMP Training Tape which aids volunteers in learning the songs and calls of the common marsh birds and amphibians. For further information on the methods, please refer to the 1997 edition of the *MMP Training Kit and Instructions for Surveying Marsh Birds, Amphibians And Their Habitats*, which is available from the Long Point Bird Observatory.

MMP in Oswego River

In 1995, one route was monitored for marsh birds in the Oswego River AOC; amphibian surveys were not conducted. 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. Habitat rehabilitation projects have been initiated in the Oswego River AOC which address loss of marsh habitat. One of these sites, Lakeshore Marsh, is being monitored under the MMP.

There are additional marshes in the Oswego River AOC where survey routes could be established. On existing routes a complementary amphibian survey would permit a more definitive analysis of the AOC's wetland-dependent wildlife. Volunteer recruitment to fill these needs is ongoing.

Table 2. Marsh Monitoring Program Routes in the Oswego River AOC.

Year	Route Type	# Routes	# Volunteers
1995	Amphibian	0	0
	Bird	1	1
	Both	0	0
1996	Amphibian	0	0
	Bird	2	2
	Both	5	4

Results

The marshes in the Oswego River AOC were mainly dominated by cattail. Purple loosestrife occurred as a co-dominant species in several sample areas. Bur-reed, grass/sedge, rush/bulrush, pickerel weed, arrowhead, smartweed and common reed were co-dominant species in a few sample areas.

The number of species of calling amphibians ranged from 3 to 7 per marsh (Table 3). Overall, 8 species were present — a high level of diversity. Four of the 5 amphibian indicator species, bullfrog, chorus frog, northern leopard frog and spring peeper, were present in the AOC (Table 3). Gray treefrog, green frog and spring peeper were present in high levels (Call Level Code 3). American toad and bullfrog were present in moderate levels (Call Level Code 2). Chorus frog, northern leopard frog and wood frog were present in low levels (Call Level Code 1). Bullfrog and gray treefrog were the most common species; both species were present in 7 of the 8 marshes sampled. Green frog and spring peeper were each present in 6 marshes.

The number of marsh nesters ranged from 3 to 14 species per marsh (Table 4). Overall, 20 marsh nesters were recorded in the Oswego River AOC — again a high level of diversity. In total, 9 marsh bird indicator species were present in the Oswego River AOC (Table 4); American Coot, Black Tern and Common Snipe were not recorded. Densities of 13 marsh nesting species were greater than the Great Lakes basin non-AOC averages. Red-winged Blackbird was the most common and most abundant species. Other common species included Common Grackle, Swamp Sparrow, Yellow Warbler and Common Yellowthroat.

Four species of water foragers and 4 air foragers were recorded in the AOC (Table 4). Great Blue Heron was the most common and most abundant water forager and Tree Swallow was the most common air forager. With the exception of Green Heron and Tree Swallow, the densities of the water and air foragers present in the sample areas were greater than the Great Lakes basin non-AOC averages.

Conclusions

Of the 9 marsh bird indicator species present, only Common Moorhen/American Coot (the calls of these two species are hard to distinguish) scored below average in abundance; the abundances of the other species scored as average (Table 5). Bullfrog abundance scored above average; northern leopard frog and spring peeper abundance scored as average (Table 5). Chorus frog was the only amphibian indicator species which occurred in lower than expected abundance.

Marsh nesting bird diversity scored above average or average in most marshes; Rice Creek Field Station Marsh and Three Rivers/Potter Marsh had lower than average marsh nesting bird diversity (Table 6). Overall, the marsh nesting bird diversity in the Oswego River AOC scored above average. Conversely, the marsh bird indicator species diversity scored below average in the individual marshes and overall in the AOC (Table 6). The overall amphibian diversity was above average or average in the majority of marshes sampled (Table 6). With the exception of the

Lakeshore Marsh 1 and Marsh 2, amphibian indicator species diversity scored as average or above average (Table 6). Overall, both the amphibian diversity and amphibian indicator species diversity scored above average in the AOC (Table 6).

The Oswego River AOC did not contain a full complement of expected marsh bird indicator species. However, the AOC supported a rich diversity of amphibian indicator species. With only one exception, the marshes sampled were medium, large or huge in size. This is a positive feature of the AOC as the amount of continuous suitable habitat is extremely important to many wildlife species. It would appear that, while the bird and amphibian communities in many Oswego River AOC marshes were less diverse than non-AOCs, overall, this watershed was relatively species rich and can be considered healthy with respect to the measures reported here (Table 6).

