Department of Environmental Conservation

Division of Water

St. Lawrence River at Massena Remedial Action Plan

Stage II

August 1991

ST. LAWRENCE RIVER REMEDIAL ACTION PLAN
MASSENA, NEW YORK

New York State Department of Environmental Conservation
MARIO M. CUOMO, *Governor* THOMAS C. JORLING, *Commissioner*

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ST. LAWRENCE RIVER

AT MASSENA

REMEDIAL ACTION PLAN

STAGE II

August 1991

New York State Department of Environmental Conservation
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ACKNOWLEDGMENTS

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The NYSDEC would like to acknowledge the valuable contributions of the Massena Citizen Advisory Committee, its subcommittees, and other interested members of the public who helped develop the Massena RAP.

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ACRONYMS

ALCOA	Aluminum Company of America
AOC	Area of Concern
ARCS	Assessment and Remediation of Contaminated Sediment
BAT	Best Available Technology (economically achievable)
BMP	Best Management Practices
CAC	Citizen Advisory Committee
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CSO	Combined Sewer Overflow
EFC	Environmental Facilities Corporation
EPA	United States Environmental Protection Agency
GLWQA	Great Lakes Water Quality Agreement
GM	General Motors Corporation - Central Foundry Division
HF	Hydrogen Fluoride
IJC	International Joint Commission
LWRP	Local Waterfront Revitalization Program
MGD	Million Gallons per Day
NPS	Nonpoint Source
NYSDEC	New York State Department of Environmental Conservation
NYSDOS	New York State Department of State
PAH	Ploynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
POTW	Publicly Owned Treatment Works
PRAP	Proposed Remedial Action Plan
PWP	Priority Water Problem
RAC	Remedial Advisory Committee
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RIBS	Rotating Intensive Basin Study
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SEQR	State Environmental Quality Review
SPDES	State Pollutant Discharge Elimination System
TOGS	Technical and Operational Guidance Series
TRIP	Toxic Reduction Implementation Plan
TSMP	Toxic Substances Monitoring Program

CHAPTER 1

INTRODUCTION

In the Great Lakes basin, the International Joint Commission (IJC) has identified 43 Areas of Concern (AOC) where persistent toxic substances are impairing uses. The St. Lawrence River near Massena, NY is one of these AOC's.

The 1987 amendments to the United States-Canada Great Lakes Water Quality Agreement (GLWQA) called for Remedial Action Plans (RAPs) to be developed by governments to make recommendations for cleanup of pollution problems in the AOCs.

A RAP embodies an ecosystem approach to restoring and protecting the biota and water quality in the AOC. Correction of these problems in the AOC will contribute to overall improvement of environmental conditions in the river and in the Great Lakes system.

Development of RAPs is a three stage process. Stage I (November 1990) describes the environmental problems and impaired uses of the AOC, the pollutants causing impairments of uses, and the sources of those pollutants. Stage II (this document) will describe a remedial strategy, make recommendations for remedial actions, and describe methods for monitoring remedial progress in the AOC. Finally, when monitoring results indicate the beneficial uses of the AOC have been restored, a Stage III RAP is to be submitted to the IJC.

Thus, the RAP will be a continuous process to remediate known problems and to carry out investigations needed to further identify water quality impairments and their causes. NYSDEC, EPA and other agencies will use the RAP as a basis for deciding on remediation priorities and for committing to specific actions.

This Stage II RAP is a continuation of the Stage I document. Therefore, the details of water quality impairments and potential sources will not be repeated here. Instead this document will focus upon remedial and control programs, and recommendations to restore beneficial uses. For detailed evidence of impairments and sources the reader is referred to the Stage I RAP.

Remedial recommendations will be described within appropriate legal and regulatory constraints. Those programs outside the RAP process that may provide remediation will be cited along with specific recommendations if appropriate. These issues will be discussed in more detail in this document.

STAGE I SUMMARY

Geographic Scope

The Massena RAP addresses two areas that are of concern for New York State. In one area, New York State can legally take action, in the other area, New York can only affect conditions through actions within our own jurisdiction.

The first area, where NY has legal authority, is limited to waters under New York's jurisdiction: the New York portion of the St. Lawrence River upstream of the Snell Lock and the Robert Moses Power Dam to the Massena public water supply intake; the Grasse River from the mouth upstream to the first dam (including the Massena power canal); the Raquette River from the mouth upstream to the NYS Route 420 bridge; and the St. Regis River from the mouth upstream to the dam at Hogansburg (Figure 1-1).

The second area includes the waters of the Moses-Saunders Power Dam to the eastern outlet of Lake St. Francis (Figure 1-2) which have been adversely impacted by contaminants. This includes waters shared by the United States, Canada and the Mohawks at Akwesasne. In this area Canadian jurisdictions have defined impairments in downstream and cross-channel waters. The sources of pollutants leaving the Massena AOC boundaries and causing downstream or cross-channel impairments are identified in this RAP along with the sources of pollutants causing impairments in the AOC.

Inputs of pollutants from the St. Lawrence River and its tributaries upstream of the Massena AOC are identified where they cause impairments in the Massena AOC. The sources of pollutants to Lake Ontario and the other Great Lakes which eventually contribute as inputs to the Massena AOC are not identified in this RAP. They are better addressed in the lakewide management plans called for by the Great Lakes Water Quality Agreement.

Environmental Setting

The St. Lawrence River is the outlet of the Great Lakes Basin, connecting Lake Ontario to the Atlantic Ocean. Near Massena it has an average flow of 245,000 cfs (6030 cms).

Three dams exist in the Massena area: the Moses-Saunders power dam used to generate hydroelectric power, the Long Sault dam used to pass excess flow in time of high water or when the turbines are shut down at the Moses-Saunders dam, and the Iroquois dam which controls the flow from Lake Ontario into the St. Lawrence.

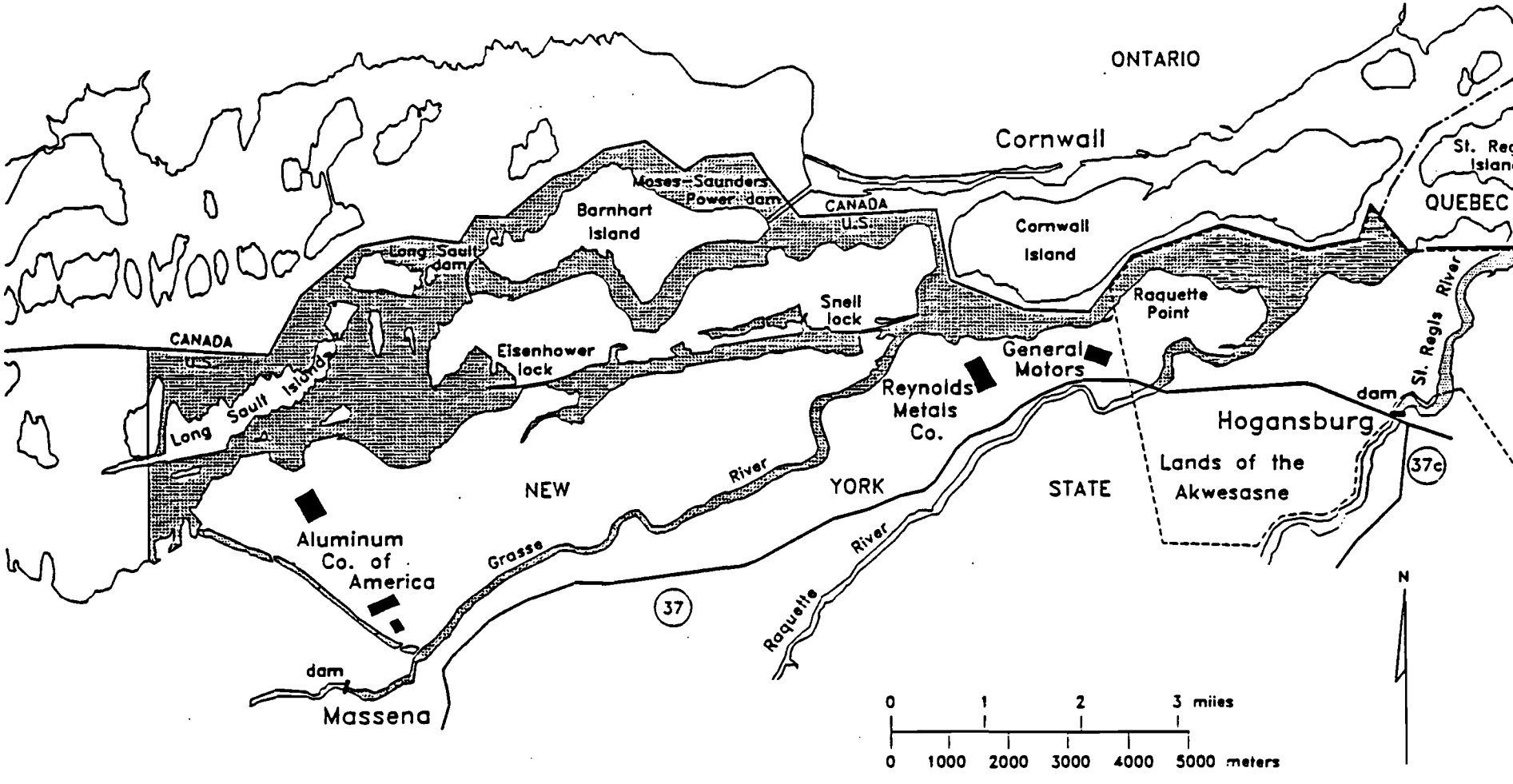


Figure 1-1. The Massena Area of Concern

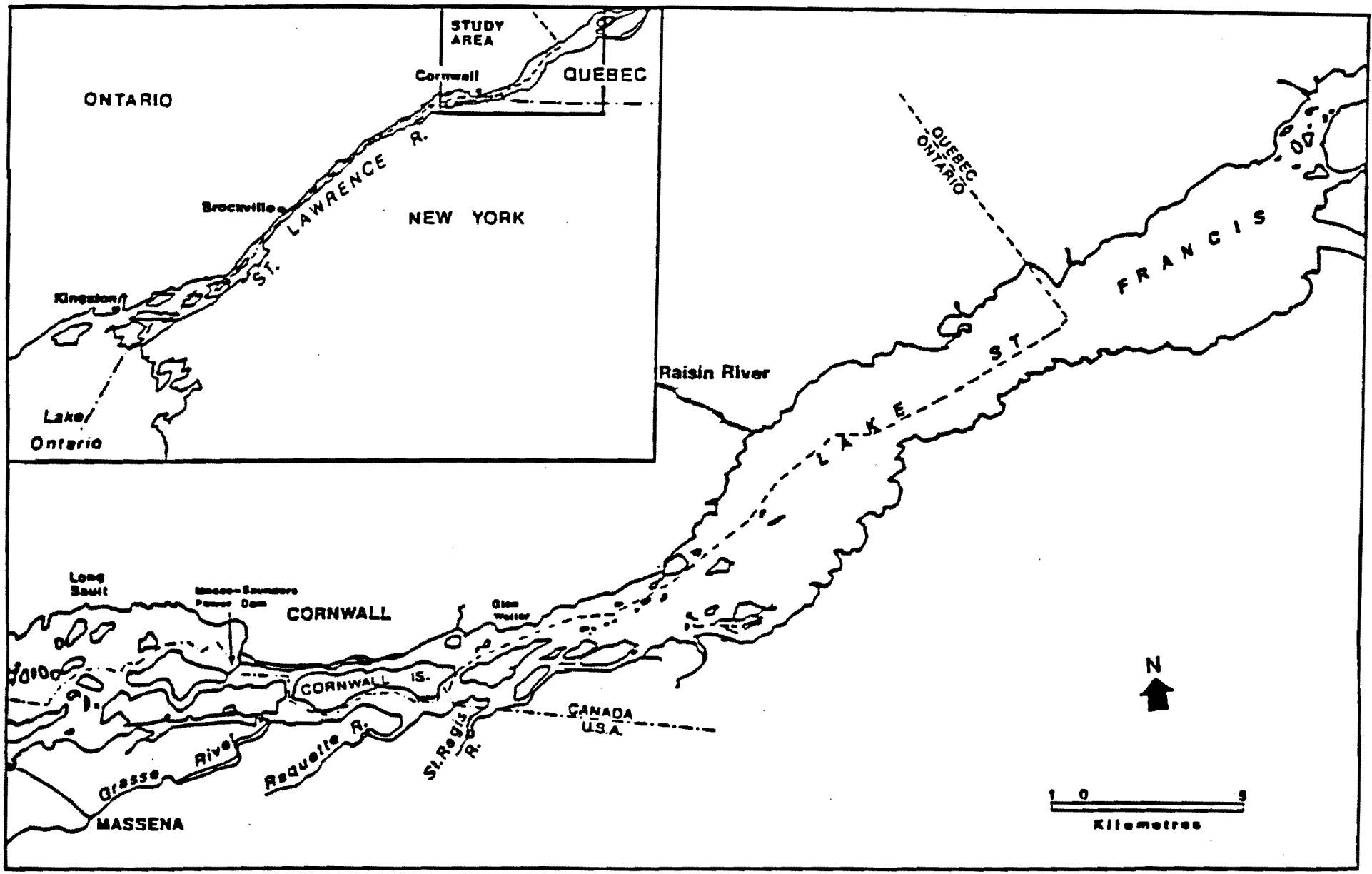


Figure 1-2 The approximate geographic scope of the impacted area

Tributaries to the St. Lawrence in the Massena part of the AOC include the Grasse River with an average flow of 900 cfs (25 cms), the Raquette River with a flow of 1306 cfs (37 cms) and the St. Regis River with an average flow of 1049 cfs (30 cms).

The river provides habitat for many species of game and non-game fish, waterfowl, mammals and aquatic plants.

The NYS Significant Habitat Inventory lists several areas in the AOC as important habitat for waterfowl, raptors and sturgeon. A total of twenty-one different species are listed as inhabiting or using the Massena area that are considered rare, endangered, threatened or of concern relative to New York State criteria.

Land Use

Tourism and recreation are major uses of the AOC, especially since the development of the Seaway and Power projects. In addition to the existing locks, dams, parks and a recently completed retail mall, an Aquarium/Ecological Center is proposed for construction.

Three industrial plants, ALCOA, Reynolds Metals and General Motors, are located in the AOC and use large quantities of water for their processes.

Public access to the river has been limited in the past because the New York Power Authority's large land holdings in the Massena area. Recently 5,100 acres of their land was declared surplus by NYPA and efforts are underway to return a portion of this land to private ownership.

The major urban center in the AOC is the Village of Massena with a population of approximately 13,000.

In addition to Massena, other communities use the St. Lawrence for recreation, industrial uses and drinking water supplies. Communities in Ontario, Quebec and Akwesasne draw and treat their drinking water from the river.

Historical Background

Prior to establishing permanent settlements on the St. Lawrence River, Native Americans and Europeans used the river for hunting, fishing, trapping and transportation. Settlement was followed by logging, dairy farming and eventually small industry. In 1897, a canal was dug between the Grasse and St. Lawrence Rivers for hydroelectric power generation. This brought the Pittsburgh Reduction Company (later renamed Aluminum Company of America) to the area. With the Seaway and Power Projects of 1954-59, Reynolds Metals and General Motors Central Foundry also located in Massena.

The RAP Goal

NYSDEC, the Massena CAC, the Cornwall RAP team and the Cornwall Public Advisory Committee (PAC), in consultation with Quebec and the Mohawks, developed a single goal for the two RAPs. The goal recognizes that pollution affects more than the immediate area of a particular jurisdiction and that attention should also be turned to downstream and crosstream areas that are impacted by pollution from the AOC.

The goal of the Cornwall and Massena Remedial Action Plans is to restore, protect and maintain the chemical, physical and biological integrity of the St. Lawrence River ecosystem and in particular the Akwesasne, Cornwall-Lake St. Francis and Massena Area of Concern in accordance with the Great Lakes Water Quality Agreement.

The goal of the Cornwall and Massena Remedial Action Plans includes protecting the downstream aquatic ecosystem from adverse impacts originating in the Akwesasne, Cornwall-Lake St. Francis and Massena Area of Concern.

This goal was agreed upon by NYSDEC, the Massena Citizen Advisory Committee (CAC), the Canadian governments, the Cornwall Public Advisory Committee (PAC) and the Mohawks at Akwesasne.

Current programs which will help meet the RAP goal include: The Federal Clean Water Act, New York's Water Quality Classification and Standards, State and Federal Hazardous Waste Remediation Programs, New York State Pollutant Discharge Elimination System (SPDES) and the New York Coastal Management Program.

Problem Identification

To define problems, NYSDEC gathered data relative to the fourteen impairment indicators listed in GLWQA. Data was supplied and evaluated by NYSDEC staff, members of the CAC and technical experts from the public at a special workshop. The draft IJC Area of Concern listing and delisting criteria were used as a basis for discussion and evaluation of the types and quality of data needed to determine individual impairments.

NYSDEC and the CAC held a public meeting to gather additional information about how the public values the St. Lawrence River; how they would like to see it used; and problems they feel exist in the river.

In addition NYSDEC and the Massena CAC added a fifteenth indicator of impairment: Transboundary Impacts. This indicator was added to evaluate export of contaminants from one jurisdiction to another.

Table 1-1 summarizes the conclusions about the impairments and their causes. Some of the statements about the existence of an impairment can be made with considerable certainty. Other statements lack direct documentation. The following

terms are used to describe the level of certainty (degree of confidence) with which we make statements about impairments:

Yes	Direct evidence exists that there is an impairment.
Likely	There is no direct evidence that an impairment exists but there may be indirect evidence that an impairment exists.
Unlikely	Indirect evidence supports the conclusion that there is no impairment but there is no direct evidence to support it.
No	Direct evidence exists that there is no impairment.

The following terms are used to describe the confidence in the evidence about causes of impairment:

Known	Pollutant or disturbance is present and a direct link with the impairment has been established.
Probable	Pollutant or disturbance is present at a level expected to cause an impairment but the link to the impairment has not been definitively established.
Possible	Pollutant or disturbance is present at a level that may cause impairment but direct evidence of the impairment has not been documented.

Source Identification

Table 1-2 summarizes causes of use impairments in the Massena AOC and their known or potential sources in the Massena AOC.

The data used to identify sources usually does not provide direct evidence to identify sources with complete certainty. The link between an impairment and a source must be logically inferred in most instances.

Sources of pollutants come in two varieties: point sources and nonpoint sources. The point sources are municipal and industrial discharges of treated wastewater through regulated outfalls such as a pipe. Nonpoint sources are characterized by contaminated sediments, runoff from hazardous waste sites, developed areas or agricultural land.

Table 1-1. Summary of Impairment Indicators, Impairments and causes in the Massena AOC.

	Indicator(s)	Impairment	Likely Cause	Confidence of Cause
i.)	Restrictions on Fish and Wildlife Consumption	Yes	PCBs, Mercury, Mirex, Dioxin.	Known
xiv)	Loss of fish and Wildlife Habitat	Yes	Physical Disturbances. Contaminated Sediment.	Known Probable
xv)	Transboundary Impacts	Yes	PCBs, Phosphorus, Metals[1], Sediments.	Probable
iii)	Degradation of Fish and Wildlife Populations	Likely	PCBs, DDE, Mercury, Physical Disturbances. Overharvest (fish)	Probable Possible
vi)	Degradation of Benthos	Likely	PCBs, Lead, Copper and Physical Disturbances.	Probable
iv)	Fish Tumors and Other Deformities	Likely	PAHs	Possible
v)	Bird or Animal Deformities or Reproductive Problems	Likely	PCBs	Possible
ii)	Tainting of Fish and Wildlife Flavor	No		Known
vii)	Restrictions on Dredging Activities	No[2]	Arsenic, Chromium, Copper, Nickel, PCBs, Zinc	Known
viii)	Eutrophication or Undesirable Algae	No		Known
ix)	Restrictions on Drinking Water Consumption, or Taste and Odor Problems	No[3]		Known
x)	Beach Closings	No		Known
xi)	Degradation of Aesthetics	No		Known
xii)	Added Costs to Agriculture or Industry	No		Known
xiii)	Degradation of Phytoplankton and Zooplankton Populations	Unknown		

[1]Could include: Aluminum, Arsenic, Cadmium, Chromium, Copper, Cyanide, Iron, Lead, Mercury, Nickel, and Zinc.

[2]Maintenance dredging is unimpaired. Likely causes are listed relative to the potential for expanded dredging proposals.

[3]The Stage I RAP examined treated drinking water data.

Table 1-2. Summary of causes and sources of impaired uses in the Massena AOC.

	Indicators	Impairment	Identified Cause(s)	Known Source(s)	Potential Source(s)
i)	Restrictions on Fish and Wildlife Consumption	Yes	PCBs Dioxin	AOC Industrial Discharges, Inactive Hazardous Waste Sites	Contaminated Sediments
			PCBs, Mirex, Dioxin	Lake Ontario	
			Mercury	Inactive Hazardous Waste Sites, Cornwall AOC	Contaminated Sediments
xiv)	Loss of Fish and Wildlife Habitat	Yes	Physical Disturbances	Dredging	Natural Erosion
			Contaminated Sediment	Inactive Hazardous Waste Sites	
xv)	Transboundary Impacts	Yes	PCBs	Industrial Discharges, Lake Ontario	Inactive Hazardous Waste Sites, Atmospheric Deposition
			Metals[1], Contaminated Sediments	AOC Industrial/Municipal Discharges	Inactive Hazardous Waste Sites
			Phosphorus	Municipal Discharges, CSOs	Other Nonpoint Sources
iii)	Degradation of Fish and Wildlife Populations	Likely	PCBs	AOC Industrial Discharges	Contaminated Sediments
			PCBs, DDE, Mercury	Lake Ontario, Cornwall AOC	Inactive Hazardous Waste Sites, AOC Industrial Discharges
			Physical Disturbances	Seaway Construction	
			Overharvest (fish)		Commercial Fishing (historic)
vi)	Degradation of Benthos	Likely	PCBs, Lead, Copper	AOC Industrial Discharges, Contaminated Sediments	Inactive Hazardous Waste Sites, Other Nonpoint Sources
			Physical Disturbances		Dredging
iv)	Fish Tumors and Other Deformities	Likely	PAHs		Contaminated Sediments
v)	Bird or Animal Deformities or Reproductive Problems	Likely	PCBs		Contaminated Sediments
vii)	Restrictions on Dredging Activities	No[2]	Arsenic, Chromium, Copper, Nickel, PCBs, Zinc	Contaminated Sediments	Inactive Hazardous Waste Sites, AOC Industrial Discharges

[1]Could include: Aluminum, Arsenic, Cadmium, Chromium, Copper, Cyanide, Iron, Lead, Mercury, Nickel, Zinc.
[2]Maintenance dredging is unimpaired. Likely causes are listed relative to the potential for expanded dredging proposals.

CHAPTER 2

CURRENT PROGRAMS AND REMEDIAL OPTIONS

The Stage I Remedial Action Plan identified water quality use impairments in the Area of Concern. It also determined potential sources of pollutants suspected to be causing these impairments. Although use impairment effects are evaluated in the Area of Concern, the sources may be found throughout the drainage basin.

This chapter will describe and evaluate current control and remedial measures being applied to the sources identified in Stage I. Areas where additional remedial measures are needed will be identified. Alternative regulatory or remedial options available to restore beneficial uses will also be discussed.

A more thorough definition of all current programs is included in a number of other documents such as the Lake Ontario Toxics Management Plan. Therefore, detailed program descriptions will not be repeated here. Instead, this chapter will describe how each program is specifically applied to sources identified to the Area of Concern.

It is recognized that not all of the sources of pollution have been identified. However, by addressing these suspected sources, progress may be made toward a cleaner environment. Table 2-1 summarizes each suspected source for the Area of Concern and identifies the control and remedial measures currently being applied to each source.

Table 2-1

Existing control and remedial programs applied to the sources identified in Stage I

Possible Source of Impaired uses in Area of Concern	Identified Cause	Existing Program
Hazardous waste sites	PCBs, mercury, dioxin (potentially: metals[1], physical disturbances)	Federal & state inactive hazardous waste site remedial program
Industrial discharges	PCBs, metals[1] (potentially: physical disturbances)	SPDES - industrial point sources
Municipal discharges/sewer overflows	phosphorus, metals[1]	SPDES - municipal point sources, industrial pre-treatment program, combined sewer overflows
Contaminated sediments	PCBs, metals[1] (potentially: PAHs)	Various, including the inactive hazardous waste site program
Seaway related sources	physical disturbances (potentially: dredging)	
Nonpoint sources	physical disturbances, phosphorus (potentially: PCBs, metals[1])	Nonpoint Source Management
Other potential sources	Historic commercial fishery overharvesting	
Lake Ontario	PCB, Mirex, dioxin, DDE, mercury	Lake Ontario Toxics Management Plan, Niagara River Toxics Management Plan, RAPS in other AOCs.
Cornwall AOC	Mercury, PCB, DDE	Cornwall RAP

[1] Metals could include: aluminum, arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, zinc.

HAZARDOUS WASTE SITES

The Stage I RAP determined inactive hazardous waste sites to be a source of PCBs to the Area of Concern. In addition, inactive hazardous waste sites within the basin were determined to be potential sources of mercury, DDT, Polynuclear Aromatic hydrocarbons (PAHs), and metals to the AOC. New York's hazardous waste remedial program as well as the status of site clean-ups at the identified sites are described below. The federal hazardous waste program operates in a similar manner. For more detailed information on these sites, please refer to the Stage I RAP.

Program Description

The New York State Hazardous Waste Remedial Program is managed by the Department of Environmental Conservation with assistance from the Department of Health and the Department of Law. It officially began in 1979 with the passage of the Abandoned Sites Act which provided the state with the legal authority to compel responsible parties to clean up inactive hazardous waste sites. In 1982, New York established the state superfund to pay for site investigations and remedial programs where a responsible party could not be identified. The Environmental Quality Bond Act of 1986 raised $1.1 billion to accelerate this superfund remedial action. State funds are used only when responsible parties cannot be found or will not agree to remediate a site, or when federal funding is not available.

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or federal Superfund) provides general authority for federal and state governments to respond to problems at hazardous waste sites. It also establishes a fund to pay the cost of this response where responsible parties cannot be identified or are unable to pay. Under CERCLA, the EPA compiles a National Priorities List (NPL) of hazardous waste sites nationwide, as candidates for federal remedial response. The state and federal governments together pursue cleanup at NPL sites, funded either by responsible parties or by federal superfund.

Under New York's remedial program, if a site is known or suspected to contain hazardous waste it is listed in the registry of inactive hazardous waste sites. Once a hazardous waste site is listed in the registry, the state must 1) determine whether the wastes are indeed present at the site and whether the site constitutes a significant threat to the environment or public health, and 2) identify potentially responsible parties. Priority for action is dependent upon a number of factors including the type of waste deposited at the site, the potential for contaminant migration and the presence of groundwater or surface water contamination from the site.

After listing, a site is investigated to determine the extent of the problem (Occasionally unlisted sites require investigation to determine if they should be listed on the registry). A Phase I investigation evaluates existing information about the site and attempts to identify responsible parties. Field work is not conducted during this phase. A Phase I investigation typically requires eight to twelve months to complete.

If additional information is needed to classify and rank a site, a Phase II investigation will be conducted to confirm the presence of hazardous waste and determine if the site poses a significant threat to public health or the environment and to determine the need for additional remedial action. This phase typically involves limited field work including installation of monitoring wells, sample collection and analysis. A Phase II study typically requires one to two years to complete.

In order to accelerate the program, NYSDEC has recently implemented a plan whereby consultants working under standby contracts conduct combined Phase I/II investigations termed Preliminary Site Assessments (PSAs) in a one to one and one-half year timeframe.

The data gathered in the Phase II field investigation or PSA is applied by the NYSDEC to the EPA hazard ranking system (Mitre Model). Those sites which initially score above a preset value (currently 28.5 on the EPA Mitre Model) can be recommended to the EPA for inclusion in its National Priorities List (Federal superfund site list) of sites. EPA will then rescore the site using the same model and if they agree the site exceeds the threshold for inclusion on the NPL the EPA will recommend inclusion for a site. If a site qualifies for the National Priorities List, then the EPA may become the lead regulatory agency for the project.

A Remedial Investigation/Feasibility Study (RI/FS) is undertaken when a site is determined to pose a significant threat to public health or the environment ("Class 2 site"). A remedial investigation (RI) is a detailed field investigation to determine the areal and vertical extent of contamination and to collect appropriate data on the site characteristics to support a detailed evaluation of remedial alternatives. A feasibility study (FS) is performed to develop and evaluate remedial alternatives to address the contamination problem at the site. A Health Risk Assessment/Environmental Assessment is normally performed as part of the RI/FS process. An RI/FS requires approximately two to five years to complete, depending on the complexity of the problem.

After the RI/FS is completed a public meeting is held to propose a remedial solution. This Proposed Remedial Action Plan (PRAP) describes the preferred alternative for remediating sources of contamination and controlling the migration of contaminants. The PRAP also discusses each alternative and the reasons for accepting or rejecting it. The public is encouraged to review and comment on the PRAP. Subsequently, the lead regulatory agency drafts a Record of Decision (ROD) which documents the final remedial decision. ROD summaries for the first operable units of the General Motors and ALCOA sites are in Appendices A and B respectively.

After the lead regulatory agency selects the appropriate remedy, a remedial design is prepared and the remedial construction is completed. Remedial designs typically require approximately one year to complete. Remedial construction may require several years to complete depending on the complexity of the site.

At any time during the remedial process it may be appropriate to implement Interim Remedial Measures (IRMs) at inactive hazardous waste sites to reduce the immediate effects of a contaminate source. IRMs are used to control environmental degradation while the required studies are completed. For example, a leachate collection system may be installed at a landfill to decrease the quantity of leachate leaving the site while the necessary environmental studies are completed. Thus, IRMs are an important tool in the remedial process to reduce the environmental effects of inactive hazardous waste sites particularly for the short term.

Current Initiatives

Table 2-3 summarizes the remedial action status of inactive hazardous waste sites which were determined to be potential sources to the Area of Concern in Stage I. The sites shown in this table are divided into four categories (A-D). Sites are placed into the appropriate category based on the likelihood they are contributing contaminants to the drainage basin that could be adversely effecting the Area of Concern. The basis for this site categorization is shown in Table 2-2.

Throughout the remedial process the public is encouraged to become involved. The public plays a key role in the process to help shape the final remedial decision. Public meetings, newsletters, fact sheets and project documents contribute to the exchange of information and provide opportunity for comment.

Conclusions

Inactive hazardous waste site remediation is an integral part of the Massena Area of Concern remedial effort. The General Motors Corporation Central Foundry Division (GMC-CFD), the Aluminum Company of America (ALCOA) and the Reynolds Metals Company (RMC) are recognized as the major Potentially Responsible Parties (PRPs) for hazardous waste contamination in the Massena Area of Concern (the U.S. side of the International border).

Remediation of contaminated river sediments in the St. Lawrence, Grasse and Raquette rivers as well as other minor tributaries adjacent to the PRP facility's are being addressed by separate EPA actions with each PRP. The GMC-CFD federal consent order also addresses "land-based" hazardous waste contamination on and adjacent to the facilities property. Separate New York State administrative consent orders with ALCOA and RMC address remediation of their respective "land-based" sites.

Table 2-2

Inactive Hazardous Waste Sites Categorization Criteria

Category A	Investigations have shown the site to be a likely source for the Area of Concern because contaminants are or may have been migrating to the river system by a specific pathway such as surface runoff, groundwater migration, contaminated sediments, etc., and remediation has not been completed.
Category B	Not enough information is known about the site to determine if it is a potential source of contaminants to the Area of Concern.
Category C	The investigations are not complete. However, the site is believed to be an unlikely source of contaminants for the Area of Concern due to distance from the river system, drainage patterns, hydrogeology, surface features, soil characteristics, etc.
Category D	The investigations are complete. The site is believed to be an unlikely source of contaminants to the Area of Concern due to distance from the river system, drainage patterns, hydrogeology, surface features, soil characteristics, etc.; or remediation is complete.

Table 2-3

Inactive Hazardous Waste Site
Remedial Action Summary

Site	Phase I	Phase II	RI/FS	Remedial Design	Construction
Category A. A likely source to the AOC.					
ALCOA (7 sites)	X	X	X		IRM-leachate collection
General Motors	NR	NR	X	9/91	IRM-temp. landfill cap
Reynolds Metals	X	NR	8/87		IRM-soil removal
St. Lawrence-Grasse River	NR	NR	10/89		
Category B. Insufficient information to categorize					
Malone Landfill	X	3/90			
Bombay Landfill	X	3/90			
Category C. Investigations incomplete. An unlikely source to the AOC.					
N. Lawrence Oil Dump	X	NR	10/88		
York Oil Co.	NR	NR	X	10/88	IRM
Sealand Restoration[1]	X	X	X	X	X

Key

Phase I = Evaluates existing information
Phase II = Field study to determine site significance
RI/FS = Detailed field study to determine the extent of contamination and recommend solutions
NR = Not Required (sufficient information exists to proceed to next phase)
X = Completed Action
date = Anticipated start date for a planned action or the actual start for a remedial action in progress
IRM = Interim Remedial Measure

[1] A supplemental RI/FS is being conducted to evaluate off-site contamination.

Table 2-4

Summary of Available Remedial Action Techniques for Hazardous Waste[1]

Technique	Functions	Applications/Restrictions	Estimated Cost
Land Disposal	Dispose of waste materials in landfills	Improper disposal can result in air pollution, groundwater and surface water contamination. RCRA requirements will markedly increase the cost but will provide for more sound disposal methods.	$ 90-200 per ton
Incineration	Thermally oxidize waste material in a controlled environment	Most effective for all organic wastes especially those with low flash points and containing relatively low ash contents.	$ 400-500 per ton
Solidification	Incorporate waste material in a controlled environment	Most economical for small quantities of waste. Waste material must be compatible with solidification agent. Waste may leach from matrices over time.	$ 50-150 per ton
Encapsulation	Surround waste material with impermeable coating	Most applicable to containerized waste materials or dewatered sludges; not fully demonstrated	$ 100-140 per ton
In-situ Solidification	Inject waste solidification agents directly into waste site	Applicable to liquid wastes from surface impoundments and well defined landfill sections. Not applicable to containerized wastes.	$100-150 per ton (in-situ)
Neutralization/ detoxification	Neutralize or immobilizes wastes by application of a neutralization agent (ie, lime) or detoxifies waste by chemical reaction	Most applicable to surface impoundments and disposal sites with permeable surfaces for metal bearing wastes. Degree of effectiveness may be difficult to determine.	$ 25-150 per ton (in-situ)
Biological	Biodegradation of some organic waste by microorganisms	Most effective for landforms and surface impoundments; can degrade a wide range of organics when acclimated; degradation process is slow and requires adequate aeration.	$15,000 per acre (in-situ)
Physical Treatment	Separates and concentrates the hazardous component by physical methods	Normally used for liquid wastes and includes such techniques as carbon adsorption, air stripping, sedimentation, solvent washing, chemical extraction, thermal extraction etc; Results in a concentrated residual that must be further treated or disposed.	Varies with specific technique
Chemical Treatment	Renders waste less hazardous through chemical methods of immobilization and detoxification.	May be done in-situ or following removal and includes such methods as neutralization, precipitation, oxidation, reduction, photolysis, chemical fixation, etc.	Varies with specific technique

References for Cost Estimates

1) "Remedial Action Technology for Waste Disposal Sites"
P. Rogoshewski, H. Bryson, K. Wagner, 1983.

2) "Wide Beach Superfund Site Pilot Testing of Chemical Treatment"
Glason Research Corporation, March 1988.

3) "RI/FS for the 93rd Street School Site"
Loureiro Engineering Associates, March 1988.

4) "Remedial Action at Waste Disposal Sites"
USEPA, October 1985.

The hazardous waste site remedial programs on both the federal and state levels are striving to remediate all of the known inactive hazardous waste sites within the New York State portion of the St. Lawrence River basin. The program is well underway at all sites (see Chapter 4) and the eventual remedial efforts will do much to correct the water quality impairments in the Area of Concern. The RAP can assist these efforts with its systematic, comprehensive, ecosystem approach to restoring and protecting water quality, biota, and related natural resources.

Remedial/Control Options

The hazardous waste program has a rigorous investigatory procedure established by Congress and by the EPA as previously described. Part of this process involves a Feasibility Study (FS), Proposed Remedial Action Plan (PRAP), then a Record Of Decision (ROD) which includes the development, screening and detailed analysis of remedial alternatives. The result of the feasibility study is the selection of a preferred remedial alternative for each site. A summary of some potential remedial action techniques is shown in Table 2-4. The preferred remedial alternative for a hazardous waste site may include one or a combination of these technologies.

The Federal Superfund Amendment and Reauthorization Act (SARA) requires that preference be given to permanent remedial alternatives that reduce toxicity, volume or mobility of contaminants. Therefore, the present NYSDEC policy (DHWR TAGM 4030) is to implement permanent remedies wherever practicable.[2]

SARA further states "EPA will seek to reduce hazards (ie. toxicity and/or mobility) to levels that ensure that contaminated materials remaining on-site can be reliably controlled over the long term through engineering and/or institutional controls." "The goal (...protect human health and the environment, that maintain protection over time and that minimize untreated waste...) should be considered when making site-specific determinations of the maximum extent to which permanent treatment can be practically utilized in a cost effective manner."[3]

References

[1]NYSDEC (1989). Buffalo River Remedial Action Plan.

[2]NYSDEC Division of Hazardous Waste Remediation (DHWR) Technical and Administrative Guidance Memorandum (TAGM)(1989). Selection of Remedial Actions at Inactive Hazardous Waste Sites (HWR-89-4030).

[3]Federal Register, Volume 55, No. 46, Thursday March 8, 1990. Rules and Regulations 8781.

INDUSTRIAL DISCHARGES

Point source industrial discharges have been greatly reduced via the SPDES program in the past two decades. Many contaminants are now discharged in amounts that are at the limits of current control technology. Any remaining significant discharges are currently being addressed through SPDES program reduction efforts and new pollution prevention initiatives (see page 3-14). Since chemicals are still discharged in small amounts, they remain as a small source to the Area of Concern. Therefore, the Stage I RAP identified industrial discharges of PCBs, lead, and copper as a known cause of impaired uses to the Massena Area of Concern. Stage I also identified industrial discharges of other heavy metals such as chromium, nickel and zinc as a potential cause of impairments to the Area of Concern. It is currently unknown if other chemicals discharged to the AOC, such as PAHs, are contributing to use impairments.

Program Description

In accordance with the federal Clean Water Act, it is illegal for a facility to discharge pollutants at a point source to a surface waterway without obtaining a federal permit. In New York State, the authority to issue these federal permits was delegated to the Department of Environmental Conservation in October of 1975. These permits, which are called State Pollutant Discharge Elimination System (SPDES) permits, include effluent limitations on the discharge of pollutants, schedules for the construction or installation of new pollution control technology, as well as requirements for self-monitoring and reporting.

SPDES permit effluent limits are developed from the more stringent of federally mandated technology-based treatment standards (or best professional judgement where such standards are lacking) or water quality standards. Water quality standards and guidance values have been adopted for over 200 toxic substances. In addition, whole effluent toxicity testing is being included in certain SPDES permits, particularly where water quality-based controls may not assure conformance with water quality standards.

Current Initiatives for PCB Permits

The present New York State water quality standard for PCB is 0.001 ug/L or 1 part per trillion (1 ppt). The concentration in most effluents needed to maintain this standard in receiving water is lower than the accepted method detection limit for total PCB. A Method Detection Limit (MDL) is the lowest concentration of a substance that can be reliably (99% probability) detected using an EPA approved laboratory methodology for analysis.

Therefore, existing discharge permits that include PCB contain numerical mass equivalents of the accepted MDL (adjusted for analytical variability) which existed at the time of permit issuance. The previously accepted MDL for total PCBs was 1.0 ug/L (1 ppb). Thus, this value was used for permit development.

New York State is required by federal regulation to utilize only EPA approved laboratory methods in its delegated permit program. Recent advances in analytical chemistry are gradually lowering the detection level for PCBs in water. EPA Method 608 which is approved for use in the SPDES program gives a MDL limit of 0.065 ug/L for each arochlor of PCB in distilled water. This method also allows the permittees to test for a higher detection limit specific to their wastewater effluent if analytical interferences prevent a lower method detection limit. Present NYSDEC program guidance requires PCB to be nondetectible in the treated wastewater effluent at the method detection limit for EPA method 608.

The Stage I RAP identified three permitted industrial dischargers as a source of PCB to the Massena Area of Concern: ALCOA into the Grasse River, General Motors Corporation[1] and Reynolds Metals into the St. Lawrence River. Unpermitted nonpoint source drainage from portions of Reynolds waste disposal area also discharges into wetlands which ultimately flow to the Raquette. The source of this PCB discharge is not from active use of this banned substance, but rather residual contamination from past use of PCBs. The NYSDEC has developed new draft wastewater discharge permits for PCBs at each of these facilities which requires:

1) The discharge of PCBs in the effluent will be nondetectible using EPA laboratory method 608 at a Method Detection Limit (MDL) of 0.065 ug/L.

2) Permittees have the option of doing a MDL study of their wastewater effluent to identify interfering substances which would justify a higher effluent specific laboratory detection limit.

3) The development of detailed Best Management Practices (BMP) plans for the control of toxics, including PCBs, in stormwater.

Some oppose the NYSDEC draft permit limit of 0.065 ug/L because it is based on a Method Detection Limit (MDL). The opposition is based on claims the MDL is derived from controlled research conditions, does not account for interferences in wastewater effluent and is not widely available in commercial laboratories.

All three companies in Massena have submitted effluent specific MDL studies to NYSDEC for approval. In addition, the conditions in these draft wastewater permits are presently being contested in on-going Administrative Permit Hearings (ALCOA and Reynolds) and in State Court under an Article 78 action initiated by Reynolds Metals. General Motors is in discussion stages of a permit reduction/modification with NYSDEC pending a resolution of the administrative and legal cases with ALCOA and Reynolds.

[1] In addition, General Motors Corporation formerly had a SPDES discharge to the Raquette River.

Current Initiatives for Other Permits

The permitted discharge limits set by NYSDEC for release of other substances such as heavy metals are determined for individual dischargers using ambient water quality standards. This is accomplished through an analysis of "analytical detectibility, treatability, natural background levels and the waste assimilative capacities of receiving waters" (6 NYCRR Sec. 701.15 (b)).

When Best Available Technology (BAT) standards exist for selected industrial categories, these federally mandated technology based treatment standards are used to establish discharge limits. In the absence of such standards, technology-based limits are determined by using Best Professional Judgement (BPJ).

The discharge limits required to protect water quality are also determined for all permits. After the appropriate water quality limits have been determined, they are compared to the technology based standards. The final effluent limitations used in the SPDES permit are the more stringent of the determined limits.

Toxic substances recognized in Stage I as likely to cause use impairments in the Massena Area of Concern are found in nine industrial discharge permits in the St. Lawrence drainage basin. The substances and the dischargers are shown in Table 2-5. Please refer to the Stage I RAP for more detailed information.

Conclusions

The operation of the SPDES program in New York State coupled with the construction of modern wastewater treatment facilities in the last twenty years has greatly improved water quality not only in the basin, but also throughout the state. Industrial discharges are generally controlled to the full extent of the law. Permit limits have been established to meet water quality standards or technology based standards where appropriate.

Point source discharges of persistent toxic substances such as PCBs and heavy metals often reflect the limits of current technology. Therefore, further remedial actions on current discharges, beyond that provided through the SPDES program and new pollution prevention initiatives (see page 3-14), will not solve the environmental problems in this drainage basin. Other pollution sources, such as contaminated sediments, are believed to be more significant sources of RAP pollutants of concern than current permitted industrial discharges. Therefore, the prevailing SPDES program should be sufficient to remedy pollutants causing impairments from industrial discharges, if the program operates with the goal of continuous improvement.

Remedial/Control Options

The goal of the RAP is to maintain the chemical, physical and biological integrity of the St. Lawrence river ecosystem in accordance with the Great Lakes Water Quality Agreement (GLWQA). Since the GLWQA calls for the virtual elimination of persistent toxic substances, additional measures should be taken to meet RAP goals for the Area of Concern such as continued steps toward zero discharge.

Advancement toward zero discharge may be accomplished now by hazardous waste site clean-up of PCB hot spots, comprehensive stormwater management and treatment, and waste minimization/reduction techniques. Advancement toward zero discharge in the future may include incorporating improved detection limits, more stringent technology based permit limits and/or more stringent water quality standards in the future as our scientific knowledge increases. The use of more efficient, safer, pollution control technology must be encouraged in the public and private sector. As technology advances, allowable discharges of substances of concern should be lowered when it can be accomplished in a technologically-sound and financially responsible manner.

Table 2-5
Toxic substances known or likely causing use impairment in the Massena AOC found in permitted discharges in the St. Lawrence River basin (see Stage I for more detailed information).

	Facility									
Substance	ALCOA	Corning Glass Co.	General Motors	Gouverneur Talc	James River Paper Co.	Newton Falls Paper Co.	Ogdensburg STP	Potsdam Paper Co.	Reynolds Metals	Zinc Corp. of America
DDT, metab.	-	-	-	-	-	-	-	-	-	-
Dioxin	-	-	-	-	-	-	-	-	-	-
Mirex	-	-	-	-	-	-	-	-	-	-
PAHs	X	-	-	-	-	-	-	-	X	-
PCBs	X	-	X	-	-	-	-	-	X	-
Aluminum	X	-	X	-	-	-	-	-	X	X
Arsenic	-	-	-	-	-	-	-	-	X	-
Cadmium	-	-	-	-	-	-	X	-	-	X
Chromium	-	-	X	-	X	-	-	-	-	-
Copper	X	X	X	-	X	X	X	-	-	X
Cyanide	X	-	-	-	-	X	X	-	X	X
Iron	-	X	X	X	-	-	-	-	-	X
Lead	-	-	-	-	-	-	X	-	-	X
Mercury	-	-	-	-	-	-	-	-	-	X
Nickel	-	-	-	-	-	-	X	-	-	-
Zinc	X	-	-	X	X	-	X	X	X	X

MUNICIPAL DISCHARGES

Discharge of untreated or partially treated sewage has been greatly reduced or eliminated in many areas of the drainage basin. This has led directly to a substantial improvement in water quality. However, the Stage I RAP has documented reports of eutrophication in localized areas downstream of the Massena Area of Concern (Lake St. Francis), with excess phosphorus identified as the likely cause. Sewage treatment plants and combined sewer overflows are known to be sources of phosphorus to the Area of Concern. These sources and the industrial pretreatment program are discussed below.

Program Description

There are currently 6 major (design wastewater flow greater than 1 mgd) and 15 minor publicly owned treatment works (POTW) discharging to surface water in the St. Lawrence River drainage basin (Table V-2, Stage I). The Clean Water Act requires all POTW's to obtain a permit for discharge to a surface waterway. The authority to issue such permits was delegated by the EPA to the NYSDEC in 1975 (SPDES). All discharge permits in New York State require a minimum of secondary treatment or more stringent treatment as needed to meet water quality standards.

Combined sewers convey both storm water and sanitary waste to the POTWs. Such sewers may also convey industrial waste. In New York State, no dry weather overflows are allowed from a combined sewer system. However, during storm or snow melt events the treatment capacity of the POTW may be exceeded. Such exceedence results in a combined sewer overflow to a surface waterbody. This overflow contains stormwater and sewage, and thus may be a significant short-term pollution source.

Combined sewer overflows (CSOs) are included in municipal SPDES permits as additional discharge points. NYSDEC has provided guidance through the Technical and Operation Guidance Series (TOGS) for decisions in the evaluation of CSOs to ensure that water quality objectives are met. The TOGS calls for the elimination or reduction of CSO discharge whenever possible.

Industrial discharges to POTWs are regulated by the National Industrial Pretreatment Program. The EPA is the pretreatment program approval authority pending delegation of this program to the NYSDEC. Pretreatment programs are required to be developed as follows:

1) Any POTW (or combination of POTWs operated by the same authority) with a total design flow greater than 5 MGD and receiving pollutants from industrial users which pass through or interfere with the POTWs operation or are otherwise subject to pretreatment categorical standards.

2) Any POTW, regardless of design flow, if the nature and volume of the industrial effluent is determined by EPA or NYSDEC to cause: an upset of the treatment process, a violation of the POTWs effluent limitations, contamination of municipal sludge, or other circumstances to warrant a program to prevent interference with the POTW or to prevent pass through of a substance.

Regulations governing the implementation of the pretreatment program direct control of pollutants originating with industrial users discharging to POTWs to be implemented in part by developing local limits to prevent interference or pass through of such pollutants. The meaning of the terms "interference" and "pass through" both involve discharges which cause a violation of any requirement of the POTWs SPDES permit. Therefore, municipal SPDES permits are the primary avenue for controlling such pollutant parameters.

One POTW (Ogdensburg) in the St. Lawrence River drainage basin is required to have a pretreatment program. EPA, with assistance from NYSDEC, monitors the implementation of this program by reviewing the pretreatment reports submitted under terms of Ogdensburg's SPDES permit. Annual pretreatment program inspections or audits are also conducted by the regulatory agencies.