Recommendations

Efforts should be made to continue to rehabilitate marsh habitat and to monitor marsh bird and amphibian populations to properly address loss of habitat in the Oswego River AOC. MMP routes should be established in all marshes and in any marsh rehabilitation projects. Complementary amphibian and marsh bird surveys should be conducted on all routes.

Table 3. Amphibian species composition and abundance (maximum Call Level Code¹) in the Oswego River AOC in 1995 and 1996. Shading denotes indicator species.

Amphibian Species	Lakeshore Marsh 1	Lakeshore Marsh 2	Lakeshore Marsh 3	Lakeshore Marsh 4	Montezuma NWR Marsh	Rice Creek Field Station Marsh	Three Rivers/Potter Marsh	Toad Harbor Marsh
American Toad	—	—	—	—	2	—	—	—
Bullfrog	1	1	1	1	1	2	1	—
Chorus Frog	—	—	—	—	—	1	—	—
Gray Treefrog	3	3	3	3	3	—	2	1
Green Frog	3	3	3	3	1	—	—	1
Northern Leopard Frog	—	—	—	—	1	—	1	1
Spring Peeper	—	—	1	1	3	3	3	3
Wood Frog	—	—	—	—	1	1	—	—

¹ Call Level Code 1: Individuals can be counted; calls not simultaneous. Call Level Code 2: Calls distinguishable, some simultaneous calling. Call Level Code 3: Full chorus; calls continuous and overlapping.

To become involved, please contact the MMP Coordinator, Long Point Bird Observatory at (519) 586-3531 (phone), (519) 586-3532 (fax) or by email at aqsurvey@bsc-eoc.org

Volunteer Efforts

Five participants contributed over 96 person hours in 1995 and 1996 to the program. In addition, many volunteer hours on non-AOC routes were required to produce results which were used for comparison purposes. Our thanks go to the dedicated volunteers who conducted the Oswego River surveys: Morton Adams, Mary Alice Koeneke, Sheila Sleggs and Molly Thompson.

The MMP is a joint program of Environment Canada (Canadian Wildlife Service and Great Lakes 2000 Cleanup Fund) and Long Point Bird Observatory, with considerable financial support from the Great Lakes Protection Fund. Additional funding for the development of these reports was provided by the Laidlaw Foundation.

Prepared by: Long Point Bird Observatory, P.O. Box 160, Port Rowan, Ontario, N0E 1M0.

Table 4. Marsh bird species composition and abundance (mean number per 10 stations) in the Oswego River AOC in 1995 and 1996. Shading denotes indicator species and “p” indicates that a species was present only outside of the sample stations.

Marsh Bird Species	Lakeshore Marsh 1	Lakeshore Marsh 2	Lakeshore Marsh 3	Lakeshore Marsh 4	Montezuma NWR Marsh	Rice Creek Field Station Marsh	Snake Swamp Marsh	Three Rivers/Potter Marsh	Toad Harbor Marsh	Oswego River AOC Mean	Great Lakes Basin Mean
<i>Marsh Nesters</i>											
Alder Flycatcher	—	—	—	3.3	—	—	—	—	—	0.8	0.3
American Bittern	—	—	—	1.7	1.0	—	—	—	—	0.6	0.8
Blue-winged Teal	—	—	—	—	4.0	—	—	—	—	0.8	1.0
Canada Goose	—	60.0	—	—	4.0	7.5	10.0	—	—	7.9	4.2
Canvasback	—	—	—	—	1.0	—	—	—	—	0.2	0.1
Common Grackle	5.0	70.0	30.0	35.0	—	—	—	—	—	16.3	6.8
Common Moorhen	—	—	—	1.7	—	—	—	—	—	0.4	2.2
C. Moorhen/A. Coot											1.0
Common Yellowthroat	25.0	20.0	10.0	3.3	6.0	—	20.0	—	10.0	8.3	6.3
Eastern Kingbird	10.0	5.0	—	—	—	—	p	10.0	—	1.7	1.5
Least Bittern	5.0	—	—	3.3	—	—	—	—	—	1.3	0.4
Mallard	5.0	—	p	11.7	p	p	5.0	—	—	3.8	5.7
Marsh Wren	5.0	20.0	10.0	11.7	9.0	—	—	—	—	7.3	8.0
Pied-billed Grebe	—	—	—	1.7	—	—	—	—	—	0.4	2.4
Red-winged Blackbird	90.0	255.0	280.0	65.0	43.0	5.0	30.0	60.0	30.0	72.7	49.2
Song Sparrow	5.0	5.0	10.0	3.3	8.0	15.0	10.0	—	—	7.1	5.1
Sora	—	—	—	—	2.0	—	10.0	—	—	1.3	1.1
Swamp Sparrow	30.0	25.0	50.0	3.3	27.0	—	20.0	—	10.0	15.2	11.1
Virginia Rail	p	—	—	6.7	4.0	—	5.0	—	—	2.9	3.5
Willow Flycatcher	—	—	—	—	—	p	5.0		10.0	0.8	0.5
Yellow Warbler	35.0	20.0	20.0	6.7	3.0	20.0	30.0	10.0	30.0	15.2	6.7
<i>Water Foragers</i>											
Belted Kingfisher	—	—	—	—	—	—	—	p	—	p	0.5
Black-crowned Night-Heron	—	—	—	—	—	p	—	—	—	p	0.4
Great Blue Heron	—	15.0	—	p	1.0	p	—	—	—	1.5	1.5
Green Heron	—	—	—	—	1.0	—	p	—	—	0.2	0.4
<i>Air Foragers</i>											
Barn Swallow	45.0	50.0	160.0	65.0	2.0	—	—	—	—	31.3	10.3
Cliff Swallow	10.0	—	20.0	—	—	—	—	—	—	1.7	0.2
Purple Martin	5.0	25.0	—	1.7	—	—	—	—	—	2.9	2.2
Tree Swallow	70.0	95.0	70.0	5.0	31.0	10.0	55.0	40.0	10.0	32.7	36.0