Current Initiatives

There are six municipalities in the St. Lawrence River drainage basin with a total of 32 Combined Sewer Overflows (CSOs):

Facility	CSOs
Alexandria Bay	2
Cape Vincent	3
Clayton	2
Gouverneur	1
Massena	6
Ogdensburg	18

The objectives of the NYSDEC CSO guidance (TOGS) is being applied by NYSDEC when making decisions concerning the municipalities listed above. Also, in two recent (1990) permit renewals (Massena & Gouverneur) the TOGS objectives were added as permit conditions:

A. No dry weather overflows.
B. Minimize CSO through proper operation and sewer system maintenance.
C. No new stormwater source shall be connected to any separate sanitary sewer in the collection system.

D. Extensions of combined sewers shall not be authorized unless approved by the NYSDEC.
E. Sanitary and storm sewers extensions shall be designed and constructed simultaneously but without interconnections.
F. When existing combined sewers are replaced or repaired separate sanitary and storm sewers shall be constructed to the maximum extent possible.
G. Flow to the POTW will be maximized during wet weather.

Conclusions

Municipal permitting programs are operating effectively as water quality has substantially improved in many areas surrounding wastewater treatment plants. Other contaminant sources such as previously polluted sediments are believed to be more significant sources of RAP pollutants of concern than current permitted municipal discharges.

However, all municipalities should operate with the goal of continuous improvement and take steps to reduce or eliminate Combined Sewer Overflows (CSOs) in the drainage basin. Such action would decrease this potentially significant intermittent pollution source. This is especially true for Ogdensburg which has 18 of the 32 CSOs in the St. Lawrence River basin.

Remedial Options

Combined sewer overflows are presently being addressed in the basin as a municipal permit condition. Remedial options for such systems include: enhanced conveyance capability (removal of any sewer system restrictions), increased POTW treatment capability, overflow collection and treatment, development of in-system storage through operational modification, and use of off-system storage for post storm conveyance and treatment.

BOTTOM SEDIMENTS

The Stage I RAP has determined sediments in the Area of Concern to have elevated levels of PCBs, lead, copper, chromium, nickel, zinc, and arsenic. Sediments are also a potential source of mercury, Polynuclear Aromatic Hydrocarbons (PAHs), fluoride, cyanide, aluminum, and furans (PCDFs) to the Area of Concern.

Program Description

No formal regulatory or remedial action programs specific to contaminated sediments currently exist at the Federal, State, or local levels. However, other environmental quality programs may address specific sediment related problems when appropriate. The only regulatory mechanism currently available to clean-up contaminated sediments in the Massena area are the state and federal hazardous waste remedial programs.

Current Initiatives

Sediments in the St. Lawrence, Grasse, and Raquette Rivers are being investigated under the regulatory authority of Federal Administrative Orders. The EPA is the lead regulatory agency for all remedial projects involving river sediments in the Massena Area of Concern. Thus, sediment contamination is being investigated and will continue to be subject to many of the remedial procedures discussed in the hazardous waste section. In addition, the bottom sediments of the St. Lawrence and Grasse Rivers in the Massena area have been listed by New York state as an inactive hazardous waste site.

The river segment listed as an inactive hazardous waste site by New York includes the St. Lawrence River from the St. Lawrence-Franklin County line upstream to Snell Lock, and along the south shore of the river excluding the shipping canal; also the Grasse River from the Massena power canal discharge to the river mouth. PCB sediment contamination is concentrated near the ALCOA, Reynolds Metals, and General Motors' discharge points.

The General Motors' hazardous waste site Record of Decision (12/17/90) has determined that contaminated sediment hotspots in the St. Lawrence and Raquette Rivers and Turtle Creek will be dredged to remove PCBs. EPA estimates there are 62,000 cubic yards of sediments with PCB concentrations above 1 ppm that must be removed from the river system. Treatability tests will be conducted during the remedial design phase to determine if biological treatment, incineration or another innovative technology is most appropriate for sediment treatment.

NYSDEC is the regulatory lead for remediation of the ALCOA and Reynolds Metals inactive hazardous waste sites. These sites are mainly land-based and generally associated with contamination of the respective companies plant sites. However, they include sediments in tributaries to the St. Lawrence, Grasse and Raquette Rivers including creeks, ditches, wetlands and lagoons. The New York State inactive hazardous waste site program is continuing in these areas.

The NYSDEC Division of Water includes sediment sampling in its water quality monitoring program and conducts studies in contaminated sediment problem areas. One such study is the Hudson River research/demonstration project. This project is attempting to dredge and encapsulate PCB contaminated sediment while also investigating destruction technologies such as biodegradation and incineration. The lessons learned from such projects may assist the RAP. Contaminated sediments are also a component of the NYSDEC nonpoint source management program.

At the federal level, the EPA Great Lakes National Program Office is currently conducting a five year study and demonstration program to determine methods for the control and removal of contaminants from bottom sediments. This Assessment and Remediation of Contaminated Sediments (ARCs) program was authorized under Section 118 of the 1987 Water Quality Act. New York's Buffalo River is one of five national demonstration projects being used to assess environmental concerns, study potential remedial technologies, and evaluate the environmental and economical effectiveness of remediation. Many types of potential remedial technologies are being investigated by this program including: solidification/stabilization, extraction, chemical treatment and biological treatment. The technologies evaluated in this project may be transferable to the Massena Area of Concern.

In addition, the EPA is currently developing sediment clean-up criteria for use in risk management decisions. These criteria will be released in a series of reports beginning in 1991. The Army Corps of Engineers is also presently evaluating sediment remediation technology including dredging and confined aquatic disposal.

Conclusions

Before the advent of the Clean Water Act, many years of unregulated industrial and municipal discharges have resulted in bottom sediments with elevated levels of contaminants in the Massena Area of Concern. Rural and urban runoff and atmospheric deposition may also have contributed to this problem. Such contamination may result in bioaccumulation of toxic materials through the food chain.

Although there is not a regulatory or control program specific to contaminated sediments, major contaminated sediment sources, such as those found in the Massena area, receive regulatory and remedial attention through the inactive hazardous waste site program.

Remedial/Control Options

In order to determine the need for remediation and evaluate the options available for remediating contaminated sediments the following obstacles must be overcome:

1. **Investigations** - The location and extent of the contaminated sediment problem must be determined by sediment sampling and investigations (complete near General Motors & Reynolds Metals). However, investigations are complicated due to the heterogeneous nature of bottom sediments. Contamination may in some cases be widespread due to resuspension from currents, waves, boats, etc. Also sediment dynamics often vary with flow, eroding during high flow and depositing during low flow.

2. **Risk Assessment** - The risks from contaminated sediments to human health, fish and wildlife, water quality, etc., must be determined. Also the effects bioaccumulation may have on the environment must be evaluated. NYSDEC has developed guidance (based on EPA methodology) for the use of sediment data to protect aquatic organisms that would be indirectly exposed to contaminants in sediment. This guidance uses equilibrium partitioning for generating sediment criteria for non-polar organics. The NYSDEC Clean-up Standards Task Force is currently evaluating different approaches at defining clean-up criteria for the protection of human health and the environment. The question of what level of contamination in bottom sediments is acceptable for protecting human health, fish, wildlife and other aquatic organisms must be answered. Only then can the need for sediment remediation be properly evaluated and intelligent choices concerning remedial options be made.

3. **Remediation** - The selection of the final remedial option (if needed) is complicated because the environmental management of contaminated sediments is in its infancy. Few remedial actions on sediments contaminated with persistent toxic substances have been completed, making the effectiveness of the various alternatives difficult to determine. To date, few remedial options that are environmentally sound, technically feasible, cost effective and also acceptable to the public have been completed.

The remedial options available for contaminated sediments are summarized in Table 2-6. In all cases the "no action" alternative should be also evaluated. Options involving dredging may cause some sediment resuspension, however, techniques are available to minimize the effects.

Resuspension of sediments is only one factor that determines bioavailability of contaminants. There are many other factors that determine contaminant bioavailability including sediment type, particle size, total organic carbon content, biological activity and hydrology among others.

Table 2-6
Summary of Available Remedial Action Techniques for Contaminated Sediments[1]

Technique	Function	Application/Restrictions[2]	Estimated Costs
Excavation & remedial action	Dredging or excavation of sediments followed by remedial options which permanently treat, destroy or immobilize all of the contaminants of concern.	The hazardous waste remedial options in Table 2-4 may be used.	Varies with chosen remedial option.
Confined Disposal Facilities (CDF)	Dispose of material in an isolated, diked location in the water or along the shore.	The most common contaminated sediment disposal practice; may create wetlands or islands; requires maintenance to prevent erosion and leakage. Little long term data on effectiveness.	$4 per cubic yard
Depositional zone placement	Open water disposal of dredged sediments.	May be capped with clean sediments. Difficult to monitor and confirm adequate placement.	$0.26 per cubic yard per mile (transportation cost)
Contained aquatic disposal	Cover sediments in-situ or relocate and cover with clean sediments.	Successfully demonstrated in Long Island Sound NY Bight. Reduces direct contact with fish and other biological life. Navigational use may preclude in-situ capping; erosion may be a factor; little long-term data on effectivenss.	$14-35 per cubic yard (estimated cost is $5/yd^3 for NY Bight - USEPA)
Land Disposal	Dispose of sediments in landfills.	Material must be dredged and transported; dewatering and material handling problems. Cost and availability of landfill space must be considered.	$90-200 per ton

Table 2-6 (cont'd.)
Summary of Available Remedial Action Techniques for Contaminated Sediments*

Technique	Function	Application/Restrictions	Estimated Costs
Solidification	Incorporate waste material into an immobile matrix such as cement, resin or grout.	In-situ techniques are unproven. Solidification following dredging not proven with sediments but has been done with other wastes. May leach from matrices over time.	$40-75 per cubic yard (dredged)
In-situ treatment	Biological or chemical treatment in place.	No need to move contaminated sediments; has not been demonstrated nor proven for toxics.	
Off-site treatment	Excavation and treatment to reduce or eliminate toxicity.	May be treated and replaced or treated and disposed. Other methods of hazardous waste treatment may be used; see Table 2-4.	
Beneficial uses of dredged sediments	Agricultural landspreading; beach nourishment; upland fill for recreation; quarry/strip mine reclamation.	Primarily for non-toxic sediments, therefore may not be applicable to the AOC.	

[1] Material for this table was obtained from:

IJC (1988). Report to the Great Lakes Water Quality Board: Options for the Remediation of Contaminated Sediments in the Great Lakes.

[2] Any remedial options involving dredging may cause some sediment resuspension, however, techniques are available to minimize effects.

NONPOINT SOURCES

The Stage I RAP identified nonpoint pollution as a potential source of pollution to the Area of Concern. Nonpoint source pollution in the Massena Area of Concern is believed to have two primary origins: contaminated sediments, which were discussed in the previous section, and agricultural runoff.

A Nonpoint Source (NPS) may be an areawide source or many small sources distributed diffusely over an area which cumulatively result in water quality degradation. Contaminants enter surface waters either dissolved in runoff or attached to sediment or other materials. Contaminants also enter groundwater by infiltrating through soil. Agricultural sources of phosphorus in the St. Lawrence basin likely include fertilizer applications to cropland, land disposal of animal waste from livestock operations, barnyard runoff, and livestock access to streams.

Current Programs

Addressing nonpoint source pollution involves a broad array of program activities on the part of several federal, state and local agencies. The NYSDEC has lead responsibility in New York by virtue of its statutory authority for the management of water resources and control of water pollution.

There are several existing federal, state and local programs that can be used to reduce agricultural NPS pollution in the St. Lawrence River drainage basin. Many of these programs are listed in Table 2-7. While the total amount of activity that may be considered NPS control-related during the past few years has been substantial, collectively, the activities have not constituted a defined program. However, the Water Quality Act of 1987 has provided new direction and authorized federal assistance for the preparation and implementation of state NPS programs.

As required by the Water Quality Act, the state submitted an assessment report[1] (2/89) to the EPA. This report identified those waters that cannot reasonably be expected to attain or maintain applicable water quality standards or the goals and requirements of the Clean Water Act due to NPS pollution. It also described the specific NPS categories that affect these waters, and general programs and methods used for controlling NPS pollution. The state also submitted a NPS management program[2] (1/90) to the EPA. Such a plan provides an overview of New York's NPS program and identifies objectives for the next four years. Both reports were approved by the EPA.

Conclusion

The primary agricultural inputs of nonpoint pollutants, (particularly phosphorus and sediment) to the basin are expected to come from the numerous dairy farms in the region. Water quality degradation may result from improper land application of animal

Table 2-7
Existing Agencies' Programs for Controlling Agricultural Nonpoint Source Pollution

County Soil and Water Conservation Districts
New York Soil and Water Conservation Committee
Cornell Cooperative Extension Service
USDA Agricultural Conservation Program
USDA Conservation Operations Program
USDA Conservation Reserve Program
USDA Food Security Act
USDA Inventory and Monitoring Program
USDA Forestry Incentives Program
USDA Resource Conservation and Development Program
USDA Watershed Protection and Flood Prevention Act
NYSDOS Coastal Management Program
NYSDEC Nonpoint Source Management Program
NYSDEC Clean Lakes Program
NYSDEC Pesticide Management
NYSDEC Stream Corridor Management
NYSDEC Groundwater Program
NYSDEC Great Lakes Phosphorous Reduction Plan
NYSDEC Stream Protection Permit Program
NYSDEC Stream Habitat Improvement
NYSDOH Public Water Supply Program

NYSDEC = New York State Department of Environmental Conservation
NYSDOH = New York State Department of Health
NYSDOS = New York State Department of State
USDA = United States Department of Agriculture

For more information on any of these programs, please refer to Chapter 5 of the NYSDEC Nonpoint Source Assessment Report, February 1989[1].

waste, barnyard runoff, cattle wading in streams, row cropping (primarily for silage corn), etc. Eutrophic conditions and excess algal growth have not been reported in the Massena Area of Concern. This is probably because of the high flow rates of the St. Lawrence River which remove nutrients contributed by agriculture and other sources. However, algal blooms have been noted downstream of the Massena Area of Concern in Lake St. Francis, where flow rates are reduced and nutrients can more readily be used by vegetative forms, including algae.

While existing programs have operated over the years to reduce agricultural NPS pollution in the basin, these programs have had limited funding and were not always well coordinated with each other. Continued progress is essential to maintain phosphorus load reductions already achieved and to implement further reductions where necessary.

The future must hold an accelerated effort to control agricultural as well as other nonpoint sources of pollution. Although the new Nonpoint Source Program is a positive step to integrate these programs, increased funding and staffing will be required at both the local and state levels of government to implement needed programs.

Remedial/Control Options

Many programs control agricultural pollution directly by aiming to conserve and manage soil and water resources within the basin. These programs are administered by a number of local, state and federal agencies. Participation is normally voluntary in such programs which include elements of financial incentives, technical assistance, technology transfer, and education.

Existing programs such as those directed by County Soil and Water Conservation Districts and the U.S. Department of Agriculture should focus on water quality concerns. These programs should be concentrating their efforts in areas where the agricultural sources are having an impact on water quality.

To control agricultural pollution, agencies use management practices that prevent or reduce the availability or transport of undesirable materials. These practices are essential tools to link water quality with the land management activities of pertinent agencies and with the activities of local government. Since most of the institutional capability for implementing management practices to control NPS exists at the local level, cooperation and coordination among agencies is essential.

Specific agricultural nonpoint sources that need to be controlled in the St. Lawrence basin likely include row cropping (silage corn) on inappropriate sites which results in excessive soil erosion; improper timing and excessive rates of fertilizer application; uncontrolled runoff from livestock concentration areas; and improper land spreading of animal waste. Animal wastes are a valuable source of nutrients for crop production and an inexpensive soil enhancer/conditioner. Therefore, control options should emphasize proper spreading techniques, not elimination of land spreading.

Sound soil, water and nutrient management practices should be implemented on specific farms identified as significantly contributing to the agricultural nonpoint pollution problem. Practices should be selected based on the nature of the farm's pollution problem, the suitability to the farm's operation and budget, and the availability of funding sources. Guides to the selection of agricultural management practices for improving water quality are available from the NYSDEC[3,4].

References

[1] NYSDEC (6/90). New York Nonpoint Source Assessment Report for St. Lawrence County, Bureau of Water Quality Management.

[2] NYSDEC (1/90). Nonpoint Source Management Program, Bureau of Water Quality Management.

[3] Longabucco, P. (1991). Controlling Agricultural Nonpoint Source Pollution in New York State: A guide to the selection of best management practices to improve and protect water quality. NYSDEC, Albany, NY.

[4] NYSDEC (1991). Management Practices Catalog: Agriculture. NYSDEC, Albany, NY.

AIR TOXICS

Pollutants released to the atmosphere eventually fall back to earth. Such pollutants may be deposited directly to waterbodies or deposited on the landscape, where they may be carried to waterbodies during runoff events. The evidence has been mounting that air emissions from man-made sources may significantly contribute to the loadings of certain pollutants, such as PCB's, into the Great Lakes[1]. Therefore, atmospheric deposition may be a significant nonpoint source of pollution to the Great Lakes basin. However, there is no direct evidence that air sources are affecting water quality in the Massena Area of Concern.

Program Description

The EPA has established a national program to develop control requirements for the sources of air toxics. In addition to establishing National Emission Standards for Hazardous Air Pollutants (NESHAP) under Section 112 of the Clean Air Act, EPA

provides technical and financial support to State agencies for the development and implementation of air toxics programs.

The New York State DEC has a comprehensive air toxics program. NYSDEC's Bureau of Air Toxics mission is to provide a coordinated, technically current regulatory approach for the control of emissions of chemical substances for which no federal ambient air quality standards have been developed. The New York State regulation, 6 NYCRR Part 212, and New York's Air Guide-1, entitled "Guidelines for Control of Toxic Air Contaminants", provide the regulatory base upon which New York's air toxics program is built.

Air Guide-1, an engineering document, contains specific chemical control guidance for over 240 chemicals separated into three categories: high toxicity air contaminants, moderate toxicity air contaminants, and low toxicity air contaminants. The higher the toxicity, the more stringent the control requirements become.

Air Guide-1 provides New York's regionalized air pollution control program staff with a screening mechanism to determine the control requirements necessary for a source seeking a new or renewed permit. As part of this review, the applicant must evaluate the predicted maximum ambient impact of the chemical contaminant with the acceptable ambient level for the chemical contaminant in Air Guide-1 to determine acceptability or the amount of emissions reduction required. NYSDEC may also require stack testing at specific air emission sources to assure compliance with appropriate standards.

The NYSDEC Division of Air conducts routine air monitoring through its Ambient Air Monitoring System. The system is designed to measure compliance with ambient air quality standards and provide long-term air quality trend data. In 1985 New York created two new statewide air monitoring networks: air toxics and acidic deposition. NYSDEC also operates a mobile laboratory to monitor ambient air quality called the Trace Atmospheric Gas Analyzer (TAGA).

The NYSDEC is using the networks to gather information and understand the levels of specific pollutants that travel through the atmosphere. The network will help identify the amounts of certain airborne heavy metals and volatile and semivolatile organics present in New York State air. Data from the network will also assist in understanding transport and conversion mechanisms as they relate to the movement of airborne toxics in the atmosphere. Such knowledge is essential if effective control programs to protect the Great Lakes/St. Lawrence basin and other areas from airborne toxics are to be developed.

Fluoride emissions from the two primary aluminum reduction industries, ALCOA and Reynolds Metals, represent the major air pollution concern in the Massena area. Therefore, 16 forage grass sites are sampled monthly during the growing season (May -

September) and analyzed for total fluorides by NYSDOH. There has been a general trend of decreasing levels of fluoride on vegetation over the years (four sites have been sampled since 1973). However, the two sampling sites closest to ALCOA and Reynolds (neither is currently used for agricultural production) exceed allowable fluoride levels.

Current Initiatives

The NYSDEC Division of Air Resources conducted ambient air sampling with the TAGA mobile laboratory in the Massena Area of Concern in November 1988, August 1989, September 1990 and June 1991. The purpose of these visits was to determine if ambient air quality in the Massena Area of Concern has been impacted by industrial emissions or hazardous waste site remediation. A "Massena Ambient Air Survey" report[2] was recently released by NYSDEC. Its findings are summarized below:

- Fluoride on vegetation at the two sampling sites closest to ALCOA and Reynolds exceed allowable levels.

- Ambient hydrogen fluoride levels directly downwind of Reynolds (1/4 mile) are significant and there is no assurance the 12 hour standard of 4.5 ppb could be achieved if the sampling time (5 hours) was extended. No measurements could be made at ALCOA due to unfavorable wind conditions and inaccessibility of monitoring locations.

- Future sampling should include additional organic compounds which may need to be addressed.

- PCBs were detected (53 and 73 ng/m^3) in air samples on the St. Lawrence River in the vicinity of General Motors.

- PCB vapors were detected in the 200 ng/m^3 range approximately 30 yards downwind of soil excavation work at Reynolds. Therefore, it is necessary to consider PCB transport via the air pathway in remedial work.

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

The recently adopted Federal Clean Air Act will significantly strengthen existing air regulations as the Act's conditions are interpreted and administered in the future. Provisions affecting the Great Lakes basin include:

- An EPA study on the toxic pollution of the Great Lakes resulting from atmospheric deposition. By November, 1995 the EPA must use the results of this study to develop regulations, if necessary, to combat the air toxics problem.

- EPA must list sufficient area source categories to regulate 90% of emissions of the 30 most hazardous area source pollutants. Regulations requiring generally available control technology for the sources must be adopted by the year 2000.

- EPA must propose a national urban air toxics strategy by 1995, which contains specific actions designated to reduce cancer risks from urban sources by 75%. This strategy must be fully implemented by 1999.

Conclusions

Air toxics do not recognize established boundaries such as the Area of Concern, drainage basins etc. Pollutants may travel great distances in the atmosphere before their effects are manifested. Therefore, the determination of atmospheric sources of pollutants to the surface waters of the Area of Concern and the St. Lawrence River drainage basin is outside the scope of this plan.

The air toxics problem should be solved at the State and regional level if appreciable progress is to be made. The initiatives discussed above are some examples of current activity that will impact facilities in the Area of Concern and the drainage basin. Additional measures will be proposed in the international Lake Ontario Lake Management Plan and other State, regional and national initiatives.

References

[1] Strachan and Eisenreich, 1988. Mass Balancing of Toxic Chemicals into the Great Lakes: The Role of Atmospheric Deposition, IJC.

[2] Mo, S.H., (1991). Air Study 229, Massena Ambient Air Survey, September 16-19, 1990, NYSDEC.

SEAWAY RELATED SOURCES

The construction of the Saint Lawrence Seaway and the Moses Saunders Power Project changed the character of the river and caused significant ecological change. The Power Project encouraged industrial development of the Massena-Cornwall area which has contaminated the water and left residual contamination in the river sediments. Seaway traffic has introduced exotic species such as the Zebra Mussel into the ecosystem. There has also been occasional oil and chemical spills from ships as well as dredging and physical modifications to the river. The change in character of the river and the blocking of fish migration by the dams has altered habitats and caused a change in plant, fish and wildlife species abundance in the Area of Concern.

The Seaway Construction

The first locks to allow navigation around St. Lawrence River rapids were constructed in 1783 between St. Francis and Lake St. Louis. Additional locks and canals were constructed and in 1847 barges and boats with a nine foot draft could travel from Montreal to Lake Ontario. By 1875 canals and locks had been enlarged to accommodate 14 foot draft vessels.

A water route for large ships from the Atlantic to the Great Lakes was conceived in 1892 by U.S. Representative John Lind of Minnesota but it was not constructed until after large iron ore deposits were discovered in Labrador. The St. Lawrence River was seen by the United States as a logical transportation route to deliver the ore to American Steel Mills. The American Seaway Act authorizing the American portion of the Seaway was signed in 1954. The Canal system, constructed between 1955 and 1959 allows ships up to 76 feet wide and 730 feet long with a maximum draft of 26 feet to transit from the Atlantic Ocean to the Great Lakes. The St. Lawrence River section of the Seaway replaced an existing Canadian 14 foot canal system which was limited to ships less than 260 feet long, 43 feet wide, and 14 foot draft.

Construction of the Seaway commenced in January 1955 and was completed in 1959 at a cost of $470 million dollars shared by Canada ($336.5 million) and the United States ($133.8 million). The Seaway was opened to traffic in June 1958 with President Eisenhower and Queen Elizabeth presiding at the dedication.

The Seaway and related construction which effects the Massena area consists of

- The Bauharnois Power Dam and lock complex near Valleyfield Quebec which controls the water levels in Lake St. Francis from the dam upstream to the Moses Saunders Dam. These works were initially constructed about 1930.

- The Moses Saunders Power Dam which controls the water levels of the Upper St. Lawrence River and Lake Ontario. The Moses Saunders Power Dam contains a major hydropower generating facility shared by the New York Power Authority and Ontario Hydro.

- The Long Sault Dam between the U.S. Mainland and Barnhart Island. It normally operates as a water level control structure for the power pool, but is capable of passing the entire river flow when necessary.

- The Eisenhower and Snell Locks, with the connecting portion of the Wiley Dondero Canal which allow ships to transit around the Moses Saunders Dam.