Table 5. Assessment of the status of individual species abundance in the Oswego River AOC in 1995 and 1996. “-” denotes values below the non-AOC average. “0” denotes values within the non-AOC average. “+” denotes values above the non-AOC average. Blank indicates that the species was not present and “p” indicates that a species was present only outside of the sample stations.

Marsh Name	Marsh Bird Indicator Species												Amphibian Indicator Species				
	AMBI	AMCO	BLTE	BWTE	COMO	COSN	LEBI	MAWR	MOOT	PBGR	SORA	VIRA	BULL	CHFR	NLFR	MIFR	SPPE
Lakeshore Marsh 1							0	0				p	+				
Lakeshore Marsh 2								0					0				
Lakeshore Marsh 3								0					0				0
Lakeshore Marsh 4	0				0		0	0	0	0		0	0				0
Montezuma NWR Marsh	0			0				+			0	0	0		+		0
Rice Creek Field Station Marsh													0	0			0
Snake Swamp Marsh											+	0					
Three Rivers/Potter Marsh													0		0		0
Toad Harbor Marsh															0		0
Oswego River Overall Assessment	0			0	0		0	0	—	0	0	0	+	—	0		0

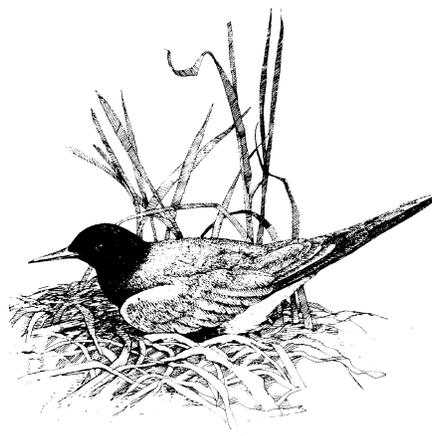


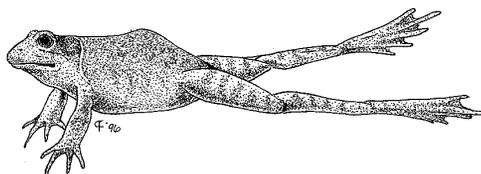
Table 6. Status of Oswego River AOC Marshes in 1995 and 1996¹. “-” denotes values below the non-AOC average. “0” denotes values within the non-AOC average. “+” denotes values above the non-AOC average.

Marsh Name ²	Latitude/ Longitude	Survey Type	Year	Number of Stations	Assessment of Marsh Bird and Amphibian Species Diversity				Overall Assessment ³
					Marsh Nesting Bird Diversity	Marsh Bird Indicator Species Diversity	Amphibian Species Diversity	Amphibian Indicator Species Diversity	
Lakeshore Marsh 1 N, Medium	43°17'58" 76°46'54"	Amph Bird	96	4 2	+	—	—	—	2
Lakeshore Marsh 2 N, Large	43°17'58" 76°46'54"	Amph Bird	96	2 2	+	—	—	—	2
Lakeshore Marsh 3 N, Small	43°17'58" 76°46'54"	Amph Bird	96	1 1	0	—	0	0	3
Lakeshore Marsh 4 N, Medium	43°17'58" 76°46'54"	Amph Bird	96	1 6	0	—	0	0	3
Montezuma NWR Marsh I, Huge	42°57'00" 76°47'00"	Amph Bird	96 95/96	5 5	0	—	+	+	5
Rice Creek Field Station Marsh I, Large	43°20'00" 76°30'00"	Amph Bird	96 96	6 4	—	—	—	0	1
Snake Swamp Marsh I, Medium	43°28'00" 76°30'00"	Bird	96	2	+	—			2
Three Rivers/Potter Marsh I, Large	43°11'00" 76°22'30"	Amph Bird	96 96	1 1	—	—	0	0	2
Toad Harbor Marsh I, Huge	43°16'00" 76°07'30"	Amph Bird	96	2 1	0	—	—	0	2
Oswego River Overall Assessment					+	—	+	+	6