- The Iroquois Dam and Lock located near Iroquois Ontario, which is an emergency water level control for the Upper St. Lawrence River and Lake Ontario and may be used to help form a stable ice cover above the dam and to limit the ice movement downstream. The Dam is normally operated in a flow through mode with the lock open. The Lock is used when the dam is in operation.

The shipping season normally extends from April to mid December, with the opening and closing dates determined by the weather and ice cover.

The Seaway has seen a decrease in shipping from its' peak of 57,450,000 tonnes in 1977 to 37,000,000 tonnes in 1989. The current primary cargo transported through the Seaway is Bulk Cargo (56%). Other commodities such as grain which was once the primary Seaway cargo have decreased in volume shipped. General cargo has been increasing in importance although it is down from it's maximum shipments in 1967 to 1972. The number of ships transits in the Montreal-Lake Ontario section in 1989 was 2768 trips, down from a peak of 7542 in 1959 and 7341 trips in 1966.

Seaway officials are attempting to promote Seaway use to both domestic shippers and to foreigners which ship to middle American markets.

Habitat

The St. Lawrence River, prior to dam construction was a free flowing river from it's source at Lake Ontario to the tidewater at Montreal. The surface gradient from Lake Ontario to Ogdensburg was essentially flat. Between there and the mouth of the Grasse River, were a series of rapids where the river elevation dropped 89 feet, primarily in the Galop Rapids (9 feet), the Plat Rapids (12 feet), and the Long Sault Rapids (30 feet). About one third of the total river drop from Lake Ontario to Montreal was in the International Rapids section. There were also major rapids near Montreal where the River dropped a total of 133 feet.

The river and adjacent wetlands afforded outstanding habitat for a wide variety of fish and wildlife species including Walleye, Pike, Sturgeon, and various waterfowl. The St. Regis Mohawks had a thriving commercial fishery for Walleye and Sturgeon which no longer exists. It is reported that approximately one third of the Mohawk Peoples' diet comprised of fish taken from the rivers.

The construction of the Moses-Saunders Dam and associated structures changed the character of the River, especially the International Rapids Section by changing the river to a lake (Lake St. Lawrence). It also modified the water level cycles upstream of the Dam by eliminating the extreme highs and the extreme lows, blocked fish migration and eliminated important spawning locations for those fish such as Sturgeon and Walleye which spawn in rapids.

The construction of the Wiley Dondero Canal from Long Sault Island to the Snell Lock, the flow modification structures to assist navigation at the lower end of Snell Lock, and the channel dredging downstream of the lock to the International Border have also caused significant changes. There has been a degradation of habitat quality caused by contaminant releases from ALCOA, Reynolds, and General Motors into the AOC. Poly Chlorinated Biphenyl compounds (PCBs) are of special concern.

There is little detailed information on the habitat changes caused by Seaway construction and operation because of the lack of pre-Seaway habitat studies. However, general statements may be made based on observations:

- The rapids, which were needed habitat for species such as Walleye and Sturgeon have been replaced with calm water. There was a Carp population explosion in Lake St. Lawrence shortly after it's creation.

- The power dam and locks interfere with movement of fish and may be a major cause of the Sturgeon population decline in Lake St. Francis.

- The controlled water levels upstream of the dams have prevented the natural cycle of wetland vegetation removal and renewal from occurring, and many wetlands are becoming "cattail deserts" with lowered fish and wildlife productivity.

- Short term variations in water levels for maximizing power production have encouraged ice scouring in the shallow water of Lake St. Lawrence which tends to create an unvegetated unproductive lake bed.

- Higher water levels behind the dams resulting from the seaway construction has accelerated erosion in some areas such as the steep clay banks near Red Mills and Waddington. These banks were left bare and have not revegetated. The extent of soil erosion and it's consequence is unknown.

- Ships' wakes are believed by some to cause accelerated erosion and bottom disturbances in some areas.

- The flooding of terrestrial areas has created large shallow areas which encourage eutrophication and emergent weed growth.

Dredging

Extensive dredging was done in the AOC to develop the shipping channel from 1956 to 1959. The size of the channel was determined by the need to have a minimum depth of 27 feet for navigation, and upstream of the Moses Saunders dam to ensure a river flow velocity of less than 2.25 feet per second which allows a stable ice cover to form during the winter. The stable ice cover is needed to prevent ice jams which can restrict the flow of water and lower the generating head at the Moses Saunders dam during winter months.

Channel construction required about 6,500,000 cubic yards of material to be dredged between Snell Lock and the International Boundary. About 13,000,000 cubic yards of material was dredged to create the channel between the Eisenhower and Snell locks, and 4,500,000 cubic yards of material were dredged upstream of the Eisenhower lock to head of Long Sault Island. The dredged materials were deposited on nearby shore and island areas.

Periodic maintenance dredging is required to maintain adequate depth in the shipping channel. Recent dredging projects have been to remove silt and channel wall material which had sloughed into the channel as well as remove ridges at the lock entrances caused by vessel anchor dragging.

The most recent dredging has been:

1988 15,000 c.y. work upstream of Snell Lock for dock development.

1990 28,000 c.y. work in Wiley Dondero Canal between locks and upstream of Eisenhower Lock.

Dredged materials are disposed of in an approved upland disposal area after testing to determine they meet land disposal criteria.

Conclusion

A maintenance dredging program to maintain channel depths and widths will be needed so long as the seaway operates. Dredged material is now disposed of on upland disposal sites after testing to ensure it will not contaminate ground or surface water.

The levels of contamination found to date in channel dredging has been low and within land disposal guidelines. The levels are expected to decrease as pollution control programs become more effective.

Dredging of river sediments from areas other than the Seaway channel must be subjected to extensive chemical testing to establish permissible disposal methods. Dredging methods which minimize sediment release and downstream transport must be selected where contaminated sediments are encountered.

Petroleum and Chemical Spills

Background

Spills of petroleum and chemicals into surface water can have devastating ecological and economic consequences to the areas where they occur. All spills into the waters of New York State, including both ground and surface water must be reported to the NYS Spill Hotline within two hours of the spill or its discovery. Spills into the St. Lawrence River or other navigable waterways must also be reported to the National Spill Reporting Hotline.

Shipping related activities are in the jurisdiction of the United States Coast Guard or Canadian Coast Guard. While ships are in the Seaway, they are under the control of the St. Lawrence Seaway Development Corporation or its Canadian counterpart, the St. Lawrence Seaway Authority. The United States Coast Guard has the primary responsibility for St. Lawrence River spill response.

The USCG has a Joint U.S.-Canada spill response plan in place. The Saint Lawrence Seaway Development Corporation (SLSDC) has also developed a "first response" plan to use until the Joint U.S.-Canada plan is implemented. The NYSDEC is a member of the Regional Response Team which would direct the response to any major spill.

Shipping associated spills in the Massena area have been very infrequent. There have been three major spills of the past 30 years which affected the Area of Concern. They are:

- The NEPCO 140 spill of June 23, 1976. The barge NEPCO 140 hit a shoal near Alexandria Bay and lost about 300,000 gallons of number 6 fuel oil. Oil was carried downriver and cleanup was necessary as far as the Moses Saunders Dam. The cleanup was completed October 22, 1976 with the total cost exceeding $8,500,000.

- The M/V Beograd spill of May 23, 1983. The M/V Beograd overfilled a fuel tank while transferring fuel to correct a list. An estimated 6,000 gallons of oil was lost overboard between the Eisenhower lock and the Iroquois Lock. Much of the shoreline in Lake St. Lawrence was contaminated with oil. Cleanup was completed in early July and cost an estimated $500,000.

- The Snell Lock xylene spill of July 26, 1989. The Lake Anne Master Ketil VE struck the lock wall and ruptured two holds. Approximately 4000 gallons of xylene was lost but was contained in the lock. The cleanup was completed within the lock and no free product was released to the River.

Other reported spills affecting the AOC are primarily from the industrial facilities which periodically report small spills from their industrial outfalls. These include occasional chemical spills as well as petroleum releases.

Program Description

Both the State and federal governments require that all spill of petroleum and chemicals be reported and be cleaned up where possible. Both governments likewise have spill funds which may be used for cleanup where the spiller refuses to accept responsibility of is unknown. The NYS program is supported by a license fee of $.04 per barrel of petroleum produce which is charged to the operator of Major Petroleum Storage Facilities.

The SLSDC will normally be the first agency notified of a commercial vessel related spill and has developed an extensive response plan, including computer modeling of the spill movements, to use and support the USCG response and management of the spill cleanup.

Current Initiatives

There is discussion toward requiring vessels which transport oil or hazardous materials to be constructed with double hulls. There are also reoccuring proposals to require all ships in the St. Lawrence Seaway System to be under the control of a licensed pilot.

Conclusions

The incidence of shipping related spills in the St. Lawrence Seaway is amazingly low, although when a large spill occurs, it can be ecologically devastating and very expensive to clean up. The major emphasis must be on preventing spills. It is also necessary to have an effective spill response plan when the inevitable spill occurs.

LAKE ONTARIO

The Stage I Remedial Action Plan (Chapter 5) identified Lake Ontario and its sources as a known source of PCBs, mirex, dioxin, DDE, and mercury to the Area of Concern. Consequently, the long-term reduction of contaminant loadings to Lake Ontario will in turn effect the remedial efforts in the St. Lawrence River near Massena.

Control of Lake Ontario and other sources in the upper Great Lakes are beyond the scope of the St. Lawrence River RAP. However, they are being addressed under several other Remedial Action Plans as well as two other binational management plans, the Niagara River and Lake Ontario Toxics Management Plans.

The Lake Ontario Toxics Management Plan (LOTMP-2/89) was developed jointly by the United States Environmental Protection Agency, Environment Canada, the Ontario Ministry of the Environment, and the NYSDEC. The LOTMP addresses the problem of lakewide contamination through planning and commitments by the agencies to specific actions to control toxics in Lake Ontario. The role of the LOTMP in relation to the RAP is discussed on page IV-33 of the Stage I document.

Under the GLWQA, lakewide management plans (LAMP) for the Great Lakes must be prepared that document impaired uses, critical pollutants, and strategies to reduce loadings of those pollutants causing impairment. A binational LAMP for Lake Ontario is proposed and will address contaminants likely adding to the identified impairment in the Massena AOC.

CORNWALL AREA OF CONCERN

The St. Lawrence River Area of Concern is a shared US/Canada responsibility. Two RAP programs are currently in progress to identify impairments, sources and remedial actions in the area. Development of separate RAP programs in each country is necessary to address the practicalities of planning and remediation under different regulatory jurisdictions.

The Stage I Massena Remedial Action Plan identified the Cornwall Area of Concern as a known source of mercury and nutrients to the basin. Impairments and sources from the Cornwall AOC have been described in the Canadian Stage I report (Environment Canada, et al, 1990). The Canadian Stage II RAP will determine necessary remedial actions in the Cornwall/Lake St. Francis area due to identified sources in Cornwall.

For more information on the Cornwall RAP, please contact:

Environment Canada
Great Lakes Environmental Office
25 St. Clair Avenue, East
Toronto, Ontario M4P 1M2

CHAPTER 3

RECOMMENDED REMEDIAL STRATEGY

The Remedial Action Plan (RAP) water quality goal was identified in Chapter 3 of the Stage I RAP. This goal which was jointly developed by the NYSDEC, Ontario MOE (which is developing a RAP for the Canadian AOC at Cornwall) and the Citizens Committees of both countries is:

> The goal of the Cornwall and Massena Remedial Action Plans is to restore, protect, and maintain the chemical, physical, and biological integrity of the St. Lawrence River ecosystem, and in particular, the Akwesasne, Cornwall-Lake St. Francis and Massena Area of Concern in accordance with the Great Lakes Water Quality Agreement. The goal of the Cornwall and Massena Remedial Action Plans includes protecting the downstream aquatic ecosystem from adverse impacts originating in the Akwesasne, Cornwall-Lake St. Francis and Massena Area of Concern.

The recommended remedial strategy to restore the beneficial uses to the Area of Concern and to meet the RAP goals is described in this chapter. Each potential source to the Area of Concern is discussed separately, with recommendations made for the remediation of each source. These recommendations make up the remedial strategy to meet the RAP goals. Specific commitments to begin implementation of this remedial strategy will be discussed in the following chapter.

The recommendations for the remedial strategy are made as specific as possible based on current knowledge within the St. Lawrence River basin. As additional information becomes available this strategy will be updated to reflect the necessary changes.

HAZARDOUS WASTE SITES

An ongoing program for the remediation of hazardous waste sites is being coordinated by EPA and NYSDEC. This program is described in Chapter 2.

All of the required Phase I investigations (existing data accumulation and assessment) at sites within the St. Lawrence River basin have been completed. Also, all required Phase II investigations (preliminary field investigations to obtain additional data for site assessment), have either been completed or are currently in progress. Most sites have advanced to the remedial investigation\feasibility study phase and have completed Interim Remedial Measures (see Table 2-3).

The RAP looked at evidence gathered in these investigations for all sites considered to be potential sources of contaminants to the Area of Concern. The sites were categorized based on their likelihood to be a source of contamination to the Massena Area of Concern (Table 2-3). The criteria for this categorization is shown in Table 2-2.

Hazardous Waste Site Remediation

Based on the categorization criteria, (Chapter 2), ten hazardous waste sites have been determined to be likely sources to the Area of Concern:

ALCOA (7 sites)
General Motors (on land and river sediments)
Reynolds Metals
St. Lawrence-Grasse River Sediments (ALCOA & Reynolds)

Remediation of these sites is considered critical to meet the goals of the RAP. Therefore,

Recommendation 1: High priority for clean-up should be given to the ten hazardous waste sites thought to be likely sources of contaminants to the Area of Concern.

ALCOA, General Motors, and Reynolds Metals are considered to be the major potentially responsible parties for the contamination in the Massena Area of Concern. This contamination is in various media (soil, sediments, groundwater, etc.) both on-site and off-site of the respective industrial facilities. The actual commitments for hazardous waste clean-ups in the St. Lawrence River drainage basin are discussed in the next chapter.

Transboundary Impacts

There are many jurisdictional boundaries near Massena: United States/Canada/Akwesasne/New York/Ontario/Quebec. Thus, the Stage I RAP added transboundary impacts as a fifteenth water resource use impairment indicator. Indirect information exists that provides evidence of downstream impacts on aquatic resources from sources originating in the Massena AOC, the Cornwall AOC, and upstream (Stage I, pages IV-27 to IV-31). Therefore,

Recommendation 2: Remedial initiatives in the Massena Area of Concern should be accomplished with full consideration of the possible transboundary effects to both the Akwesasne and Canadian environment.

Implementation of this recommendation will assure consistency with the goal established for the RAP in Stage I and repeated at the beginning of this chapter.

The selection and implementation of the remedial program in the Massena area should be done in a manner that will minimize cross-media and downstream contamination. Appropriate environmental monitoring is critical to confirm there are no adverse impacts during remediation. In addition, long term environmental monitoring is needed to assess current and future environmental quality conditions. New York, the Canadian governments, EPA and the Mohawks at Akwesasne have agreed to consider a joint-international environmental quality monitoring program addressing the Massena/Cornwall Area of Concern.

INDUSTRIAL DISCHARGES

The conclusion made in this document (Chapter 2) for permitted industrial discharges is that further action on current dischargers beyond that provided through the normal operation of the SPDES program, will not be necessary to solve the problems in the drainage basin. The SPDES program is gradually tightening permitted discharges and will continue to do so in the future.

SPDES Program

The current SPDES program generally controls discharges to the full extent of the law and industrial point source discharges are often at the limits of current technology. However, one of the goals of the Great Lakes Water Quality Agreement (GLWQA) is the virtual elimination of the discharge of persistent toxic substances (zero discharge). Therefore, additional measures such as pollution prevention (in plant point source reduction, process changes), waste minimization (total industrial plant water use minimization), antidegradation, innovative or upgraded waste treatment capability, etc. will be needed to assure current point source discharges will meet this goal.

The renewal of SPDES permits in the St. Lawrence River basin should consider steps toward this GLWQA goal through lower discharge limits. Such an action would not only lower the loadings to the Area of Concern, but would also lower the loadings to downstream areas such as Lake St. Francis. Therefore,

Recommendation 3: Continue to lower allowable discharges in SPDES permits (especially for RAP critical pollutants: PCBs, heavy metals, PAHs) by incorporating changes in legal authority, improved analytical detection limits (thereby allowing more extensive use of water quality based limits), more stringent technology based limits and/or more stringent water quality standards whenever technically and economically feasible as pollution control technologies and/or waste reduction techniques improve.

Control by discharge permits under the SPDES program ensures releases have a minimal effect on human health and the environment. As pollution control technology and waste reduction techniques improve, discharge limits should continue to be lowered incrementally until the GLWQA goal of zero discharge can be achieved. Industrial facilities can assist this effort by adopting a goal of continuous improvement of discharges.

Treatment Technology

The lowering of allowable SPDES discharges can be achieved by the continued development and updating of Best Available Technology (BAT) guidelines by the federal Environmental Protection Agency. These BAT guidelines outline the "Best Available Technology that is economically achievable" for industrial wastewater treatment in various industrial categories. They must be updated as pollution control technology advances.

Recommendation 4: Best Available Technology (BAT) guidelines for industrial facilities should continue to be developed and periodically updated.

Reclassification

New York State maintains water quality classifications assigned under state regulations to reflect the actual or intended best use of the water. This classification is the legal basis for water quality protection programs such as SPDES. Each class has a set of water quality standards specifying the minimal conditions that must exist to protect the water for its designated best use.

The St. Lawrence River currently has an "A" water quality classification. This is inconsistent with the International Boundary Water classification (A-Special) given to other New York State boundary waters such as Lakes Erie and Ontario, and the Niagara River. Although both classification categories best usages include drinking water, primary and secondary contact recreation, fish propagation and survival, the "A-Special" classification gives special consideration to the water quality objectives of the Great Lakes Water Quality Agreement.

Recommendation 5: The reclassification of the St. Lawrence River from "A" to "A-Special" should be pursued in accordance with State regulations.

A proposed reclassification must undergo months of legal preparation and is subject to the State Environmental Quality Review (SEQR) process and the Administrative Procedures Act. The effects of the reclassification on permits, waste treatment requirements, etc. must be evaluated as part of the regulatory process.

This action has added significance in light of the Federal government's "Great Lakes Critical Programs Act of 1990". This act calls for the Great Lakes States to adopt water quality standards based on EPA guidance for the Great Lakes region. Reclassification of the St. Lawrence could make any future regional standards easier to adopt in New York State by incorporating the new standards into the "A-Special" classification.

Water Quality Enhancement and Protection Policy

The virtual elimination of persistent toxics goal of the Great Lakes Water Quality Agreement will be assisted by the proposed NYSDEC water quality enhancement and protection policy. This policy will carry out the laws of the State of New York to enhance and protect water quality in the following ways:

1. Discharge Restriction Categories - Protect sensitive waters that cannot assimilate the effects of general or specific discharges by amending the classification regulations to add discharge restriction categories that prohibit some or all discharges.

2. Antidegradation - Maintain the existing water quality even where water is cleaner than standards require, unless socio-economic conditions justify lowering quality (in no situation will waters be allowed to go below standards). The NYSDEC will refine the state's existing antidegradation policy by establishing a process for deciding on proposed actions that might affect water quality.

3. Substance Bans - Protect all waters from specific persistent toxic substances by banning manufacture and use in New York State.

Recommendation 6: Develop and implement a water quality enhancement and protection policy that is consistent with the Great Lakes Water Quality Agreement.

It is clear that additional tools are needed to supplement traditional pollution control mechanisms. The Water Quality Enhancement and Protection Policy proposes new decision-making processes that will supplement current programs and move New York toward the goal of eliminating the discharge of pollutants. For example, now is the time to develop pollution prevention strategies and incorporate them into water quality management decisions. This proposed policy, which is presently being developed with an extensive public participation processes, is intended to help the Department move in this direction.

MUNICIPAL DISCHARGES

Due to documented reports of algal blooms downstream of the Area of Concern (Lake St. Francis), permitted municipal discharges, including combined sewer overflows, were identified in Stage I as sources of phosphorus to the Area of Concern.

Combined Sewer Overflows

All municipalities within the St. Lawrence River drainage basin should operate with a goal of continuous improvement and work to eliminate Combined sewer Overflows (CSOs) to the maximum extent. Such action is required under the authority of some existing SPDES permits.

Recommendation 7: Implement upgrades and remediation of municipal systems as needed to eliminate combined sewer overflows to the maximum extent.

Special conditions to reduce or eliminate combined sewer overflows should be included into renewed SPDES permits. Such conditions could take the form of those recently included in the Massena and Gouverneur SPDES permit renewals (see Chapter 2), or they could be more comprehensive. SPDES permit writers should consider requiring an evaluation of sewer systems to determine the remedial work needed to reduce CSO frequency.

Combined sewer overflow remedial actions may result in significant financial requirements that must be addressed by federal, state, and local governments. In the past, combined sewer overflow abatement projects in priority water quality areas have been funded by the EPA and NYSDEC construction grants program. Although this grant program ended in 1990, a revolving loan program has been established as a source of funding for remedial activity.

The New York State Water Pollution Control Revolving Fund will provide low interest loans to municipalities to assist in the construction of water pollution control facilities. The fund will be supported by combined Federal (80%) and State (20%) resources totalling $1.05 billion. These funds will support twenty year loans at a subsidized interest rate of 2/3 the market rate. There are also provisions for small, lower interest loans in financial hardship situations. Repayment of these loans will maintain a perpetual source of financing for future water pollution control projects.

BOTTOM SEDIMENTS

The Stage I report has identified sediments as a known source of benthos degradation in the Massena Area of Concern.

Hazardous Waste Sites

The sediments in the Massena Area of Concern have been determined to be an inactive hazardous waste site. As such they are the subject of Recommendations 1 & 2 of this chapter.

Remediation of the sediments in the vicinity of the General Motors plant (St. Lawrence & Raquette Rivers) is being accomplished as part of the overall remediation of the 270 acre GM site under a Federal Administrative Order. ALCOA and Reynolds Metals are under separate Federal Administrative Orders to investigate and remediate contaminated river sediments.

Reynolds is responsible for the remediation of contaminated sediments in the St. Lawrence and Raquette Rivers immediately upstream from General Motors. ALCOA is responsible for remediation of six and one-half miles of the Grasse River beginning just upstream from the facility and extending downstream to the confluence with the St. Lawrence.

The Orders are designed so that one facility's investigative and remedial responsibility takes over where another facilities responsibility ends (see Figure 3-1). Therefore, all major contaminated sediment areas are covered under one of the three Federal Orders.

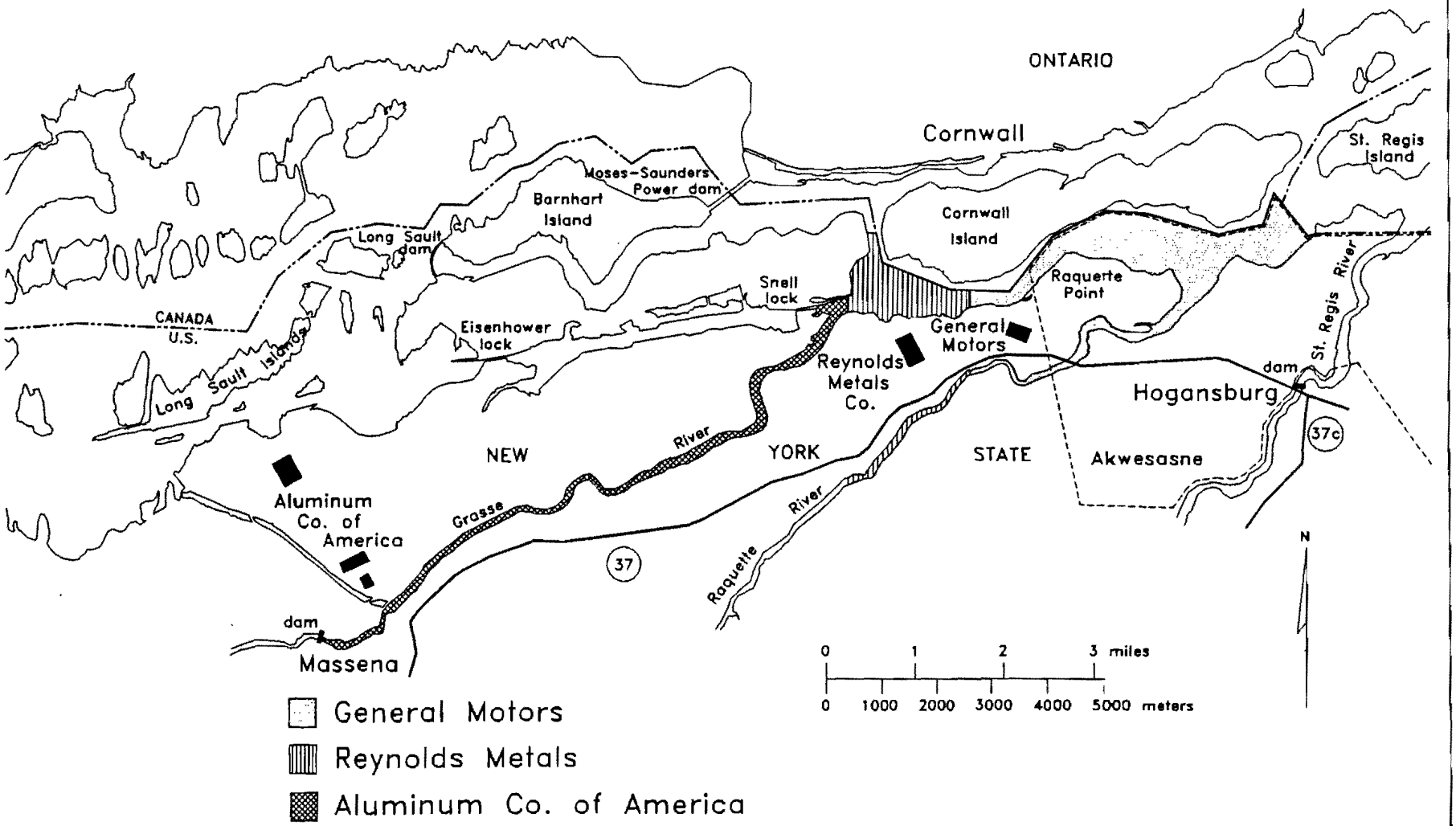
It is appropriate to clean up contaminated sediments in a manner that will prohibit recontamination following remediation. Normally this would necessitate remediation of upstream sediment sources before completing sources downstream. However, other factors may come into play: the speed of the river flow may preclude recontamination of downstream sources; downstream sources may be more serious, thus requiring immediate attention; etc. Therefore,

Recommendation 8: Final remediation of upstream sediment sources should be completed before downstream sources, unless it can be demonstrated that recontamination of the downstream sediments will not occur. However, immediate interim action on downstream sources (when necessary) should not be delayed.