¹ See the Marsh Monitoring Program’s 1997 Final Technical Report for a detailed description of the scoring system.

² R = rehabilitation site, C = coastal, N = nearshore, I = inland. Tiny (2 - 2.5 ha), Small (2.5 - 5 ha), Medium (5 - 25 ha), Large (25 - 50 ha), Huge (>50 ha).

³ A score of 0, 1 or 2 indicates impairment, a score of 3, 4 or 5 indicates no apparent impairment and a score of 6, 7 or 8 indicates an above average marsh.



[See References in Appendix for Marsh Monitoring Program]

APPENDIX N

Watershed Restoration and Protection Action Strategies (WRAPS)

The purpose of a Watershed Restoration and Protection Action 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 that watershed. A Watershed Restoration and Protection Action Strategy is a concise, and action-oriented document that:

- Compiles currently available information about the state of the watershed and ongoing assessment, outreach and implementation activities, and
- Proposes environmental and natural resource priorities or goals and measurable objectives for achieving those goals.

Clean Water Action Plan - Watershed Restoration and Protection Action Strategies are rooted in the 1998 federal Clean Water Action Plan, a plan to accelerate watershed restoration across the country. The Action Plan strives to fulfill the original goals of the 1972 Clean Water Act to accomplish fishable, swimmable, and safe waters for all Americans. The Action Plan lays out a broad vision of watershed protection, encompassing protection of coastal and estuarine waters; fresh waterbodies; wetlands; groundwater; natural resources; and drinking water sources.

Unified Watershed Assessment - As one of the first steps toward achieving that vision in the new millennium, in 1998, EPA required states, as a condition for supplemental funding, to prepare Unified Watershed Assessments (UWAs) to identify watersheds in need of restoration and develop a schedule for addressing them. In New York, the Unified Watershed Assessment provided an opportunity to demonstrate the proactive approach the state has taken toward watershed protection in the last decade and to qualify for over \$6 million in federal funds to complement the major investment that the state already makes in water quality. After categorizing the watersheds, DEC prepared a schedule for developing Watershed Restoration and Protection Action Strategies in each watershed in need of restoration and for each watershed that needed action to sustain water quality.

New York's 1998 Unified Watershed Assessment brings together water quality and natural resource factors in each of the state's 54 watersheds. For each watershed area at the USGS 8-digit Hydrologic Unit Code (HUC) scale, technical staff of DEC and the USDA Natural Resources Conservation Service used evaluation data, expertise and public input to identify restoration priorities. The UWA built on the state's existing water program and natural resource initiatives, especially the Rotating Intensive Basin Studies (RIBS). The strong partnerships that New York already enjoyed among state, tribal, and local agencies; conservation districts; federal and interstate agencies; county districts; watershed-based organizations; and other key stakeholders proved to be invaluable.

Based on a number of water quality and natural resource factors and assessment, the UWA assigned each of New York's 8-digit HUC watersheds (called sub-basins) to one of four categories in the EPA framework:

- Category I: Watersheds in need of restoration (26 sub-basins)
- Category II: Watersheds meeting goals including those needing action to sustain water quality (22 sub-basins)
- Category III: Watersheds with pristine or sensitive aquatic system conditions on lands administered by federal, state, and tribal governments. (None at this time)
- Category IV: Watersheds with insufficient data to make an assessment. (6 sub-basins).

Under the Watershed Restoration and Protection Action Strategy (WRAPS), many of the areas that meet USEPA's definition of Category I watersheds are existing priorities for the State of New York. In 21 of the state's 26 Category I watersheds, restoration and protection efforts are already underway through such federal and state programs as the National Estuary Program; Natural Heritage Rivers; priority TMDL; stakeholder involvement; availability of state resources and on-going planning activities by partner agencies and local organizations.