Once upstream sources of pollution are reduced or eliminated, the potential for recontamination of sediment downstream is diminished. Thus, any necessary remediation need only be completed once and a duplication of effort and resources is

FIGURE 3-1

Approximate Location of Study Areas



avoided. This is especially true if sediment relocation options will be used as they may cause resuspension of the sediments. If a sediment removal option is chosen, then methods which minimize the resuspension of sediments must be used.

However, the fact that sediments are downstream from another source should not be used as an excuse for inaction. If interim measures would show substantial improvement to the environment, then they should be completed as soon as possible.

The clean-up of bottom sediments must consider not only recontamination of previously remediated sediment areas, but also the potential downstream and transboundary effects such remediation may have. Therefore, recommendation 2 (page 3-3) of this plan must be implemented during all remedial initiatives including sediment remediation. The RAP program, committee and the general public need to remain vigilant and to closely follow and monitor all the site remediation activities to ensure all of this work is completed properly.

Sediment Criteria

Sediment criteria are required to determine the horizontal and vertical extent of sediment remediation that may be necessary. The EPA has been working to develop criteria that will determine unacceptable levels of contaminants in sediments. Also, NYSDEC Division of Fish & Wildlife has developed sediment criteria for a number of contaminants including PCBs. This criteria is currently being evaluated by the NYSDEC clean-up standards task force and is available for public review in a draft clean-up policy and guidelines document (June 1991). The completion of this work and the application of the criteria to the sediments of the Area of Concern is essential to assist in the evaluation of sediment data.

Recommendation 9: Criteria for the evaluation of contaminated sediments must be completed as soon as possible.

The state should ensure its criteria meet all of the valid EPA requirements to qualify these criteria as New York State ARARS (Applicable or relevant and appropriate federal or state standards, requirements, criteria or limitations).

The completion of this criteria will assist in the evaluation of the extent of contamination by helping to determine which sediments may need remediation and which ones pose minimal risk. However, flexibility must be maintained in determining the extent and type of sediment remediation needed. Therefore, these criteria should be viewed as an additional management tool to assist with the identification of clean vs. contaminated sediments.

NONPOINT SOURCES

With the notable exception of contaminated sediments, which were discussed in the previous section, excessive nutrients (phosphorus) from agricultural related activities are thought to be the most important nonpoint source problem related to the Massena Area of Concern (see Chapter 2). However, the Stage I RAP concluded that there is no water quality impairment due to eutrophication or undesirable algae in the Massena Area of Concern. This is probably a result of the high dilution capacity of the St. Lawrence River which precludes problems except in areas where flow is reduced and deposition occurs.

Stage I also concluded that aquatic resources may be adversely impacted by sources originating within the Massena Area of Concern, the Cornwall Area of Concern, and upstream of the Massena/Cornwall area. However, it is difficult to determine the impacts of Massena AOC contaminants on downstream resources since Lake Ontario contributes a large percentage of the same organic and inorganic pollutants to the St. Lawrence River in both water column and suspended sediments.

Eutrophication has been indicated to have some impact in localized areas downstream of the Areas of Concern (Lake St. Francis). However, impacts of contamination across the St. Lawrence river are unlikely due to hydrologic characteristics. Since most of the algal problem in Lake St. Francis is associated with the north shore, the problem may be related to Canadian sources. However, the extent originating from the New York side of the border is currently unknown.

Stormwater drainage and other nonpoint source discharges from industrial plant areas can also result in the removal of contaminants off-site into nearby receiving streams. However, remedial actions pertaining to such sources are addressed in the hazardous waste site and industrial discharge portions of this plan.

Nonpoint Source Management

New York State is combatting this and other nonpoint source pollution problems through its nonpoint source management program. This multi-agency cooperative plan makes many recommendations to control nonpoint source pollution within the State.

The Nonpoint Source Management Program, which was approved by the EPA in January of 1990, has yet to receive the funding necessary to accomplish all of its objectives. However, the NYSDEC in cooperation with the county districts and the State Soil and Water Conservation Committee, has completed (June, 1990) nonpoint source assessment reports for each individual county within New York State.

These reports, which were one of the objectives of the management program, identify waterbodies perceived or known to be affected by nonpoint source pollution. For each affected waterbody the pollution problem is described, including the degree of the problem, the type of pollutants, and the sources. These countywide assessments will be used in the development of the Priority Water Problem (PWP) list. The PWP is used to prioritize impaired waterbodies to guide in the management of statewide water quality programs.

Recommendation 10: Implement New York State's Nonpoint source management program (including its recommended control measures), with special emphasis given to problem areas identified in the NYSDEC Soil and Water Conservation district assessment reports.

New York's nonpoint source management program identifies management practices for the control of nonpoint source pollution, describes a watershed planning process for addressing nonpoint source problems and recommends control measures to address each category of nonpoint source pollution. Options for control measures include:

- Planning - including inventory, assessment and monitoring
- Regulations - land use, activities on land, enforcement, etc.
- Direct government action - control structures, dredging, etc.
- Financial incentives - cost sharing, tax breaks, loans, etc.
- Research and demonstration projects
- Technology Transfer
- Education

However, this plan needs funding to be able to adequately address nonpoint source problems by providing adequate financial assistance.

Best Management Practices

The use of best management practices can reduce the impact of agricultural runoff by providing for erosion control, reducing excess fertilizer usage on cropland, and controlling runoff through such areas as barnyards, animal waste disposal areas, etc. However, education of local farmers, landowners, and governments is necessary if such practices are to be widely adopted and thus benefit the environment.

Recommendation 11: Increase educational and training opportunities for local landowners and governments to learn best management practices that will decrease the environmental problems associated with agricultural runoff and other types of nonpoint source pollution. This should be a cooperative federal, state and local effort directed toward areas within the basin having identified nonpoint source problems.

Increasing educational and training opportunities may be accomplished in many ways. Public informational programs using meetings, workshops, direct mailings, local newspapers, radio, agricultural bulletins, etc. may be used to distribute information on best management practices. On-site demonstrations and tours of facilities using best management practices have proven to be an effective educational tool. Knowledgeable speakers can visit local organizations (Farm Bureaus, Granges, etc.) as well as encourage the formation of new organizations to promote sound land use practices.

Such opportunities will only occur through the cooperative efforts of landowners, the private sector, the general public, as well as Federal, State and local agencies. Adequate resources will be required from all levels of government to implement necessary informational and educational programs. Also additional agency staffing or restructuring of current staff and assignments may be needed to conduct informational meetings and workshops, and to provide technical recommendations for best management practice installation and implementation.

Implementation on farmland is complicated by the fact that most farms are small businesses that have a small return on investments. Therefore, any loss in income is significant. If significant cooperation is to be obtained from such landowners it will be important to demonstrate benefits requiring a minimum of investment or loss in productivity.

It is clear that education alone will not eliminate nonpoint source pollution. Financial incentives, additional regulatory controls and adequate enforcement will be needed. The cost of pollution must be made internal to the polluter before widespread benefits will be seen. Successful implementation will require a broad understanding of the problem and public support for the necessary controls. It will also require coordination and cooperation by the public and from agencies at all levels of government. This direction will be provided by the New York State Nonpoint Source Management Program.

AIR TOXICS

Chapter 2 concluded that the solution to the air toxics problem is beyond the scope of this remedial action plan. However, there are several initiatives that can be made in the Massena Area of Concern to assure better air quality:

Recommendation 12: Reduce hydrogen fluoride emissions from facilities in the Area of concern to assure all standards (forage grass and ambient air) are met.

Recommendation 13: Hazardous waste remedial efforts must include measures to monitor and mitigate (when necessary) air transport of contaminants during clean-up.

It is important to use the ecosystem approach during air permitting and hazardous waste remediation to avoid transferring contamination from one media to another.

POLLUTION PREVENTION

The environmental control programs established over the years have brought improvements in water quality to the St. Lawrence River basin. The implementation of this Remedial Action Plan will bring further improvements in water quality. However, it has become evident that it is not sufficient to rely solely on end-of-the-pipe pollution controls and after-the-fact clean-ups. Preventing pollution generation at its source must become more prevalent if appreciable progress is to be made toward the goals of the RAP and the goals of the Great Lakes Water Quality Agreement.

Pollution Prevention practices may include changes in production, operations, raw material usage, etc. It may also include reduced use of harmful substances and waste reduction. State and federal initiatives to prevent pollution are described below.

New York State Initiatives

NYSDEC is putting emphasis upon reducing or eliminating hazardous wastes at their source: the commercial or industrial processes where they are generated. In the preferred sequence of hazardous waste management techniques, as outlined in state law (1989), source reduction ranks first. Wastes that cannot be reduced are to be reused or recycled. Any remaining wastes must be detoxified, treated or destroyed. Only treated residual wastes can be landfilled; all other land burial of hazardous waste must be phased out.

New York State has established a goal of reducing hazardous waste generation by 50% by 1999. The 1989 Hazardous Waste Reduction and RCRA Conformity Bill in New York State subjects hazardous waste generators to new stringent waste reduction requirements including the submittal of hazardous waste reduction plans. Failure to meet the standards set in this law can mean losing certification to generate hazardous wastes.

To help commercial and industrial enterprises in New York State comply with the laws for managing hazardous wastes, NYSDEC's Division of Hazardous Substances Regulation has developed technical assistance programs and a series of publications. Technical experts are available to visit individual plants and to present information to trade and professional associations. NYSDEC program staff also provide telephone assistance for industries, using up-to-date waste reduction information through a computerized bibliographical clearinghouse.

In addition to NYSDEC's programs, the New York State Environmental Facilities Corporation (EFC), a public benefit corporation, is actively involved in providing on-site technical assistance. EFC helps small and mid-sized industries comply with regulations and apply waste reduction and waste treatment technologies.

In New York State there are an estimated 50,000 small quantity generators of hazardous wastes. Many are service industries such as auto repair, dry cleaning, painting and printing. Since few of these generators have trained environmental or technical staff, New York's small quantity generator regulatory program emphasizes regulatory requirements and waste reduction. This program includes workshops on regulatory compliance and pollution prevention, publication of manuals and technical assistance booklets and the operation of a toll-free hotline (800-462-6553).

In addition to hazardous waste management, New York State will require Toxic Reduction Implementation Plans (TRIPs) to be prepared and implemented by many facilities. These plans will be submitted to NYSDEC by each facility required to hold an air or water permit that emits or discharges to the environment, toxic chemicals:

- greater than 40,000 lbs/yr fugitive and stack emissions
- greater than 12,000 lbs/yr to a SPDES discharge or POTW.

TRIPs will cover greater than 95% of discharges to air, water and land from a total of approximately 400 facilities. They will be a multi-media approach to pollution prevention.

As discussed in Chapter 2 (Air Toxics section), NYSDEC is developing fugitive emission regulations that require a 50% reduction of unregulated or fugitive emissions. These regulations will require the submission of a reduction plan to NYSDEC.

NYSDEC's Division of Water is developing a Water Quality Enhancement and Protection Policy which will assist in the development of pollution prevention strategies and incorporate them into water quality management decisions. This policy is discussed in detail in the "industrial discharge" section of this chapter.

Federal Initiatives

Congress passed the Pollution Prevention Act of 1990 which established the following hierarchy of options to reduce the risks to human health and the environment from pollution:

1. pollution should be prevented or reduced at the source whenever feasible;

2. pollution that cannot be prevented should be recycled in an environmentally safe manner;

3. pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and

4. disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

The EPA has initiated a national pollution prevention strategy that includes efforts to eliminate barriers to pollution prevention in existing and future regulatory programs and to encourage voluntary prevention initiatives by industry. This plan targets 17 high risk chemicals for prevention. EPA is seeking voluntary reduction efforts from hundreds of companies who have reported releases of these chemicals. Therefore, this strategy will require the combined efforts of innovative private sector initiatives and a refocussing within the existing regulatory and enforcement programs. The EPA has also developed a Pollution Prevention Action Plan for the Great Lakes which highlights EPA prevention activities within the Great Lakes basin.

RECOMMENDATION 14: Pollution Prevention practices should be incorporated at all sources to the St. Lawrence River drainage basin to the maximum extent practicable.

INVESTIGATIONS

The Stage I RAP showed there are data gaps in our knowledge of water quality in the Massena Area of Concern. Such limited data restricts our ability to make sound judgments on remedial actions. Therefore, further investigations are needed to understand the water quality problems in the Area of Concern.

The Great Lakes Water Quality Agreement (GLWQA), Annex 2, lists 14 indicators of beneficial use impairment which were discussed in chapter 4 of the Stage I RAP. The Massena RAP has also added a fifteenth indicator of use impairment: Transboundary impacts.

Stage I examined data from the Area of Concern to determine the existence of the fifteen impairments. Six indicators of impairment could not be determined with high confidence due to inconclusive evidence or lack of data. Therefore, these six beneficial use impairment indicators will require further study. Potential investigations derived directly from these indicators are described below and summarized in Table 9-1. Such investigations will provide a more thorough definition of the use impairments in the Area of Concern.

Recommendation 15: Complete the six investigations needed to conclude the assessment of beneficial use impairments in the Area of Concern.

The information obtained from the results of these investigations will be incorporated into the Stage II process through annual progress reports (see Chapter 5). It is likely that additional data and investigations will be needed during RAP implementation. Such data gaps will be identified in the Natural Resource Damages Assessment plan (see pages 3-24 and 4-18) and may also be explored in future RAP annual reports.

Fish and wildlife population Investigation

Objective: To determine if fish or wildlife populations have been degraded and to determine the cause(s) if such a degradation exists.

Background: The Stage I RAP concluded that impairment indicator #3, degradation of fish and wildlife populations is likely. This conclusion is based on indirect evidence of impacts on localized fish, aquatic invertebrate and furbearer populations and contaminant levels in snapping turtles, amphibians and waterfowl.

Proposal: A comprehensive fish and wildlife investigation within the Area of Concern. This investigation should determine the level of impairment and its causes. Specific fish and wildlife management goals should be established to support healthy self-

Table 3-1

Investigations for a More Thorough Definition of Impairments

Data Gap	GLWQA[1] Impairment Indicator#	Reasoning
Fish and wildlife population study	3	Indirect evidence of localized impacts suggests an impairment is likely.
Fish tumor investigation	4	Levels of PAHs suggest impairment is likely, however, no data is available.
Bird and animal deformity/reproduction investigation	5	Comprehensive studies have not been performed, however, an impairment is likely (mink/fish link).
Benthos investigation	6	Impairment likely in localized areas. Little contaminant levels data.
Phytoplankton/ zooplankton investigation	13	Impairment definition is unknown because population and impact data does not exist for the AOC.
Transboundary impact investigation	15	Indirect evidence of export from the AOC.

[1] GLWQA - Great Lakes Water Quality Agreement

sustaining populations of desired fish and wildlife. Such goals should be consistent with ecosystem objectives being established for the Great Lakes basin and fish community goals being established by the Great Lakes Fishery Commission. The investigation could include a furbearer population study, waterfowl contamination levels, fish bioassays, etc.

Usefulness: This study will further define a GLWQA indicator that is likely to exist, but needs to be confirmed by a comprehensive study. It will also set fish and wildlife management goals for the Area of Concern. However, the actual determination of chemical impacts on fish and wildlife in-situ (beyond the obvious, i.e. avoidance or mortality) is difficult, expensive and may not be conclusive.

Fish Tumor Investigation

Objective: To determine if fish liver tumors exist in the Area of Concern.

Background: The Stage I report concluded GLWQA indicator #4, fish tumors or other deformities are likely to exist. This conclusion was based on indirect evidence of the level of PAHs in sediments in the Area of Concern. Therefore, a study to confirm or deny the presence of liver tumors in bullheads and suckers may be needed in the Area of Concern.

Proposal: A study to confirm or deny the presence of neoplastic and pre-neoplastic liver tumors in non-migratory species in the Area of Concern. Brown bullheads and suckers are typically used because they are bottom dwelling and most likely to be affected by environmentally induced tumors. The bullheads should be favored since they move around less than suckers, thus increasing the likelihood that the results are indicative of conditions in the Area of Concern. Also, research in other AOCs has shown a direct link between PAHs and liver tumors in bullheads. A statistically significant number of fish should be captured from specific target areas (sub-basins) of the Area of Concern to determine source areas. The fish must be analyzed by a histopathologist with experience with fish liver tumors. Liver tumors must be used as the indicating factor because lip and surface abnormalities may be virally induced and, therefore, not necessarily related to environmental contamination. Results should be correlated with sediment/surface water concentrations known to induce tumors. This investigation should be done in cooperation with NYSDEC Region 6 fisheries staff and may also be coordinated with the Departments contract fish pathologist at Cornell University's College of Veterinary Medicine.

Usefulness: This study will further define a GLWQA indicator that likely exists but has not been confirmed with adequate evidence. However, determination of a causative agent and relating the incidence of tumors to a specific contaminant or source is very difficult.

Bird and Animal Deformity/Reproduction Investigation

Objective: To determine if bird or animal deformities or reproductive problems exist and result from contamination origination in the Area of Concern.

Background: The Stage I report concluded GLWQA indicator #5, bird or animal deformities or reproductive problems, are likely to exist due to the indirect evidence of contaminants in fish flesh exceeding NYSDEC criteria for the protection of fish-eating wildlife. However, no comprehensive studies have been completed.

Proposal: A survey to compare bird or animal deformities or reproductive problems in the Area of Concern to a control area. Fish eating birds may show the greatest effects from RAP area contaminants. However, their mobility makes identifying contamination specifically related to the Area of Concern difficult. Consequently, an investigation should be designed to include sensitive wildlife indicator organisms with a small, localized territorial range (ie. snapping turtles). It may also be advantageous to address animals such as mink, which would be expected to be found in the Area of Concern, but do not seem to be present.

Usefulness: The study will further define one of the 14 GLWQA indicators of impairment. However, it may be more economically advantageous to look at fish flesh and relate it to known affects resulting from consumption of fish by humans or wildlife.

Benthos Investigation

Objective: To determine if the degradation of benthos exists in the Area of Concern.

Background: The Stage I report concluded GLWQA indicator #6, degradation of benthos, is likely. Widespread adverse impacts have probably not occurred, however, localized impacts have been reported.

Proposal: A benthic macroinvertebrate community structure (abundance and diversity) investigation which includes toxicity or bioavailability testing of sediment-associated contaminants. This investigation could include size/age demographic studies and examination of fecundity. Any benthos investigation conducted should compare the Area of Concern and its sub-basins to a similar unimpacted control area. The chosen control invertebrate communities should possess trophic group distributions (e.g. suspention vs. deposit feeders) similar to those of AOC study sites.

Usefulness: A benthos investigation would further define one of the 14 GLWQA indicators of impairment.

Phytoplankton/zooplankton Investigation

Objective: To determine if phytoplankton or zooplankton are being affected by the water quality in the Area of Concern.

Background: The Stage I report concluded GLWQA indicator #13, degradation of phytoplankton and zooplankton populations, was unknown. This is because the appropriate data needed to make a decision on this impairment indicator has not been gathered.

Proposal: A phytoplankton and zooplankton community structure investigation which includes bioassays (Ceriodaphnia and other indigenous species) to determine relative toxicity. Results from the Area of Concern should be compared to an unimpacted control area with similar chemical and physical characteristics. This will determine if the water quality in the Area of Concern is affecting the phytoplankton and zooplankton community structure and the extent of ecological toxicity due to environmental contaminants.

Usefulness: This investigation would further define one of the 14 GLWQA indicators.

Transboundary Investigation

Objective: To determine if significant loadings of contaminants are exported from the Massena Area of Concern to downstream areas.

Background: The riverine nature of the Massena Area of Concern and indirect evidence of probable impacts downstream have prompted the addition and evaluation of a fifteenth indicator of use impairment. Transboundary impacts is not a GLWQA use impairment indicator, but export of contaminants from the Area of Concern needs to be evaluated in order to comprehensively define problems in the aquatic ecosystem. The Stage I RAP concluded that there are transboundary impacts, however this conclusion was not made with high confidence because a link between the AOC sources and downstream impacts was not definitively established, nor was the effect of upstream sources determined relative to AOC sources.

Proposal: A suspended sediment investigation to determine the quantity of suspended sediment transport to and from the AOC and the extent such sediment particles are contaminated with substances of concern. Chemical analyses should include PCBs, PAHs and mercury among others. Sampling points should include areas upstream, downstream and cross stream of the AOC including all major tributaries to the AOC. Sampling should be storm event and/or seasonally based to determine factors that may contribute to significant loadings.

Usefulness: This investigation will determine the suspended sediment contaminant loading to the Area of Concern as well as the loading leaving the area of concern and migrating downstream. Thus, this special impairment indicator will be more definitively defined.

NEW YORK STATE COASTAL PROGRAM

The New York State Coastal Program, administered by the Department of State, was established pursuant to the Federal Coastal Zone Management Act of 1972 and the State Waterfront Revitalization and Management Act of 1981. These acts call for coordinated exercise of governmental authority over land and water uses in the coastal area for the purpose of preserving and using coastal resources in a manner that balances natural resource protection and the need to accommodate economic development.

To accomplish this, the acts provide, in part, that all State and federal actions in the coastal area shall comply with a single set of decision-making criteria, or policies. In general, the policies either promote the beneficial use of coastal resources; prevent the impairment of certain coastal resources; or provide for the management of activities which may impact coastal resources.

Implementation of the Coastal Program is effectuated through three program components: Local Waterfront Revitalization Programs, review of federal and state government actions for consistency with the policies, and the advocacy of projects and activities which implement specific coastal policies.

The Local Waterfront Revitalization Program (LWRP) was established to address the problems of coastal development in full partnership with local government. Management of coastal development must, of necessity, include regulation of land use decisions. New York's municipalities have the primary authority for directly regulating land use. The LWRP refines and supplements the state coastal program by incorporating local needs and objectives. It is essentially a detailed land use plan that sets forth design, location, and environmental standards for all development along the municipality's waterfront. Federal and state laws require that all government agencies in their direct, funding, and permit actions adhere to any LWRP approved by the Secretary of State.

The State Coastal Management Program contains a policy (#7) intended to protect coastal Fish and Wildlife Habitats of Statewide Significance. Habitats have been identified throughout the Great Lakes region. The State has officially designated fifty-one habitats located along the shores of Lake Erie, the Niagara River and Lake Ontario and is awaiting federal concurrence on these designations. Once the federal government agrees, the consistency provisions of the CMP will apply. Approximately forty habitats on the St. Lawrence River are currently under evaluation and will eventually be designated. This includes two habitats (Moses Saunders tail waters and NE Long Sault Islands) within the boundaries of the Area of Concern.

REMEDIAL STRATEGY SUMMARY

Some of the conclusions drawn in the Stage I Massena RAP concerning use impairments and their causes, were made with low confidence due to the circumstantial nature of the evidence. Consequently, the RAP has concluded that further investigation is needed to fully understand the impairments and sources of pollutants to the Massena Area of Concern. The investigations needed to more fully define GLWQA indicators of use impairment are outlined in table 3-1.