Working together with federal, state, and local partners, the New York State Department of Environmental Conservation completed a draft Watershed Restoration and Protection Action Strategy for the Susquehanna and Chemung River Basins in April 2001. Federal guidance and New York State's Unified Watershed Assessment both encourage that strategies be built upon existing strategies and plans, such as the National Estuary Program's Comprehensive Conservation Management Plans (CCMPs). The Long Island Sound CCMP and the New York-New Jersey Harbor Estuary CCMP have been accepted by EPA as New York's 1999 strategies submissions. The draft Peconic Estuary Program CCMP and the draft South Shore Estuary Comprehensive Management Plan were submitted to EPA in April 2001.

In cooperation with stakeholders, strategies for other areas of the state are intended to be developed based on existing management planning efforts to the greatest extent possible. The schedule for developing strategies is based largely on the cycle for updating the state Waterbody Inventory/ Priority Waterbody List (WI/PWL), allowing the use of current information. The Department of Environmental Conservation, working in partnership with the Natural Resources Conservation Service and the New York State Association of Regional Councils, first completed the framework for developing strategies.

The pilot basin, the Upper Susquehanna / Chemung was selected based on the availability of recent monitoring data and strong stakeholder support. The process for developing the pilot and a WRAP strategy includes: 1) contacting watershed stakeholders and gathering information on existing activities and local issues; 2) compiling a GIS and inventory of water quality, natural resources, land use and other data in the watershed; 3) holding workshops to analyze the information and set directions; 4) creating a draft State of the Basin report; and, 5) formulating and reviewing a WRAP Strategy.

APPENDIX O

Proposal to Address Upstream Contaminated Sediments In the Oswego River by exploring U.S. Army Corps of Engineers Grant Funding developed in 2003 by NYSDEC, USACE, and SUNY Oswego

Proposed Project Description: Under USACE Section 401, a Feasibility Study is planned to be proposed to conduct further investigation on the sediment contamination at Battle Island and the Armstrong site. Collecting additional information, such as a food uptake study, has been suggested for this upstream Oswego River area by SUNY Oswego. The overall and long term objective is to assist in the determination of the fate of the known contaminated sediments in the Battle Island area. NYSDEC has preliminary determined that the contamination is not present in amounts or exposed at its location to present a significant threat to the environment. Regardless, NYSDEC endorses the proposed study by the academic community at SUNY Oswego within the scope of the RAP delisting document and funded as a USACE approved project. No impact from this proposed upstream study area on the AOC has been identified.

Oswego RAP and Funding Issues: Currently, the delisting of the Oswego RAP is moving forward in 2003 and is likely to extend into 2006 depending on the issuance of the FERC power dam license and incorporation of provisions that fully address the fish habitat and fish population restoration and protection. In conjunction with the SUNY Oswego proposal, the USACE had expressed interest in conducting an initial feasibility study under Section 401 funding prior to the delisting but funding was not available. Because this particular grant must be linked to the AOC, a study project prior to delisting is a possibility; afterwards, a different grant would be needed. For the Oswego RAP Area of Concern, these upstream contaminated sediments are defined as “out of AOC” sources and have been identified as not contributing to or causing use impairments in the AOC*. The academic community believes there is a local exposure threat as well as a long term loading threat to Lake Ontario.

If the local government and/or SUNY Oswego can provide the matching grant, funding of the study under Section 401 could be implemented. Traditional USACE planning assistance funding could be considered at that time; however, this is a much more complicated application process unlikely to occur for this Oswego project. The 35% matching funds under Section 401 can include in-kind services. At this time, NYSDEC has no funding to support this matching grant. In order to be considered a project proposal must be submitted to secure a place in line with other grant project proposals.

Project Focus: 1) To provide additional information to determine if removal or in-place remediation is appropriate to reduce the impact of contaminated sediments at Battle Island; and, 2) To assist in determining if further source trackdown is needed for CERCLA to address.

Next Steps: With the identification of a local sponsor and commitment of the 35% matching grant, the USACE would prepare a preliminary feasibility study that could further recommend a longer term course of action and may include collection of field data. SUNY Oswego, in conjunction with SUNY Syracuse, is the most likely sponsor for the project lead and in securing the matching grant. DEC will endorse the project to provide additional information to address remaining concerns for the upstream sediment

contamination at Battle Island and the Armstrong site. At the same time, DEC is proceeding with the delisting of the Oswego AOC because criteria and guidance provide for this course of action *. In the interim no project proposal has been prepared to secure a funding position.

Contacts: This project was initiated through participation by: Phil Berkeley, USACE; Tony Friona, USACE; Jim Pagano, SUNY Oswego; Steve Eidt, NYSDEC; Bob Townsend, NYSDEC.