Investigations in and around the St. Lawrence, Grasse and Raquette Rivers as part of the hazardous waste programs will further define the existing environmental problems. Also, the ongoing Rotating Intensive Basin Study (RIBS) will result in a 1993 report that should add to our knowledge in the St. Lawrence River drainage basin. The RIBS should develop a baseline by which to evaluate future improvements, assist in locating and identifying water quality problems, investigate water quality cause and effect relationships, etc.

Although more investigations are needed to fully understand all of the impairments and pollutant sources to the Area of Concern, remedial action will not stop while additional evidence of impairment is gathered. It is critical to continue to remediate known sources and correct known problems while seeking the additional evidence that is needed. Therefore, remedial and control activities will continue in all program areas as the recommended investigations are implemented. This will include the use of interim remedial measures where appropriate.

NYSDEC and EPA are cooperating to remediate the hazardous waste sites in the Massena Area of Concern. Federal orders call for the clean-up of the St. Lawrence, Grasse and Raquette River systems as well as the General Motors federal superfund site. State enforcement orders address the remaining land-based areas which are also sources to the river system. In addition, NYSDEC is moving toward zero discharge of PCB's from wastewater discharges.

Perhaps the biggest obstacle in implementing this RAP will be funding the numerous investigations and remedial actions that will be required. Many of the critical investigations and remedial actions are being funded by the three potentially responsible parties in the Massena area: the Aluminum Company of America (ALCOA), General Motors Corporation and Reynolds Metals Company. Also, the NYSDEC will pursue other sources of funding to implement the recommendations of this RAP. These include the State and Federal Superfund programs for hazardous waste sites, the State Water Pollution Control revolving loan fund for municipal sewer system upgrades, etc.

Another potential source of implementation funding is the use of Natural Resource Damage lawsuits. Such suits hold liable those responsible for damages to natural

resources resulting from the release of hazardous substances. Natural resources include land, fish, wildlife, biota, air, and ground and surface waters owned, managed and controlled by or appertaining to the State of New York. Recovered funds may be used to restore, replace or acquire the equivalent to the injured resource.

NYSDEC is implementing a statewide Natural Resource Damage Strategy to determine priority areas for executing natural resource damages in New York State. Problem areas across the State, including those in the Massena area, will be reviewed as part of this strategy to determine priority for litigation.

A Natural Resource Damage Preassessment Screen (New York's first) has already been completed for Massena. This Preassessment Screen is a preliminary summary of potentially impacted natural resources in the St. Lawrence, Grasse and Raquette Rivers and the surrounding environment in the Massena area. The most apparent injury to natural resources is the elevated levels of PCBs in Massena area fish which has led to advisories to limit consumption.

A trust fund has been established with contributions from the three potentially responsible parties. This money will be used to procure a consultant to develop a Natural Resource Damages Assessment Plan (Assessment Plan). The Assessment Plan will identify what additional data and information needs to be gathered and the associated data gathering methods to be used in order to determine and quantify the extent of injuries and assess the monetary value (damages) of these injuries. Once completed, the Assessment Plan must be implemented which will form the basis for the amount of damages to be claimed/recovered. Eventually, a restoration plan will be developed which will identify the specific actions to be carried out to restore and/or replace the injured resources.

The implementation of this RAP will require broad public understanding and support. Financial incentives, additional regulatory controls and adequate enforcement are needed as discussed in this Chapter. The cost of pollution must be made internal to the polluter before widespread benefits will be seen. Implementation will also require coordination and cooperation by the public, private interests and from agencies at all levels of government.

All remedial components identified in the RAP must properly evaluate the potential impact downstream (transboundary impacts) as well as in the Area of Concern. The specific actions currently underway or planned to implement the RAP remedial strategy are discussed in the next chapter.

CHAPTER 4

COMMITMENTS

The remedial strategy outlined in Chapter 3 includes some recommendations that will require funding in excess of what is currently available. Therefore, commitments are based on current availability of funds and existing programs for remedial actions. Further remedial actions will proceed on an incremental basis as information from investigations and the necessary funding becomes available.

Although all of the recommendations in the strategy outlined in the previous chapter are considered to be important, certain remedial elements are considered to be critical for achieving the goals and objectives of this RAP. These critical elements, such as hazardous waste site remediation, are reflected in the current commitments of this chapter.

The New York State Department of Environmental Conservation will provide the general coordination for the implementation of the remedial strategy. However, the participation of other agencies and groups at the federal, state, and local level will be required.

An overview of commitments describing objectives, anticipated completion dates, and responsible agencies is shown in Table 4-1. A more detailed description of the RAP commitments is described in the following text. Each commitment contains the next step which shows the subsequent action needed to fulfill the overall remedial strategy.

HAZARDOUS WASTE SITES

1. High Priority Clean-ups

Recommendation 1 - high priority for clean-up should be given to the ten hazardous waste sites thought to be likely sources of contaminants to the Area of Concern.

The ten sites thought to be a likely source to the Area of Concern are:

ALCOA (7 sites)
General Motors
Reynolds Metals
St. Lawrence-Grasse River Sediments

The NYSDEC has modified its priority ranking system for hazardous waste site remedial actions (investigation and clean-up). This new system will assist in directing remedial resources to the most serious sites. The new ranking system contains a number of priority conditions including preference given to sites identified as a component of a RAP.

Completion Date: Ongoing
Responsible Agency: NYSDEC

Next step: To complete the hazardous waste site investigations and remedial actions outlined below.

2. Phase II Investigations

All required phase I investigations (existing data accumulation and assessment) of hazardous waste sites determined to be potential sources of pollutants to the Area of Concern have been completed in the St. Lawrence River basin. Phase II field investigations to obtain additional data for site assessments are being completed at the following sites:

Malone Landfill
Bombay Landfill

Completion Date: Fall 1991
Responsible Agency: NYSDEC

Next Step: Once phase II investigations are complete, the sites will be ranked and determinations made as to the need for Remedial Investigation/Feasibility studies (RI/FS). If an RI/FS is determined to be required, remedial action can be initiated by the responsible party under the direction of a Consent Order or directly by the NYSDEC or EPA (superfund) in the absence of a known responsible party.

3. Remedial Investigation/Feasibility Studies

Remedial investigations/feasibility studies will be conducted to determine the full extent of contamination and to assess alternative remedial measures. Such studies are being conducted at the following sites:

a. ALCOA

There are seven New York State listed inactive hazardous waste sites on the ALCOA property which include at least thirteen separate land-based disposal areas requiring remediation (for more detailed information on each site, please refer to appendix B of the Stage I RAP). A 1985 Consent Order with NYSDEC was the regulatory mechanism for remediation at this facility until a more comprehensive Consent Order was signed in November 1990. Under terms of the new Order ALCOA must conduct a comprehensive investigative and remedial program and must maintain any required treatment and monitoring systems as specified by NYSDEC. The remedial investigation has been completed for all of the ALCOA sites.

A feasibility study for the following eight contaminated areas was completed in November 1990:

Oily Waste Landfill
Spent Potlining Pile I
Spent Potlining Pile A
Dennison Road
Primary Lagoon and Dredge Spoils Area
West Marsh
Soluble Oil Lagoon
Unnamed Tributary

The NYSDEC issued a Proposed Remedial Action Plan (PRAP) for these 8 areas in November 1990. A public meeting to solicit comments on the PRAP was held in Massena on January 10 1991. NYSDEC issued a Record of Decision (ROD) for the chosen remedial alternatives in these areas in March 1991 (see Appendix B). The estimated cost of the recommended remedial measures for the eight ALCOA sites, including long-term treatment and monitoring is $46-52 million. Engineering design for these areas began in June 1991. Initial remedial construction is expected to begin during the 1992 construction season.

A feasibility study for the industrial landfill and annex was submitted to NYSDEC in February 1991. A feasibility study for the remaining areas (60 acre, sanitary, and waste lubricating oil lagoons, groundwater and wastewater) was completed in March 1991. NYSDEC will complete a PRAP for these areas by September 1991. Following public review NYSDEC will issue a Record of Decision for all remaining sites by January 1992.

Interim remedial measures are being used as much as possible to reduce or eliminate major contaminant pathways.

b. Reynolds Metals

A 1987 Consent Order with the NYSDEC requires an RI/FS to be completed. The remedial investigation has been completed and a revised feasibility study was completed June 1991. A proposed Remedial Action Plan (PRAP) is scheduled to be released for public review by September 1991. NYSDEC will issue a Record of Decision (ROD) for the chosen remedial alternatives by December 1991.

Interim remedial measures (IRMs) are being used as much as possible to reduce or eliminate major contaminate pathways. An IRM was implemented in 1988/89 which consisted of the removal of contaminated soils and appurtenances from, and reconstruction of a stormwater drainage swale. A recent IRM in the summer of 1990 removed contaminated soils from a former permitted wastewater outfall. Additional measures have been taken to reduce leachate migration from the industrial landfill and Black Mud Pond. A stormwater/groundwater treatment unit has been installed in the North yard area.

c. St. Lawrence-Grasse-Raquette Rivers

On September 28 1989, EPA in cooperation with NYSDEC issued separate unilateral administrative orders to both ALCOA and Reynolds. These orders were authorized under Section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980. The orders require investigation and remediation of contaminated sediments in the St. Lawrence-Grasse-Raquette Rivers.

An investigation and remedial alternative analysis process similar to an RI/FS is underway for each of the ALCOA and Reynolds "study areas" as defined by their respective orders. The current status of each of these investigations is as follows:

- Reynolds has completed field work and submitted a draft river sampling report. A draft analysis of alternatives report is expected by December 1991.

- ALCOA has submitted a river sampling workplan which is presently being revised. Sample collection is expected to be completed by fall 1991.

d. North Lawrence Oil Dump

A two phase state-funded RI/FS is currently underway. The first phase has been completed and the second phase is scheduled for completion by September 1991.

e. Sealand Restoration

A Record of Decision has been signed for the removal of on-site contaminants. A total of 1442 drums and 7097 tons of soil have been removed from the property and disposed at an approved facility. The disposal cell has been backfilled and capped. A separate RI/FS is being developed to evaluate off-site contamination.

Completion date: Varies - see dates above
Responsible agencies: EPA and NYSDEC

Next step: Following the required remedial investigation/feasibility studies, site remedial measures can be designed.

4. Remedial Design

The remedial alternative chosen and described in a Record of Decision must undergo a design phase in order to tailor the remedial concept to the specific site parameters. Remedial designs are being developed for:

a. General Motors

This is a national priority list site (EPA) which includes the industrial facility and the surrounding area including the St. Lawrence and Raquette Rivers. The RI/FS has been completed and an EPA Record of Decision (ROD) for the chosen remedial alternatives was issued on December 1990 (see Appendix A). This ROD excluded the industrial landfill and east disposal area. Planned actions include:

- GM will commence remedial design for areas included in 1990 ROD - fall 1991

- EPA issued the Proposed Remedial Action Plan (PRAP) describing the preferred remedial alternatives for the landfill and east disposal area in May 1991. A Record of Decision to address these operable units will be completed in October 1991.

- New York State will complete the three-part health risk assessment which includes three individual investigations on the principle routes of exposure: fish, wildlife and human breast milk - March 1992. This area-wide assessment resulted from Consent Order negotiations and is being funded by General Motors (80%) and NYSDEC (20%).

b. York Oil

The EPA Record of Decision for on-site remediation at this federal NPL site is pump and treat and destruction of oils by incineration, and solidification of contaminated soils. A remedial design for this site will be completed by June 1991. A Federal Superfund RI/FS for off-site remediation is presently in progress and is scheduled for completion in December 1992. However, EPA will begin some site remediation in summer 1992.

Completion date: Varies - see a and b above
Responsible Agency: EPA

Next step: Following the design phase, the remedial measures will be implemented and the site will be monitored to assure the chosen remedial measures are effective.

INDUSTRIAL DISCHARGES

1. SPDES Permits

Recommendation 3 - Continue to lower allowable discharges in SPDES permits (especially for RAP critical pollutants: PCBs, heavy metals, PAHs) by incorporating changes in legal authority, improved analytical detection limits (thereby allowing more extensive use of water quality based limits), more stringent technology based limits and/or more stringent water quality standards whenever technically and economically feasible as pollution control technologies and/or waste reduction techniques improve.

a) The NYSDEC is committed to continue to lower allowable discharges whenever feasible. The NYSDEC is presently defending its new detection limit for PCB's (0.065 ug/L) in administrative hearings. ALCOA, General

Motors and Reynolds Metals have submitted Method Detection Limit Studies of their wastewater effluent in attempts to justify higher limits (see page 2-11).

b) ALCOA - has provided carbon treatment for one of its five outfalls (June 1991) and will also provide treatment on a second outfall by February 1992. In addition, ALCOA will reduce wastewater discharges from the current 12 MGD to 6 MGD by December 31, 1991, and to less than 1 MGD by 1993. The Company is currently negotiating a Consent Order with NYSDEC which would include new PCB discharge limits, bioaccumulation monitoring and other measures to protect the environment. In addition, the NYSDEC announced in July 1991 that ALCOA will pay $7.5 million in criminal fines and civil penalties for violating New York environmental laws (wastewater discharge and hazardous waste violations).

c) Reynolds - will implement phase 4 of a source control/mitigation effort in 1991.

Completion date: Ongoing
Responsible agency: NYSDEC

Next step: Incorporate revised PCB limit into SPDES permits when regulatory authority is finalized.

2. Best Available Technology

Recommendation 4 - Best Available Technology (BAT) guidelines for industrial facilities should continue to be developed and periodically updated.

Wastewater treatment guidelines for the Best Available Technology that is economically achievable (BAT) are developed as the minimum enforceable level of pollution control for various industrial categories. EPA is scheduled to promulgate new BAT effluent guidelines on the following schedule:

-Pesticides Chemicals Manufacturing subcategory (1992)
-Offshore Oil and Gas Extraction Category (1992)
-Pesticides Chemicals Formulating/Packaging subcategory (1994)
-Hazardous Waste Treatment Facilities Category (1995)
-Machinery Manufacturing and Rebuilding Category (1995)
-Coastal Oil and Gas Extraction Category (1995)

Revised BAT effluent guidelines are scheduled to be promulgated as follows:

-Organic Chemicals, Plastics and Synthetic Fibers Category (1993)
-Pharmaceutical Manufacturing Category (1994)
-Pulp, Paper and Paperboard Category (1995)

Completion date: Varies - see above dates.
Responsible agency: EPA

Next step: Industrial permits will be modified to reflect the new guidelines as they become available.

3. Reclassification

Recommendation 5 - The reclassification of the St. Lawrence River from "A" to "A-Special" should be pursued in accordance with State regulations.

A regulatory impact statement which evaluates the effects of reclassification on permits, waste treatment requirements, etc. is being prepared for all proposed stream reclassifications in the St. Lawrence River basin. Other legal preparation is ongoing and will culminate in a public hearing(s).

Completion Date: Spring 1992
Responsible Agency: NYSDEC

Next Step: Hold public hearing(s) on proposed reclassifications in the St. Lawrence River drainage basin.

4. Water Quality Enhancement and Protection Policy

Recommendation 6 - Develop and implement a water quality enhancement and protection policy that is consistent with the Great Lakes Water Quality Agreement.

The NYSDEC is developing this policy for New York State which will limit new or increased loadings of pollutants to the aquatic environment (see page 3-6). An extensive public participation program is anticipated for 1991. In addition, NYSDEC, Great Lakes States, and EPA (Regions II & V) are participating in the Great Lakes Water Quality Initiative to develop an antidegradation policy for the entire Great Lakes basin.

Completion date: In progress
Responsible agency: NYSDEC

Next step: Following the development of this policy, it will be implemented not only in the St. Lawrence River drainage basin, but also across the entire State.

5. Industrial Wastewater Discharge Permit Monitoring and Renewal

The NYSDEC monitors industrial discharges to assure compliance with permit limits by reviewing self-monitoring reports from dischargers, inspecting facilities, and independently sampling effluent to verify the validity of self-monitoring data. Significant violations of permit conditions results in measures to ensure compliance (such as technical assistance) or enforcement for chronic or uncooperative violators.

Completion date: Ongoing
Responsible agency: NYSDEC

Next step: Discharge permits are issued on a five year cyclical basis.

MUNICIPAL DISCHARGES

1. Municipal System Remediation

Recommendation 7 - Implement upgrades and remediation of municipal systems as needed to eliminate combined sewer overflows to the maximum extent.

Remedial actions are being implemented throughout the St. Lawrence River drainage basin, where appropriate, under the authority of existing SPDES permits and consent orders:

a) **Clayton**

Currently under Consent Order to develop and implement a Municipal Compliance Plan (MCP) to correct SPDES permit violations. The MCP was approved on January 17, 1991 and requires an expansion of the wastewater treatment plant. Plant expansion construction activities are scheduled to be completed in August 1992.

b) **Ogdensburg**

Currently under Consent Order (10/12/90) to correct SPDES permit deficiencies. A facility evaluation by NYSDEC Operations and Assistance Section was required by the order. This evaluation recommended several operational changes which have since been implemented by the facility.

A new draft SPDES permit is currently available for comments. This draft permit has incorporated the NYSDEC guidance for Combined Sewer Overflows (page 2-16) and requires sewer system optimization and maintenance reports. The sewer system optimization report is required to be submitted to NYSDEC one year after final permit issuance. The permittee is also required to establish a monitoring and maintenance program for the combined sewer system by April 1992.

c) **Massena**

The SPDES permit issued in August 1990 has incorporated the NYSDEC guidance for combined sewer overflows (page 2-16). Failure to meet these requirements will necessitate corrective action.

d) **Gouverneur**

The SPDES permit issued in August 1990 has incorported the NYSDEC guidance for combined sewer overflows (page 2-16). Failure to meet these requirements will necessitate corrective action.

Completion date: Varies - see above dates
Responsible agency: Local Governments

Next step: Monitoring of the sewer systems and local ambient water quality will be needed following the implementation of combined sewer overflow remedial measures. This will assure the remedial measures were effective.

2. Municipal Discharge permit monitoring and renewal

The NYSDEC monitors municipal discharges to assure compliance with permits by reviewing self-monitoring reports from dischargers, inspecting facilities and independently sampling effluent to verify the self monitoring data. Significant violations of permit conditions results in measures to ensure compliance (such as technical assistance) or enforcement for chronic or uncooperative violators.

Completion date: Ongoing
Responsible agency: NYSDEC

Next step: Discharge permits are issued on a five year cyclical basis.

BOTTOM SEDIMENTS

1. Sediment Remediation

Recommendation 8 - Final remediation of upstream sediment sources should be completed before downstream sources, unless it can be demonstrated that recontamination of the downstream sediments will not occur. However, immediate interim action on downstream sources (when necessary) should not be delayed.

Sediment remediation in the vicinity of the General Motors plant is being completed as part of the overall site clean-up (see the hazardous waste section). By issuing Administrative Orders to ALCOA and Reynolds Metals, EPA is acting under CERCLA authority to direct remediation of the major upstream contaminated river sediment areas. ALCOA will be conducting investigative field work in 1991, with actual remediation to start as early as 1992. Reynolds has completed investigative field work. A draft report was submitted in early 1991 with remediation to start as early as 1992. Remediation techniques and/or engineering methods that will minimize downstream movement of contaminants must be used.

Completion date: Varies - see above
Responsible agency: EPA

Next step: Following remediation of the sediments, environmental monitoring will be needed to assure the clean-up has been effective.

2. Sediment Criteria Development

Recommendation 9: Criteria for the evaluation of contaminated sediments must be completed as soon as possible.

The NYSDEC Division of Fish & Wildlife has developed sediment criteria for a number of contaminants (including PCBs). These criteria will be included in the NYSDEC publication entitled "Clean-up policy and guidelines". This publication will be available in draft form for public review in summer 1991.

The Federal Environmental Protection Agency has been working for several years on developing and validating tests and associated acceptance criteria that would allow decisions to be made relative to the likely environmental impacts of contaminated sediments. This work will conclude with reports on recommended tests and criteria on the following schedule:

- Criteria for 6 nonpolar compounds (September 1991)
- Criteria for 6 additional nonpolar compounds and interim criteria for 2 metal compounds (September 1992)

- Criteria for 4 nonpolar compounds and 3 metal contaminants (September 1993)

Completion date: Varies - see above
Responsible agency: EPA

Next step: When a criteria methodology has been developed, it may be applied to sediments within the St. Lawrence River drainage basin to determine the need for or extent of sediment remediation.

3. Assessment and Remediation of Contaminated Sediments (ARCS)

The ARCS program is a five year study and demonstration program being conducted in five Great Lakes Areas of Concern including New York's Buffalo River. The program will include risk/hazard assessments. modeling, treatability studies, concept planning for full scale remediation and planning for pilot (field) scale sediment treatability studies.

Completion date: 1992
Responsible agency: EPA

Next step: The guidance documents and case studies generated by this project may be used to assist in the evaluation of contaminated sediments and technologies in the Massena Area of Concern.

NONPOINT SOURCES

1. Nonpoint Source Management Program

Recommendation 10 - Implement New York State's Nonpoint Source Management Program (including its recommended control measures), with special emphasis given to problem areas identified in the NYSDEC Soil and Water Conservation District assessment reports.

The NYSDEC has a nonpoint management program in place and has recently completed (June 1990) a nonpoint assessment report for every county within the state. These documents, which were produced in cooperation with the county districts and the State Soil and Water Conservation Committee, will be used to update the Priority Water Problem (PWP) list. The PWP is used to establish priority for funding to address water quality pollution problems in New York State.

Completion date: April 1991
Responsible agency: NYSDEC

Next step: Refer to NPS Management Program

2. Education and training

Recommendation 11 - Increase educational and training opportunities for local land owners and governments to learn best management practices that will decrease the environmental problems associated with agricultural runoff and other types of nonpoint source pollution. This should be a cooperative federal, state and local effort directed toward areas within the basin having identified nonpoint source problems.

a) A Best Management Practices Catalog is now being developed which will contain one page summaries of best management practices for all categories of nonpoint sources. It will be produced one source category at a time. An agriculture section will be completed by July, 1991 and an urban/stormwater runoff section will be completed by October, 1991. Sections dealing with other source categories will be developed in the future, but exact deadlines have not been established.

b) A manual entitled, Controlling Agricultural Nonpoint Source Pollution in New York State: A Guide to the Selection of Best Management Practices to Improve and Protect Water Quality was completed in April 1991.

Completion date: Varies - see above dates.
Responsible agency: NYSDEC

Next step: Publicize and distribute these manuals to support agencies.

Recommendation 12 - Reduce hydrogen fluoride emissions from facilities in the Area of Concern to assure all standards (forage grass and ambient air) are met.

As a result of data collected showing violations of standards, Reynolds Metals may be required to reduce gaseous hydrogen fluoride emissions and improve air quality monitoring at its facility. Such actions will be outlined in an air emission permit renewal following expiration of the current permit in August 1991. ALCOA will likely be required to take similar actions in its permit renewal following expiration in December 1992.

Completion Date: See above dates
Responsible Agency: NYSDEC

Next Step: Assure appropriate actions are executed to meet all required air quality standards.

Recommendation 13 - Hazardous waste remedial efforts must include measures to monitor and mitigate (when necessary) air transport of contaminants during clean-up.

Hazardous waste site health and safety plans often include monitoring to assure worker safety. However, such workers are often protected from chemical hazards by appropriate equipment. Monitoring at site borders must assure off-site protection to the public and the environment during remediation.

Completion Date: Ongoing
Responsible Agency: EPA/NYSDEC

Next Step: Assure plans are properly implemented during site remedial efforts.

POLLUTION PREVENTION

Recommendation 14 - Pollution prevention practices should be incorporated at all sources to the St. Lawrence River drainage basin to the maximum extent practicable.

1. Annual Conference

NYSDEC cosponsors an annual hazardous waste reduction conference in Albany, where participants can learn about techniques for reducing and recycling hazardous wastes.

Completion date: Ongoing
Responsible Agency: NYSDEC

2. Company Recognition

NYSDEC is publishing a series of success stories to recognize companies that have achieved significant reduction of hazardous wastes.

Completion date: Ongoing
Responsible Agency: NYSDEC

3. Hazardous Waste Reduction Plans

The Hazardous Waste Reduction and RCRA Conformity Law specifies a phased schedule for submittal of hazardous waste reduction plans:

- Generators of more than 1,000 tons by July 1991
- Generators of more than 500 tons by July 1992
- Generators of more than 50 tons by July 1993
- Generators of more than 25 tons by July 1996

Waste reduction plans must consider technically and economically practicable waste reduction alternatives. The law allows industries to choose their waste reduction approaches, but requires that the approach chosen actually result in progress. NYSDEC will report by January 1993, on the possibility of requiring plans from smaller quantity generators.

Completion date: See above dates
Responsible agency: NYSDEC

Next Step: State law requires the prepared plans be approved by NYSDEC and implemented by each generator. Generators must also monitor reduction effectiveness and submit annual reports describing progress. Any company failing to comply risks losing certification as a hazardous waste generator.

4. Toxic Reduction Implementation Plans

Regulations are currently being developed that will require the submission of these plans from certain facilities holding air or water discharge permits during a five year phase-in schedule.

Completion date: January 1992
Responsible Agency: NYSDEC

Next Step: Following promulgation of the regulations, affected companies must develop the plans over a five year period. Failure to develop or implement the plans may lead to revocation of environmental discharge permits.

5. Pollution Prevention Strategy

A voluntary federal initiative is underway to reduce the industrial discharge of the following toxic chemicals: benzene, cadmium, carbon tetrachloride, chloroform, chromium, cyanide, dichloromethane, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, nickel, tetrachloroethylene, toluene, 1,1,1-trichlorethane, trichloroethylene, xylene.

Completion date: 33% reduction goal - December 1992
50% reduction goal - December 1995
Responsible Agency: EPA

Next Step: To expand this prevention strategy beyond industry to include other sectors of society: farming, energy consumption, transportation, municipalities, municipal waste disposal, etc.

6. Pollution Prevention Action Plan for the Great Lakes

This federal action plan is designed to compliment the federal pollution prevention strategy (see #5 above) and efforts underway at the state level. It will target specific geographic locations and key pollutants such as the 17 toxics identified in the national strategy and others of specific importance to the Great Lakes (as identified in lake management plans, RAPs, etc.). Although participation in this plan will be voluntary, it will include technical assistance, research and regulatory efforts.

Completion date: 33% reduction goal - December 1992
50% reduction goal - December 1995
Responsible Agency: EPA

Next Step: Begin implementation of this plan.

INVESTIGATIONS

Recommendation 15 - Complete the six investigations needed to conclude the assessment of beneficial use impairments in the Area of Concern.

Efforts are underway to obtain funding for these investigations.

Completion date: Unknown
Responsible agency: NYSDEC

Next Step: Begin additional remedial efforts, if investigation results warrant such action.

NEW YORK STATE COASTAL PROGRAM

This program includes the Local Waterfront Revitalization Program, consistency between federal and state actions and coastal policies and projects to implement specific coastal policies.

1. Local Waterfront Revitalization Program

a) Program plans have been developed and approved by the New York Secretary of State for the following St. Lawrence River communities:

Village of Cape Vincent
Village of Clayton
Town of Morristown
Village of Morristown
City of Ogdensburg
Town of Waddington
Village of Waddington

b) The Town of Clayton has a draft waterfront plan that is under review. This plan should be finalized by June 1992.

c) As part of a land settlement the New York Power Authority is offering funds for communities to prepare waterfront plans. This includes the Town of Massena.

2. Significant Fish and Wildlife Habitat

Approximately fourty St. Lawrence River habitats are being evaluated for designation as significant. Two of these habitats (Moses Saunders tail waters and NE Long Sault Islands) are within the boundaries of the Massena Area of Concern. These areas are scheduled to be designated by New York State (after public hearings) by June 1992

Completion Date: See Above
Responsible Agency: Department of State

Next Step: Implement the various waterfront plans and policies.

NATURAL RESOURCE DAMAGES CLAIM

New York State is pursuing a natural resource claim to recover damages from General Motors, ALCOA and Reynolds for injury to natural resources. Recovered damages will be used for the restoration, rehabilitation and/or replacement of the injured resources (including governments costs of assessing the injury). A preassessment screen which summarizes potentially impacted natural resources in the Massena area has been completed. A consultant will be procured to develop an assessment plan.

Completion date: summer 1992
Responsible agency: NYSDEC

Next step: Following public review of the assessment plan, injury determination field work will begin (fall 1992).

TABLE 4-1

St. Lawrence River Remedial Action Plan
Summary of Commitments

Objective	Completion Date	Responsible Agency	
A. Hazardous Waste Sites			
1. High clean-up priority to top ten sites	Ongoing	NYSDEC	
2. Conduct Phase II Investigations:			
• Malone Landfill	Fall 1991	NYSDEC	
• Bombay Landfill			
3. Conduct RI/FS:			
• ALCOA	March 1991	NYSDEC	COMPLETE
• Reynolds	June 1991	NYSDEC	COMPLETE
• River sediments	See text	EPA	
• N. Lawrence Oil Dump	Sept. 1991	NYSDEC	
4. Conduct Remedial Design:			
• York Oil	June 1991	EPA	
• General Motors		EPA	
• ALCOA	1992/93	NYSDEC	
B. Industrial Discharges			
1. SPDES Permits			
a) Continue to lower allowable discharges	Ongoing	NYSDEC	
b) ALCOA treatment & reduction	1991-93	NYSDEC	
c) Reynolds source control/mitigation	1991	NYSDEC	
2. Develop BAT Guidelines	1992-1995	EPA	
3. Reclassification Hearing	Spring 1992	NYSDEC	
4. Develop Antidegradation Policy	In progress	NYSDEC	
5. Monitor and renew industrial permits	Ongoing	NYSDEC	
C. Municipal Discharges			
1. Municipal System Remediation	Varies - see text	Local governments	
2. Monitor and renew municipal permits	Ongoing	NYSDEC	
D. Bottom Sediments			
1. Complete ALCOA area investigation	1992	EPA	
2. Complete Reynolds area investigation	1992	EPA	
3. Complete General Motors area investigation	Complete	EPA	COMPLETE
4. Develop sediment criteria	1991-1993	EPA/NYSDEC	
5. Remediate identified sediment areas		EPA	
E. Nonpoint Sources			
1. Update priority water problem list	April 1991	NYSDEC	COMPLETE
2. a) Develop NPS catalog			
- Agriculture	July 1991	NYSDEC	
- urban/stormwater runoff	October 1991	NYSDEC	
b) Develop agricultural BMP manual	April 1991	NYSDEC	COMPLETE
F. Air Toxics			
1. Reduce HF emissions	December 1992	NYSDEC	
2. Remediation air monitoring	Ongoing	NYSDEC	

G.	Pollution Prevention		
	1. Annual Conference	Ongoing	NYSDEC
	2. Company Recognition	Ongoing	NYSDEC
	3. Hazardous Waste Reduction Plans	1991-96	NYSDEC
	4. Toxic Reduction Implementation Plan Regulations	January 1992	NYSDEC
	5. Pollution Prevention	1992-95	EPA
	6. Pollution Prevention Plan for the Great Lakes	1992-95	EPA
H.	Investigations	Unknown	NYSDEC
	1. Fish & wildlife populations		
	2. Fish Tumor		
	3. Bird & animal deformity/reproduction		
	4. Benthos		
	5. Phytoplankton/zooplankton		
	6. Transboundary impacts		
I.	Natural Resource Damages Claim		
	1. Assessment plan	Summer 1992	NYSDEC

CHAPTER 5

IMPLEMENTATION & MONITORING

RAP IMPLEMENTATION

Remedial implementation activities will be completed by the jurisdictions or organizations identified in this remedial action plan. Most commitments are the responsibility of the New York State Department of Environmental Conservation (NYSDEC), with several different program divisions playing a role (e.g. Water, Hazardous Waste Remediation, Fish and Wildlife, etc.). Other responsible parties include: Federal agencies, other state agencies, county and municipal governments, individual industries, etc.

The NYSDEC Division of Water will manage the implementation of the RAP. This implementation will depend on the coordinated effort of numerous public and private organizations, agencies, special interest groups and individual citizens within the drainage basin. To assist in this effort a remedial advisory committee will be formed.

Implementation Policy

The NYSDEC will work with a Remedial Advisory Committee to accomplish the goals of the St. Lawrence River at Massena Remedial Action Plan. In doing this, the NYSDEC will carry out the following functions:

1. Actively seek funding to support RAP recommendations
2. Ensure that specific commitments replace RAP recommendations as funds become available.
3. Work with concerned publics in an open manner and ensure public input through a Remedial Advisory Committee.
4. Revise RAP recommendations as appropriate in light of new information and utilize the input of a Remedial Advisory Committee.
5. Report to the public and the Remedial Advisory Committee periodically on accomplishments, remedial action effectiveness, and future commitments.
6. Focus additional public attention on RAP implementation.

Remedial Advisory Committee

Continuing with its commitments to public participation in the RAP process, NYSDEC will appoint a Remedial Advisory Committee (RAC) to advise and assist NYSDEC with the implementation of the RAP. The RAC will be representative of concerned groups outside of NYSDEC that have an interest in the Massena Area of

Concern and the St. Lawrence River drainage basin. This committee will advise NYSDEC on progress reports, plan updates, new political settings, new technical capabilities and knowledge, etc.

Eight to twelve RAC members will be selected by the NYSDEC Commissioner to advise and assist NYSDEC with RAP implementation. Representatives will be appointed who can foster and guide the implementation of the RAP either by being a responsible party for remedial actions or through constituency building in the community. The CAC and other groups may nominate potential RAC members for consideration.

RAC members will be selected to represent a balance among:

-Elected and appointed government officials;
-Public interest groups (non-economic interests);
-Economic interests;
-Private citizens (non-economic interests).

Some members of the current Citizens Advisory Committee (CAC), who helped to develop the RAP may be included on the Remedial Advisory Committee for continuity during RAP implementation. Also, individuals with an interest in RAP implementation who may not have been CAC members may be included on the RAC.

The RAC will advise NYSDEC through the RAP implementation phase until the 14 use impairment indicators are restored. Restoration of beneficial uses to the Area of Concern is likely to be a long-term process. Therefore, RAC membership will be limited to a two year period with the opportunity available for reappointment following this term of service. The RAC shall elect officers annually.

The Remedial Advisory Committee will be responsible for:

- Assessing RAP accomplishments, new technical capabilities and knowledge, and new funding opportunities.
- Recommending actions, including RAP revisions, to NYSDEC, other agencies, local governments, and the state and federal legislature.
- Advising the Department on public outreach efforts.
- Advising the Department on social and economic impacts of the RAP.

In addition to the Remedial Advisory Committee members, agencies at all levels of government will be asked to participate and provide input to RAP implementation as needed.

Progress Report

To insure that the Remedial Action Plan is dynamic, annual progress reports will be issued by NYSDEC. These reports will summarize the results of remedial investigations, research and development, list accomplishments, describe future commitments, and provide necessary revisions to the plan. Issuance of progress reports should be timed so that future recommendations can be considered in the state and federal budgetary process. Opportunities will be available for the interested publics to comment on the updates, planned action, and the overall strategy.

Plan Updates

It is expected that major changes to the RAP will be required in the future, even though minor changes in the RAP may be reported routinely in the progress reports. For example: new information may become available during investigations in the river basin; other activities completed outside the RAP, such as major changes in land use along the river, or changes in the use of the river itself may alter the setting of the RAP; and new research and development findings related to remediation may suggest changes in strategy.

As the need for these changes becomes apparent, and on the advice of the Remedial Advisory Committee NYSDEC will prepare revisions with an active public participation process. This process will be dynamic with a goal of continually improving the St. Lawrence River system. The proposed revisions will also be submitted to the International Joint Commission and will meet the requirements for staged reporting under the Great Lakes Water Quality Agreement.

ENVIRONMENTAL MONITORING

Numerous remedial activities are currently underway or have been proposed for the Massena Area of Concern. However, additional environmental monitoring will be required during remedial implementation to assure that the goals of the RAP are being achieved. Environmental monitoring is essential to confirm the various sources of contamination have been reduced or eliminated and beneficial uses have been restored to the Area of Concern. It is also needed to confirm problems cited as "likely" in the Stage I.

Monitoring related to surface waters are most pertinent to the RAP. Consequently, the following two monitoring programs are described below: water quality monitoring conducted by NYSDEC's Division of Water; and fish flesh monitoring conducted by NYSDEC's Division of Fish & Wildlife.

Water Quality Monitoring

New York State's water quality monitoring program was significantly modified in 1987 to integrate ambient monitoring for toxic and conventional water quality parameters in four media: water column, sediment, macroinvertebrates, and fish. This program modification is called Rotating Intensive Basin Studies (RIBS) and is implemented by the NYSDEC Division of Water.

In the RIBS program the major drainage basins of the state have been divided into three groups which balance anticipated workloads. Each grouping is monitored extensively for two consecutive years within a six year cycle. During each two year study, 18-24 water column samples are collected at each monitoring site. Flow measurements are also made and the sampling schedule is designed to increase the frequency of sampling during months which have the greatest hydrological (flow) variability. This increases the likelihood of sampling under a wide range of flow conditions.

The water column samples are analyzed for metals (cadmium, copper, mercury, nickel, lead, zinc, iron, aluminum, manganese), volatile halogenated organics, nutrients, suspended solids, conductivity, hardness, turbidity, dissolved oxygen, pH, and temperature. Bioassays are also performed with Ceriodaphnia to test for possible toxicity.

The RIBS program also includes collection of bottom sediment, macroinvertebrates, and fish samples. Two composites of fine grained surficial bottom sediments are collected at each monitoring site. Bottom sediment analysis includes heavy metals, PCBs, organochlorine pesticides, and nitrogen/phosphorus based pesticides. In addition, total volatile solids, acid volatile sulfides, grain size, and two types of total organic carbon analyses are performed to normalize the sediment data.

Macroinvertebrates are collected 2-6 times at each site during the two year RIBS active period. They are analyzed for community structure (species richness and diversity), heavy metals, PCBs and organochlorine based pesticides.

The RIBS also includes the collection of 2-4 species of fish at each site. Fish sampling and a community evaluation is performed by the Division of Fish and Wildlife. The fish are analyzed for heavy metals, PCBs and organochlorine pesticides by the NYS Health Department. The Division of Fish and Wildlife also conducts its own monitoring program which is described in more detail below.

Fish Flesh Monitoring

In addition to assisting with fish sample collection for the RIBS program, the Division of Fish & Wildlife conducts the statewide Toxic Substances Monitoring Program (TSMP). The TSMP monitors fish flesh throughout the state to establish trends for organochlorine and heavy metal contamination.

This data is also evaluated by the NYS Department of Health for risk to human consumers. Fish flesh contaminant data collected through this program have led to consumption advisories for the entire St. Lawrence River and the Grasse River from its mouth to the Massena dam (see pages IV-2 to IV-5 of the Stage I RAP).

A minimum of two different species (one predator and one forage fish) are collected from waterways throughout the State. Sampling locations in the St. Lawrence basin include the St. Lawrence River at Massena, Ogdensburg, Clayton, and Alexandria Bay; and the Raquette and Grasse Rivers.

Due to the special nature of its problems, the Area of Concern has received intensified monitoring to include increased sample numbers and species types. For example, 1988 sampling from twelve general locations in the Area of Concern resulted in the following report: Chemical Contaminants in Fish from the St. Lawrence River Drainage on Lands of the Mohawk Nation at Akwesasne and Near the General Motors Corporation/Central Foundry Division Massena, New York Plant (NYSDEC Technical Report 90-1, April 1990). This project was jointly funded by General Motors (GM) and NYSDEC and completed in cooperation with the Mohawk Nation at Akwesasne as part of the health risk assessment for the GM Remedial Investigation/Feasibility study.

New York State also conducts a fish flesh monitoring program for Lake Ontario. Collections are made on a biennial basis because of the time required to produce meaningful changes in contaminant concentrations in adult fish. These changes frequently require one to three years to manifest themselves once a contaminant source is eliminated.

Air Monitoring

As discussed in Chapter 2, NYSDEC has been visiting Massena annually with its Trace Atmospheric Gas Analyzer (TAGA) mobil laboratory. The purpose of these visits is to determine if ambient air quality in the Massena area has been impacted by industrial air emissions or hazardous waste site remediation.

Monthly forage grass samples have been collected from May to September at 15 sites in the vicinity of the Massena industrial plants. These samples are analyzed for total fluorides by the New York State Department of Health. NYSDEC in cooperation with the Mohawk tribe has recently increased the frequency of forage sampling and expanded the sampling to include four sites on the U.S. side of the Mohawk reservation and three sites on Cornwall island.

NYSDEC Division of Air staff has been meeting with Mohawk officials about establishing a comprehensive ambient air monitoring program on Akwesasne. NYSDEC has offered to assist with sample locations, providing equipment and training. The overall objective of this and other air monitoring programs is to gather sufficient air quality data to improve management of air resources by more stringent emission controls or other management tools as the data warrants.

Remedial Monitoring

During remediation of the various hazardous waste sites, environmental monitoring will be necessary to assure the protection of public health and safety. Monitoring will vary at each site depending on the nature of the remedial efforts, but is likely to include air and water monitoring when appropriate. For more information at each specific site, please refer to the appropriate remedial health and safety plan.

Current Monitoring Initiatives

Reynolds Metals Company conducted water and sediment quality studies in the St. Lawrence and Raquette Rivers during September 1990 as part of its obligations under the EPA unilateral CERCLA 106 Order issued to the Company for the St. Lawrence River system. A similar type of study is planned for the summer of 1991 by ALCOA in the Grasse River, Massena Power Canal and Robinson Creek mouth on the St. Lawrence River as part of ALCOA's obligations under its separate unilateral CERCLA 106 order by the EPA for this same general area.

Data collection for the first RIBS in the St. Lawrence River basin is presently being conducted (1991/92) and the results will be documented in a future report. The RIBS sampling sites are shown in Figure 5-1. Although intensive monitoring will be conducted at all six sites on a six year cycle (two on followed by four off), annual monitoring will continue at the three permanent sites shown in Figure 5-1. Annual monitoring will be performed five times each year and consist of water column analyses for metals, halogenated organics and standard field parameters.

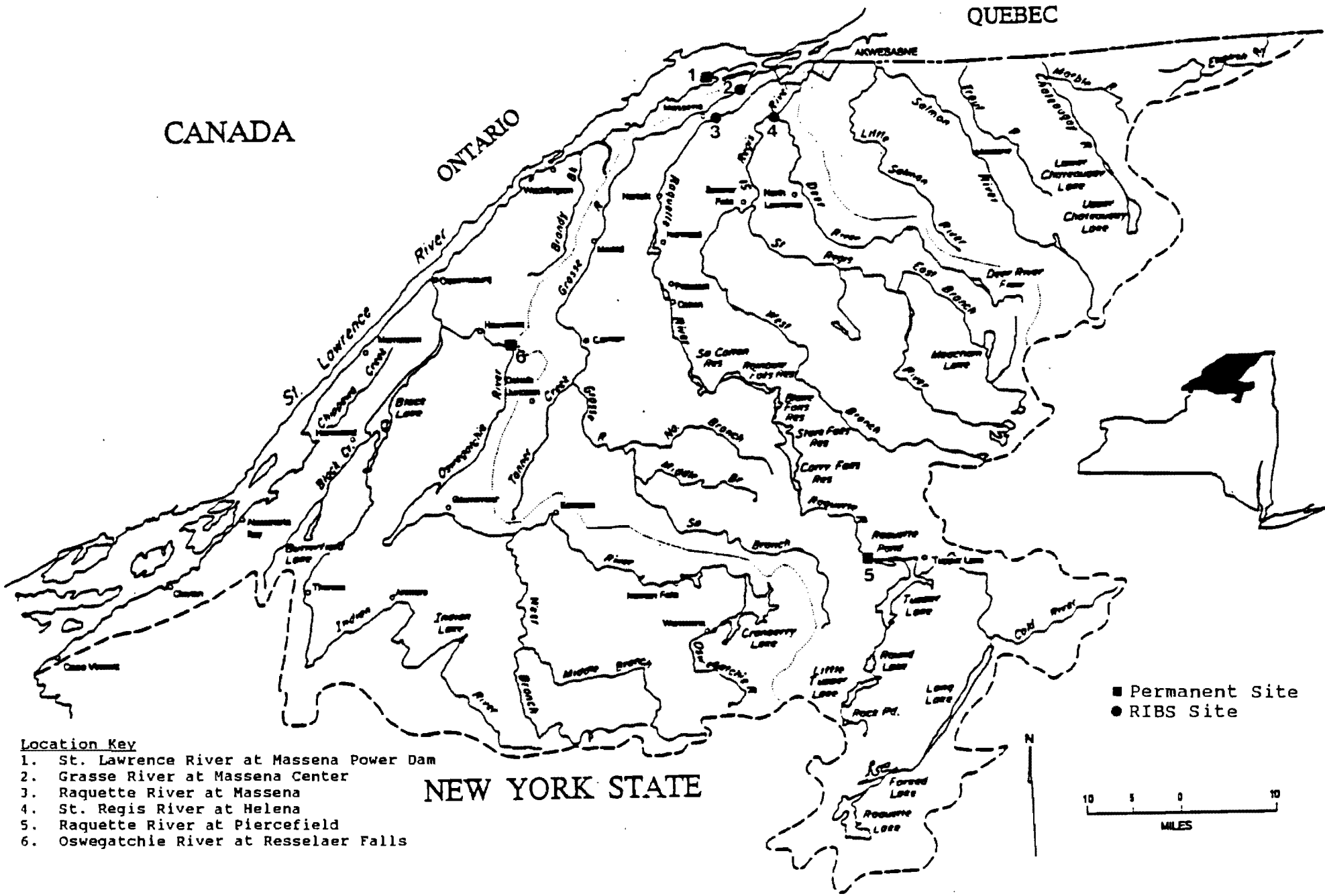


Figure 5-1. Rotating Intensive Basin Studies (RIBS) Monitoring Sites in the St. Lawrence River Drainage Basin

The RIBS being performed by New York State are but a subset of a larger monitoring effort for the St. Lawrence River, the AOC and areas downstream of the AOC. Agencies of Canada and the St. Regis Mohawk Tribe have performed and will continue to perform numerous studies which monitor changes in both abiotic and biotic compartments of the River's ecosystem. Some of these studies were presented at a March 8, 1991 monitoring workshop held at Clarkson University in Postdam, N.Y.

This International workshop on environmental monitoring programs for the St. Lawrence River was sponsored by the Massena Citizens Advisory Committee. Fourty-five participants attended including representatives from NYSDEC, St. Regis Mohawks, Environment Canada (Quebec Region), Quebec Ministry of Environment, Massena area industries, academia, citizens, etc. Representatives from Ontario (Environment Canada-Ontario Region & Ontario Minsitry of Environment) were unable to attend, however, they submitted information on Ontario's monitoring activities. The purpose of this workshop was to discuss current monitoring programs, their shortcomings and proposed changes in monitoring.

In order to achieve a coordinated and productive result from the monitoring activities of both the Canadian and U.S. agencies, representatives of the agencies have agreed to consider an international monitoring effort. The first step in such an effort would be a tri-national meeting between monitoring representatives. Eventually, this effort should include citizen participation.

One important task of the working group should be to develop a methodology for summarizing the data collected, interpreting it and disseminating the information to the public. The international working group should also concern itself with data gaps inherent in the sampling methodology. One such potential data gap appears to be the lack of information regarding the contribution of persistent toxics to the River via airborne pathways needs to be quantified and compared with other inputs in order to get a total picture of the budget, or flux, of pollutants through the ecosystem.

The use of high risk indicator species at or near the top of the food chain, such as mink, otter, bald eagle or osprey should be discussed by such a working group. A sensitive indicator species could be used as a long term monitoring tool for assessment of toxics in the river system and food chains.

Summary

The environmental effects of remediation often take several years to show significant changes within the ecosystem. Therefore, the NYSDEC Rotating Intensive Basin Studies (RIBS) will be used as an important tool to monitor long term water quality trends in the St. Lawrence River Drainage Basin. Short term water quality trends will be monitored through the annual routine sampling which will occur at the permanent sampling locations identified in Figure 5-1.

The RIBS will make use of water and sediment samples as well as biotic indicators such as fish and macroinvertebrate contaminant analysis, macroinvertabrate community structure analysis, and bioassays. Details on the sample type and analyses performed are summarized above. The RIBS should provide a more comprehensive evaluation of any potential geographic pattern of contamination in the basin. It may also assist in obtaining a better understanding of the relative contribution of various sub-basins to the overall pollutant picture in the Area of Concern.

Although the RIBs is a good screening process, it cannot replace a site specific long-term monitoring plan for the particular problems in the Massena Area of Concern. Therefore, short-term and long-term remedial monitoring at the specific hazardous waste sites (done as part of the hazardous waste programs) will also be a critical remedial component. Also, Canadian and U.S. environmental agencies have agreed to consider an international monitoring effort.

CHAPTER 6

PUBLIC PARTICIPATION

Background

Public participation has been a major element of NYSDEC's workplan for developing the Massena RAP since the Department began work on Stage I. The Department has heard from the public through both formal and informal channels throughout the process. Formal activities include a Citizen Advisory Committee (CAC), government-to-government communication with Canadian and Mohawk agencies, public meetings, technical workshops, monthly mailings to a list of over 250 individuals and a number of other public outreach activities. Informal participation has occurred through communication among CAC members; conversations between individual CAC members and their constituent groups, family, friends and neighbors; and discussions between NYSDEC staff and members of the public. NYSDEC also looked to its own staff in other program areas for information needed to complete the RAP.