Comments: This 401 grant project will assist in addressing upstream sediment contamination for the Oswego River and RAP. In the event of delisting, the project is still viewed as important and worthwhile by all participants towards collecting further data and making recommendations on the fate of sediments in this upstream segment of the Oswego River. Known information about the Battle Island and Armstrong site is listed below to assist decision making:

1. Limited contaminated sediments are present around Battle Island in the Oswego River.
2. Evidence of elevated contamination in the river exists directly downstream from the Armstrong site.
3. There is a series of dams and canal lock system from this contaminated sediment area downstream for six miles to the Oswego Harbor and Area of Concern. These dams are known to catch contamination behind them.
4. Harbor area sediments in the Area of Concern are not contaminated for navigational dredging and disposal of dredged material in Lake Ontario.
5. For the contaminated sediments at Battle Island, there is a concern to determine if an environmental impact exists and if remedial action is warranted. The contamination amount, concentration, and threat are assess as not warranting action by DEC. SUNY Oswego is concerned about this “non-action”.
6. For the contaminated sediments in the Oswego River directly downstream from the Armstrong site, there is a concern to determine if this is more widespread, whether source trackdown is needed, and if CERCLA action is warranted. The contamination amount, concentration, and threat are assess as not warranting action by DEC. SUNY Oswego is concerned about this “non-action”.
7. The 401 feasibility study should focus on providing information on data gaps to address contaminated sediments at Battle Island and raise attention to a source trackdown concern under CERCLA if necessary.

Background: The basis for the academic community concern is discussed in the Stage 3 document in Section III.B under use impairment indicator #10 addressing dredging restrictions. Although there are no dredging restrictions in the AOC, the academic community has modeled some data that concludes there is likely an ongoing upstream source of mirex to Lake Ontario (reference Appendix H.2 by DePinto). NYSDEC has conducted intensive water column sampling to identify loads to Lake Ontario and the Oswego River indicates consistently low results (reference Appendix H.17 by Litten). NYSDEC has therefore not identified an ongoing loading issue for the Oswego River to Lake Ontario.

* USEPA delisting principles and guidance provide for delisting with the existence of sources outside the Area of Concern. Also, beneficial uses may be recognized as not being capable of full restoration. For the Oswego AOC, the isolated upstream sediments have not been identified as contributing to or causing any use impairments in the AOC.

APPENDIX P

Power Point Presentation Oswego River Remedial Action Plan - Stage 3 - Delisting Proposal

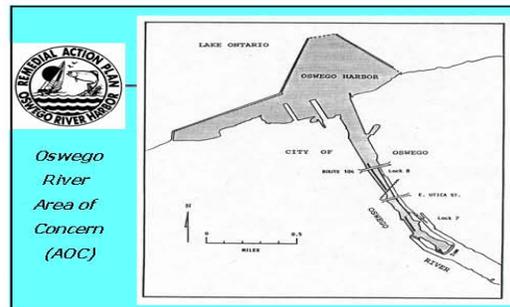
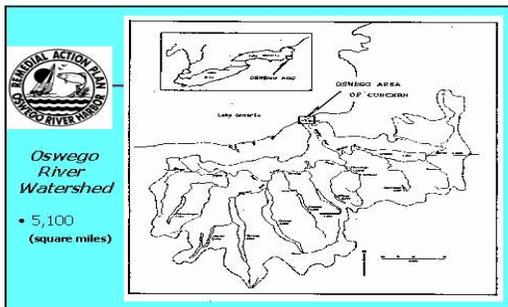
A copy of the Power Point Presentation (39 slide .pdf file) is provided below. The presentation addresses the AOC listing; what was learned from the RAP process; facts about the Oswego AOC and RAP; Oswego RAP activities, investigations, and priorities; workshop results; the use impairment resolution process; the next steps to delisting; and what is next for this Oswego AOC to maintain and enhance beneficial uses.



Oswego River RAP

Oswego River
Remedial Action Plan
Stage 3- AOC Delisting

*As developed by the Remedial Advisory Committee and NYSDEC
presented by Robert Townsend
LIC Biennial Meeting 2005*



Oswego Harbor (Wright's Landing)



Oswego River (below dam north to harbor)



Oswego River (Varick Dam upstream)



Oswego River Remedial Action Plan



Why Listed as
Area of Concern ?

- Fish Consumption Advisory in Lake Ontario
- Watershed Effects on Lake Ontario
- Fishery Concerns
- Aesthetic and Eutrophic Concerns
(turbidity, floatables, sewage, weeds)



Learned From RAP Process:

- Work Needs Manageable Parts
- Concerns Not Limited to AOC Geography
- Ecosystem Approach Complex
- Public Participation Essential
- Environmental Monitoring Important
- Expert Opinion Needed
- Restoration and Stewardship Goals



Presentation Outline

- Oswego RAP Facts
- RAP Process and Results
- Indicators Resolution
- Next Steps



Oswego RAP Facts

- RAC Membership Watershed Focused
- Governments Moved to Watershed Focus
- AOC has Limited Boundary
- Water Quality Improvements
 - Floatables, Garbage, Sewage Gone
 - Mitigated Point Sources, NPS, CSOs
 - Zebra Mussels Help Clarity



Oswego RAP Facts (Cont'd)

- Accomplished All Achievable in AOC
- Remaining Concerns Addressed on Larger Scale
 - Lakewide Management Plan
 - FERC Requirements; Fishery Goals
 - Watershed Management Planning
- Responsible Parties Identified
 - Improvements Continue
 - Environmental Protection Continues



Oswego RAP Facts (Cont'd)

- Assessment: RAP/AOC Goals Met
- Best Uses Not Impaired
- Oswego AOC no Longer Focus Area
- Press Reports Supportive
- Environmental Success Story



Achieving Guidelines

- EPA Delisting Principles Met:
 - Maximize Restoration
 - Focus on AOC Sources
 - Identify Non-AOC Source Responsibility
 - Use Consultation Process
 - IJC Reviews and Comments




Oswego RAP Process

- Completed Stage 1 and Stage 2
- Conducted Investigations
- Monitoring Evaluations
- Committee Meetings
- Status Reporting
- Defined Criteria & Endpoints
- Developed Stage 3 Delisting



Oswego RAP Investigations

- Rotating Intensive Basin Studies
- '93 and '95 WQ Trend Studies
- '94 Oswego Harbor Survey
- '95 Fish Pathology Study
- '97 Oswego River Sediment Study
- Water Column Studies (PISCES & TOPS)
- Marsh Monitoring Program
- '02 Battle Island Sediment Assess



Priorities Led to Workshop

- Assess Contamination Release
- Assess Fish Health (Re: Advisory)
- Link Environmental Data to Best Uses
- Reassessment Best Use Indicators
- Determine Restoration / Protection
- Involve Experts
- Conduct Technical Workshop



Oswego Workshop Results

- Fish Advisory Addressed by LaMP*
- Fish Habitat Addressed by FERC**
- Fish Pop. by FERC, LaMP, Conditions
- AOC Not Eutrophic Body of Water
- Weeds/Algae are Aesthetic Concerns
- Best Uses Intact / Maximized
- Maintain Watershed Follow-up

* LaMP = Lakewide Management Plan for Lake Ontario
 ** FERC = Federal Energy Regulatory Commission relicensing



Use Impairment Resolution Process

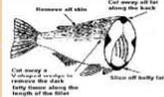
- Endpoints and Delisting Criteria
- Resolution Statement
- Supporting Data
- Rationale
- Assure Responsible Parties
- Assure Monitoring and Protection



Oswego RAP Stage 1 Identified Use Impairments

1. Fish Consumption Restrictions
2. Fish Habitat Loss
3. Fish Population Loss
4. Eutrophication or Undesirable Algae

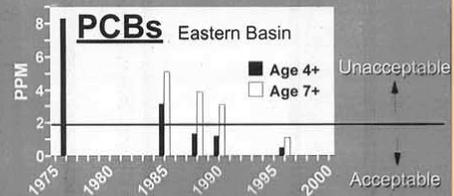
1. Fish Consumption Restrictions



- Due to PCBs, Mirex, Dioxin in Lake Fish
- Advisory Not Specific to AOC
- Resolution by Lake Ontario LaMP (monitoring; trackdown; corrective actions)
- Lake Ontario Fish Data Supports Progress
- Endpoint Achieved = Lake Restoration

PCBs in Lake Ontario Lake Trout (Eastern Basin)

Indicator: Lake Trout
Measure: Lake Trout Pollutant Concentrations



2. Fish Habitat Loss

- Due to Dry Area Below Varick Dam
- Endpoint: Not Impaired by Flow
- FERC License Provisions Resolve



3. Fish Populations Loss

- Due to Dry Area Below Varick Dam
- Endpoint: Similar to Lake Reference
- FERC, LaMP, Conditions Resolve



4. Eutrophication or Undesirable Algae

- Due to Historic High Nutrient Levels
- Watershed / Nearshore / Lake Related
- Algal and Weed Area Limited
- Endpoints Achieved:
 - Water Quality Standards Met
 - No Persistent Water Quality Problem
 - Not Attributable to Cultural Eutrophication



4. Eutrophication or Undesirable Algae (Cont'd)

- Nutrient Sources Addressed
 - Point and Nonpoint Sources
 - Combined Sewer Overflows
 - Zebra Mussels Reduce Algae
- Riverine Environment; Not Eutrophic
- WQ Survey Data = Not Impaired
- Beneficial Uses Intact
- Weeds Addressed as Aesthetics



Oswego RAP Stage 1 – Other Use Impairment Considerations

5. Degradation of Benthos
6. Fish Tumors or Other Deformities
7. Bird & Animal Deformities or Reproduction Problems
8. Aesthetics
9. Plankton Populations



5. Degradation of Benthos

- Endpoint: No Significant Impact
- RIBS Report: Not Impaired
- Sediment Study Supports No Impairment
 - High Biological Sediment Quality

6. Fish Tumors or Other Deformities



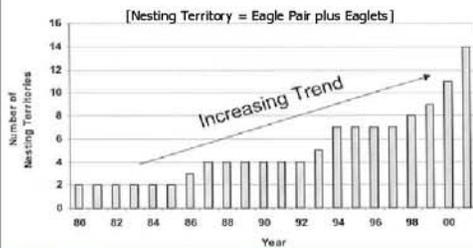
- Endpoint: No Abnormal Incidence
- Fish Pathology Study: No Impact
- Workshop Research Review Supports

7. Bird & Animal Deformities or Reproduction Problems



- Endpoint: No Abnormal Incidence
- Marsh Monitoring Program: No Impact
- No Wildlife Impacts Identified
- Wildlife Trend Data Supports
- Lake Ontario Basin Indicator Progress
(Re: Eagles)

Lake Ontario Basin Wildlife Data Supports Progress



Bald Eagle Nesting Territories Indicate Basin Restoration

8. Aesthetics



- Endpoints:
 - Floatables & Odors Minimal
 - Weeds Managed as Nuisance
- Harbor Area Uses Mechanical Harvest
- Weeds in Upstream; Nearshore; and Lock Areas
- Water Quality Survey: No AOC Impact
- Consistent With "Priority Waterbody List"



9. Plankton Populations

- Endpoint: Integrity Similar to Reference
- 1980's Nutrient and WQ Concern
- Water Quality and Plankton Study:
 - No AOC Impact
 - River Nutrient Not Excessive
 - Overall Healthy Plankton
 - Variable, Not Diverse, Riverine Environment



Oswego RAP Stage 1 Indicators Not Impaired

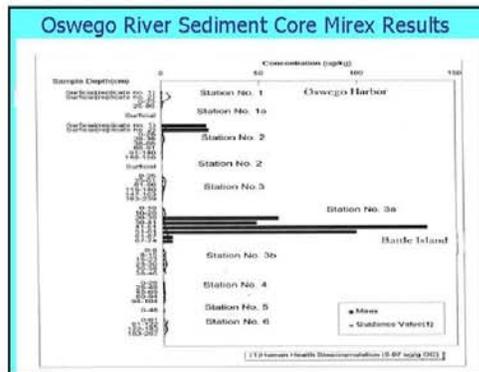
- Dredging Restrictions
- Beach Closings
- Tainting of Fish / Wildlife Flavor
- Drinking Water Restrictions
- Added Costs to Agriculture / Industry



10. Dredging Restrictions

- Endpoint: No Dredge Restrict (USACE*)
- Maintenance Dredging Not Impaired
- Recent Dredging Permit Confirms
- Sediment Study Results Support
- Concern Upstream at Battle Island
- Upstream Study Conducted

* USACE = United States Army Corps of Engineers





Other BUIs Reassessment: Not Impaired

- No Beaches in AOC
- No Fish Tainting
- No Drinking Water Restrictions
- No Added Costs



Next Steps to AOC Delisting

- ✓ Delisting Proposal on Web
- ✓ Consult with Stakeholders
- ✓ Technical and Peer Review
- ✓ Consult with EPA, IJC (ongoing)
- Update Delisting Proposal on Web
- Formal Public Notice and Comment
- Complete Responsiveness Summary
- Forward Final Stage 3 to EPA
- Fulfill DEC/EPA/IJC/DOS Liaison
- AOC Delisting by US Federal



What's Next For The Area

- Lake Ontario LaMP Addresses Fish Advisory
- FERC and LaMP Address Other Fish Concerns
- Watershed Activities* Address Objectives
- Remedial Measures in Watershed Ongoing

* WRAPS = Watershed Restoration and Protection Strategies