The public has played an important role in shaping the process and products of the RAP. They highlighted issues, contributed information, helped develop and review the plan and added their own motivating energy to the process. The thoughts and feelings of the community about the RAP and the public's specific suggestions and comments were considered along with technical information in developing the RAP.

The Citizen Advisory Committee

Before starting Stage I, NYSDEC invited thirty members of the community, who represent many different interests, to sit on the Massena RAP Citizen Advisory Committee (CAC). Representatives of sportsmen's groups, industry, local government, environmental groups, the Native American community, civic groups, small business and other government agencies are members of the CAC.

Members differ in their perspectives, ideas and goals for the RAP process. Some want to actively help shape the plan others are present to keep track of the process and the outcome for their group and perhaps prevent negative impacts. All points of view are interesting and valuable to the Department in developing the RAP. NYSDEC has not asked the group to come to a consensus. The Department wants to hear all their opinions about the plan- what are their goals, fears, insights about the feasibility and desirability of the plan. Ultimately, NYSDEC hopes that the participation of community members in the development of the plan will result in a better plan- one that is accepted by the public and will be implementable.

CAC Activities in Stage II

The CAC advised NYSDEC through the development of both Stage I (problems, causes and sources) and Stage II (remedial options, recommendations and commitments) of the RAP. Stage I activities are discussed in the Stage I document.

Prior to beginning work on Stage II, the CAC evaluated the Stage I process and discussed what changes they wanted to make in their operating procedure before embarking on Stage II. Three changes occurred as a result of this discussion: the committee devoted more of their meeting to discussion and less to presentations and they opted for a less formal seating arrangement to better accommodate discussion. They also indicated that they would prefer to see and comment on the document in draft text form and not look at it in the initial outline form. This effectively dropped out a step in the review process established in Stage I.

Another internal issue, which manifested itself during Stage I, was tackled by the CAC during development of Stage II. The issue grew out of the decision by the committee to comment on the General Motors Preliminary Remedial Action Plan (PRAP), part of the Superfund process in progress at the General Motor's plant in Massena. The PRAP is related to the Massena RAP in that the clean up of the GM hazardous waste sites will contribute to attaining the RAP goal. Disagreement between members of the committee on whether to support the recommended plan for remediation proposed by GM or the one proposed by EPA led to a split between two groups on the committee. By committee vote, the CAC supported the cleanup proposed by GM in lieu of the plan proposed by EPA. A minority opinion was filed with the official stand of the CAC.

The incident surfaced the deeper issue of the lack of frank discussion between members of the committee regarding the relationship between economic and environmental needs. CAC members agreed to invite a mediator to facilitate a discussion of this issue. The facilitated meeting was a positive one. It helped identify areas where the CAC could start deeper discussions of economic/environmental need and some positions held by members were explored. However, time set aside for the meeting was limited. The facilitator offered to return to continue the discussion at another time. Some members of the CAC felt that further discussion was necessary, others felt that they had taken enough time for the issue and they wanted to get back to working on the RAP document. The Committee voted not to spend additional time discussing this issue.

During the course of Stage II the CAC endorsed a proposed Aquarium and Ecological Center project and decided not to comment as a group on the ALCOA Proposed Remedial Action Plan (part of the State Hazardous Waste Remediation Program at the ALCOA plant).

Technical Subcommittee Activities

The technical subcommittee reviews and interprets technical information for the CAC and is involved with the development of technical aspects of the RAP. They helped plan and conduct technical workshops for the CAC and the public and sponsored speakers at the CAC meetings. To fund these efforts, the St. Lawrence County Planning Department held a Section 205 (j) grant (federal pass-through Clean Water Act money) for the subcommittee.

The subcommittee held two technical workshops during Stage II: Remediation Techniques and Monitoring. In the first, Remediation Techniques, a private consultant described methods currently available for cleaning up contaminated land and sediments. At the second, Monitoring, representative of the Canadian, Mohawk and New York environmental agencies described their agency's monitoring programs in the St. Lawrence River followed by discussions with participants about possible cooperative efforts. About thirty people attended each workshop including members of the CAC and NYSDEC.

Public Outreach Subcommittee Activities

The public outreach subcommittee works to inform the community about the RAP and tries to enlist support for implementation of the plan. They plan and conduct public outreach activities and participate in community events.

At the beginning of Stage II, the committee was small but still made attempts to get the word out to the public. The traveling display and RAP factsheets and newsletters were taken to several sportsmen's shows and a local college. Booths for the 1991 season shows are currently being reserved.

The slide presentation developed in Stage I was also taken to additional community groups who wanted to hear about the RAP.

As the subcommittee gained a few more members, plans were put in motion to update the original slide show for use during the RAP implementation phase. This project is still in progress.

Volume three of the newsletter was written and distributed. This project was managed by an intern at NYSDEC with the help of members of the CAC and the public outreach subcommittee. A third fact sheet was also produced in this manner.

The public outreach subcommittee also worked with the technical subcommittee to plan and publicize the technical workshops.

Steering Committee

The steering committee members include NYSDEC staff, the CAC chairman, 1st vice chairman, 2nd vice chairman and the chair persons of the subcommittees. Its role is to provide direction for the project and coordinate between the activities of the CAC and NYSDEC. The steering committee is chaired by NYSDEC and gives the CAC a voice in the management of the project.

Established during Stage I, the steering committee continued its leadership role during Stage II.

International and Inter-agency Communication

Stage I describes mechanisms developed to encourage communication among the various jurisdictions on the River: joint goal and problem statements and the St. Lawrence River Restoration Council.

During Stage II New York and Ontario worked on a joint problem statement document. This document contains the conclusions from the Massena Stage I and the Cornwall Stage I on what problems exist in the St. Lawrence River.

The Restoration Council did not meet as frequently during Stage II. They indicated that they will review both the Cornwall and the Massena Stage I documents.

NYSDEC also maintained its communication with other governments and other NYS agencies to share technical materials and information with them. Agencies other than NYSDEC will have roles to play in the implementation of the RAP. Because of this, an effort to remain in communication with these groups will extend beyond development of Stage II and into implementation.

Draft RAP

The draft Stage II RAP was sent to interested parties for review and comment in June 1991. A seven page newsletter was developed and distributed to a wide audience to announce the availability of the draft RAP and to summarize its contents. The newsletter also announced the public availability session which was held in Massena on June 27, 1991 from 3 to 8 p.m. This session allowed citizens an opportunity to informally discuss RAP issues with NYSDEC personnel.

Future Plans

The CAC finishes its responsibilities and will disband when Stage II is submitted to the IJC. A Remedial Advisory Committee (RAC) will be appointed to advise the Department during implementation of the RAP. Their tasks will include both advising on implementation and helping to prepare periodic updates of the RAP itself as new information becomes available and remediation activities are completed (See Chapter 5). Advice has been solicited from the CAC on the formation of the RAC.

APPENDIX A

Record of Decision

General Motors Corporation

Central Foundry Division Site

Massena, New York

This Appendix contains a summary of the Record of Decision (ROD) for the first "operable unit" at the General Motors site (issued December 17, 1990). The full ROD is available in local repositories (Massena Public Library) and from the lead regulatory agency (EPA).

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

General Motors Corporation - Central Foundry Division Site
Massena, St. Lawrence County, New York

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the General Motors - Central Foundry Division Superfund Site, in Massena, New York, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendment and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document explains the factual and legal basis for selecting the first operable unit remedy for this Site.

The New York State Department of Environmental Conservation (NYSDEC) and the St. Regis Mohawk Tribe concur on the selected remedy. Letters of concurrence from NYSDEC and the St. Regis Mohawk Tribe are appended to this document.

The information supporting this remedial action decision is contained in the Administrative Record for this Site.

ASSESSMENT OF THE SITE

Certain actual or threatened releases of hazardous substances at or from this Site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

This action or "operable unit" is the first of two operable units that are planned for the Site. This operable unit addresses several of the principal threats at the Site by treating contaminated river system sediments and sludges, soil, and groundwater at the Site. The second operable unit will address the threats resulting from the East Disposal Area and the Industrial Landfill at the Site.

The major components of the selected remedy include:

- Dredging and excavation of sediments and soils from polychlorinated biphenyl (PCB) contaminated areas in the St. Lawrence and Raquette Rivers, Turtle Creek, and associated riverbanks and wetlands;

- Interim surface runoff control to prevent migration of contamination from the East Disposal Area;

- Excavation of PCB contaminated sludges, soil, and debris in the North Disposal Area, in and around the four Industrial Lagoons, and in other areas on General Motors (G.M.) property (two of the four lagoons, which are currently in use by G.M., will be remediated when they are taken out of service);

- Excavation of PCB contaminated soil on St. Regis Mohawk Reservation land adjacent to the G.M. facility;

- Recovery and treatment of groundwater downgradient from the Site with discharge of treated groundwater to the St. Lawrence River; and

- Treatment of dredged/excavated material by either biological treatment (or another innovative treatment technology which has been demonstrated to achieve site treatment goals) or thermal destruction to be determined by the U. S. Environmental Protection Agency (EPA) following treatability testing. Treatment residuals will be disposed on-site. Other innovative PCB treatment technologies will be tested concurrently with biological treatment so that EPA will have additional information in the event that biological treatment proves to be unsatisfactory for treatment of any Site material. EPA will select the treatment technologies to be employed, in consultation with NYSDEC and the St. Regis Mohawk Tribe.

DECLARATION

The selected remedy is protective of human health and the environment, complies with Federal, State and Tribal requirements that are legally applicable or relevant and appropriate to the remedial action (or provides grounds for invoking a waiver of these requirements), and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable and satisfies the statutory preference for remedies which employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on-site above health-based levels in the active Industrial Lagoons until they are taken out of service, a review will be conducted within at least five years after commencement of

remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Constantine Sidamon-Eristoff
Regional Administrator
U. S. Environmental Protection Agency

December 17, 19
Date

ROD FACT SHEET

SITE

Name: General Motors - Central Foundry Division (first operable unit)

Location: Massena, St. Lawrence County, New York

HRS Score: Group 5

NPL Rank: 350

ROD

Date Signed:

Remedy: Dredging/excavation of sediments and soils in the St. Lawrence and Raquette Rivers and in Turtle Creek; excavation of sludges, soil and debris in the North Disposal area, in the four Industrial Lagoons, and in other areas on G.M. property; excavation of soil on St. Regis Mohawk Reservation land; treatment of dredged/excavated material by either biological treatment (or another innovative treatment technology which has been demonstrated to achieve site treatment goals) or thermal destruction to be determined following treatability testing; and downgradient groundwater recovery and treatment.

Capital Cost: $ 84.8 million

O & M/Year: $ 197,000 - $ 464,000 per year

Present Worth: $ 78 million

LEAD

Potentially Responsible Party

Contact: Lisa Carson, (212) 264-6857

Main PRP: General Motors Corporation

WASTE

Type: PCBs, phenols, PAHs

Media: Sediments, soil, sludges, and groundwater

Origin: On-site disposal of PCBs used in hydraulic fluids

Est. Quantity: Approximately 253,000 cubic yards of PCB contaminated material addressed in this ROD

DECISION SUMMARY

GENERAL MOTORS - CENTRAL FOUNDRY DIVISION SITE

MASSENA, NEW YORK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

NEW YORK

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APPENDIX B

Record of Decision

Aluminum Company of America (ALCOA)

Massena Operations

Massena, New York

This Appendix contains a summary of the Record of Decision (ROD) for the first "operable unit" at the ALCOA site (issued March 15, 1991). The full ROD is available in local repositories (Massena Public Library) and from the lead regulatory agency (NYSDEC).

Site Names and Numbers -

The Aluminum Company of America (ALCOA) Massena Operations Massena, New York; sites -

Oily Waste Landfill - #645016
Spent Potlining Pile 1 - #645001
Spent Potlining Pile A #645003
Primary Lagoon and Dredge Spoils Area - #645005 Unit 3
Soluble Oil Lagoon - #645005 Unit 1
Dennison Road - #645004
West Marsh - #645017
Unnamed Tributary - #645019

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the above listed ALCOA sites developed in accordance with the New York State Environmental Conservation Law (ECL), and is consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 USL Section 9601, et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA). Section IX of this record lists the documents that comprise the Administrative Record for the ALCOA sites. The documents in the Administrative Record are the basis for the selected remedial action.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from these site, if not addressed by implementing the response action selected in this Record of Decision (ROD), present a current or potential threat to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDIES

OILY WASTE LANDFILL - 645016

All wastes and visibly waste contaminated soils will be excavated in accordance with clean up goals established in Section VI of the ROD. Lightly contaminated material that complies with the Land Disposal Restrictions (LDRs) will be placed in an on-site secure vault. ALCOA will further investigate the feasibility of waste treatment via the solvent extraction process which concentrates the contaminants in a waste oil stream. This waste oil stream will be incinerated off-site, while the treated material will be placed in an on-site secure vault.

Confirmatory sampling will be performed after the initial excavation to determine if clean up goals have been satisfied. If the goals are not met, a decision will be made regarding the need for additional work to protect public health and the environment. Upon completion of the excavation work, the area will be backfilled and capped. Contaminated groundwater will be recovered and treated as determined in FS II. If ALCOA can show, to the Department's satisfaction, that an alternative treatment technology exists that significantly and permanently treats the waste, or that no feasible treatment alternative exists, the Department may amend the ROD in accordance with O&D memorandum 89-05-9.

POTLINING PILE I - ID #645001

The existing cap will be upgraded to conform to the cap requirements for an approved hazardous waste disposal facility. A deeper leachate collection system will be installed outside the existing system. This will be enclosed by a soil-bentonite barrier keyed into the underlying clay. The depth of the barrier will be determined during Remedial Design. Operation of the leachate collection system will continually lower the groundwater level within the barrier, thereby creating an inward hydraulic gradient toward the disposal cell. The collected leachate will be treated on-site, or properly disposed off-site. Deeper groundwater recovery and treatment will be evaluated in FS II.

POTLINING PILE A - ID #645003

The waste and contaminated soils at Pile A will be excavated and placed in an on-site secure vault. Confirmatory sampling will be performed after the initial excavation to determine if clean up goals have been met as explained in Section VI of the ROD. If the goals are not met, a decision will be made regarding the need for additional actions to protect public health and the environment. The area will be backfilled and capped after completion of the excavation work. Groundwater recovery and treatment will be addressed in FS II.

PRIMARY LAGOON AND DREDGE SPOILS AREA - ID #645005 UNIT 3

The dredge spoils and lagoon sludge and underlying soil will be excavated and dewatered, if necessary, solidified, and placed in an on-site secure vault. The lagoon wastewater will be decanted and treated to satisfy the facility's discharge limits. Confirmatory sampling will be performed in both instances to determine if clean up goals have been met. If the goals are not met, a decision will be made regarding the need for additional work to protect public health and the environment. Once the excavation is complete, the entire area will be backfilled and capped. Groundwater recovery and treatment will be evaluated in FS II.

SOLUBLE OIL LAGOON - ID #645005 UNIT 1

Initially, the wastewater will be decanted and treated to satisfy the facility's discharge requirements. The sludge and underlying soils will then be excavated and treated via the solvent extraction process. The concentrated waste oil stream resulting from the extraction process will be incinerated off-site, and the treated materials will be placed in the on-site vault. Confirmatory sampling will be performed after the initial excavation to determine if clean up goals have been satisfied. If the goals are not met, a decision will be made regarding the need for additional work to protect public health and the environment. Upon completion of excavation activities, the area will be backfilled and capped. Groundwater recovery and treatment will be evaluated in FS II.

DENNISON ROAD - ID #645004

The drum disposal area, and any additional waste and visibly waste contaminated soil within the drum disposal area will be excavated. Additional exploratory borings are necessary to define the extent of contamination, and need for additional remediation to meet clean up goals, in the adjoining former ravine. If further excavation is deemed infeasible due to site conditions, or technical constraints, the Department may amend the ROD in accordance with O&D memo 89-05-9. The PCB - contaminated surface soil south of the trench will also be removed. Materials which meet the Land Disposal Restrictions (LDRs) will be placed in the on-site vault. Empty drums or other debris which cannot physically undergo treatment will also be placed in the vault. The remaining material will be subjected to solvent extraction in order to concentrate the contaminants in a waste oil stream. This stream will be incinerated off-site, while the "treated" material will be put in the vault. If treatability studies show that solvent extraction cannot meet the LDRs, alternative treatment technologies will be considered in an amended ROD. Confirmatory sampling will be performed after the initial excavation to determine if clean up goals have been satisfied. If the goals are not met, a decision will be made regarding the need for additional work to protect public health and the environment. After the excavation work is complete, the area will be backfilled and capped. Groundwater recovery and treatment will be evaluated in FS II.

WEST MARSH - ID #645017

A drainage system will be installed along the existing marsh channel, and the area will be backfilled and capped to create an upland region. The cap will comply with the requirements for closure of an industrial waste disposal area. Water collected from the drainage system will be monitored and treated as

necessary to meet the facility's discharge limits. The 3 acres of lost wetlands will be relocated to an area acceptable to the Department. This location will be specified in the ROD following FS II. The area will be monitored for 5 years to insure that the remedy has effectively abated impacts on biota.

UNNAMED TRIBUTARY - ID #645019

The section of the tributary between the IRM work zone and Route 131 (ALCOA's property line) will be sampled for residual contamination. Any areas of PCB contaminated sediment/soil above 1 ppm will be excavated and placed in an on-site secure vault. Confirmatory sampling will be performed. Excavation will continue until all PCB levels are below 1 ppm. The original grades in the tributary will be re-established using clean fill and rip-rap, as needed, to control erosion. Biological monitoring will be conducted for 5 years to determine the effectiveness of the clean up.

The length of the tributary between Route 131 and the Grasse River will be evaluated further prior to developing a remedial program. ALCOA shall submit a work plan to the Department to further evaluate remedial alternatives for this segment of the tributary.

DECLARATION

The selected remedies are designed to be protective of human health and the environment, are designed to comply with applicable State Environmental Quality standards and are cost effective. These remedies satisfy the Department's preference for treatment that reduces the toxicity, mobility or volume of hazardous substances, pollutants or contaminants as the principal goal.

MAR 1 6 1991

Date

Edward O. Sullivan
Deputy Commissioner

RECORD OF DECISION

for

THE ALUMINUM COMPANY OF AMERICA
MASSENA OPERATIONS
MASSENA, NEW YORK

prepared by

THE NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION - REGION 6
WATERTOWN, NEW YORK

MARCH 1991

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APPENDIX A - REMEDIATION SCHEDULE

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APPENDIX C - RESPONSIVENESS SUMMARY/PUBLIC

APPENDIX C

RESPONSIVENESS SUMMARY

NYSDEC held a public availability session to discuss the Stage II RAP on June 27, 1991 in Massena. Verbal comments were received at that time. In addition, copies of the June 1991 draft Stage II RAP were distributed to the general public and other government agencies in both the U.S. and Canada to solicit comments.

NYSDEC staff addressed editorial and informational comments. The changes were made but not included in this summary. Most comments contributed to the improvement of the thoroughness and accuracy of the document. Substantive comments and NYSDEC response are shown below.

General

Comment: The RAP needs additional details (beyond those reported in Stage I) of the remedial measures which are about to take place in the area of concern.

Response: Agreed. Specific remedial measures at a hazardous waste site are documented in a Record of Decision (ROD). Two RODs have been completed in the Massena area: General Motors operable unit 1 and ALCOA operable unit 1. Summaries of these RODs have been added to the RAP in new appendices. Future RAP annual reports will provided summaries of additional RODs as they become available. Copies of the full RODs are available from the issuing agency and in local repositories (libraries).

Comment: Numerous verbal and a few written comments were received regarding specific remedial alternatives, techniques and/or designs at the hazardous waste sites (particularly General Motors).

Response: The hazardous waste site process, which includes Record of Decision (ROD) procedures and extensive public input opportunities, addresses specific remedial alternatives. The RAP can not short circuit this legal process. Therefore, all specific comments on remedial alternatives and techniques have been referred to the hazardous waste regulatory program elements to be incorporated into the Record of Decision process. Also, many of these concerns will be addressed during the remedial design phase at the hazardous waste sites. This phase will have a public comment component where specific concerns with techniques and design (i.e. dredging) will be addressed. It should be noted that the General Motors site ROD for the first operable unit requires dredging of contaminated

sediments as soon as possible because they are a principal threat. This material may need to be temporarily stored upland during the design phase while treatability testing is ongoing.

Comment: Stage I discussed the introduction of foreign exotic species to the Area of Concern, such as the zebra mussel. There is no mention of this subject in Stage II.

Response: Such discussions were in draft versions of the Stage I report and were subsequently removed from the final Stage I RAP. The Department agreed with comments received on the Draft Stage I document that zebra mussels do not originate in the Area of Concern, are not currently impairing uses in Massena, nor is it likely the area is the source of this problem which is seen through out the Great Lakes.

Comment: SPDES discharge limits reflect the current EPA technological limits of contaminant detection for PCBs, therefore, further discharge restrictions are not possible according to the document. There are however, technologies available which improve detection limits to 1 ppt.

Response: The legal authority of SPDES permits depends on analytical techniques that are proven to be reliable and reproducible using replicate analyses (99% probable the substance is present). Experimental technologies that have not passed the necessary technical requirements can not be used until they are approved by the EPA. The current approved detection limit for PCBs is 65 ppt.

Comment: SPDES permit limits should be technically and statistically verified on a constant basis before lowering permit limits.

Response: As explained in the previous response, analytical technologies used to develop permit limits must be legally defensible and approved by the EPA. As is explained in Chapter 2, permittees have the option of performing a method detection limit study to identify potential problems (interferences) with an analytical method that are specific to a particular wastewater effluent.

Comment: There are no calculations of contaminant loadings.

Response: Sampling in New York is not geared toward determining loadings. It is normally done for enforcement purposes and is intended to verify that discharges are kept below maximum or average limits. However, some loadings were calculated and are documented in the Stage I RAP.

Comment: Can there be restrictions on the volume of effluent released from the industries to reduce the total load to the system?

Response: Waste minimization efforts are underway throughout New York State and wasteflow reduction is a major element of a waste minimization plan. New pollution prevention sections have been added to Chapters 3 and 4 to discuss initiatives and progress in this area. Chapter 4 also discusses efforts by ALCOA to reduce wastewater discharge from its facility from 12 MGD to less than 1 MGD by 1993.

Comment: It is assumed that the existing standards are adequate to restore, protect or maintain beneficial uses. When they were developed based on assimilative capacity of a waterbody, how can it be assumed that they are adequate using an ecosystem approach?

Response: New York State standards <u>are not</u> devised based on assimilative capacity of waterbodies, they are developed based on effect shown in laboratory studies. Therefore, New York's water quality standards protect the environment by defining the level of no effect on the ecosystem. Permit limits are developed to keep ambient levels below the standard.

Comment: Canadian data to support historical and/or ongoing movement of PCBs in water, fish and sediment in the river and Lake St. Francis should be cited in this report.

Response: Data analysis and documentation were a function of the Stage I RAP. Stage I (November 1990) used many sources of data, including Canadian sources, to document the conditions in the AOC. The function of this Stage II document is to develop a remedial strategy to correct the situations that are documented in Stage I.

Comment: The RAP does not embody an ecosystem approach because it uses political boundaries rather than ecological boundaries. While it appropriate for Stage II "remedial recommendations [to be] described within appropriate legal and regulatory restraints" there are actions that can be appropriately taken that influence bodies outside the direct jurisdiction of NYSDEC.

Response: The RAP addresses remediation of the Area of Concern while considering the interrelationship of the various environmental media (water, soil, air, etc.) and considering transboundary impacts (which was added to Stage I as a fifteenth impairment indicator). However, the RAP has not specifically identified sources that are outside of New York's political jurisdiction due to difficulties in identifying such sources that have an impact in the Massena Area of Concern. Although such sources are difficult to identify

and quantify, it is likely that sources from other political jurisdictions (both upstream and cross-stream) are having some effect in the AOC since the St. Lawrence river drains the entire Great Lakes basin. Action on such sources however, is beyond the scope of the RAP. There are other more appropriate mechanisms such as the Lake Ontario Toxics Management Plan (which has a public involvement element), the Council of Great Lakes Governors, the Great Lakes Commission, etc. to accomplish these objectives.

Comment: The report does not discuss sport fishing, seasonal waterfowl hunting and water based recreation in the AOC. A map showing marinas, beaches, parks, wildlife refuges, etc. would be helpful. The importance of a clean healthy environment in supporting low economic bases such as tourism, outdoor recreation and agriculture needs to be linked to the RAP process.

Response: These topics were discussed in the Stage I RAP. However, in order to focus on remediation of the AOC, these topics were not specifically addressed in Stage II. They may be addressed in one or more of the annual reports.

Chapter 1 - Introduction

Comment: There were several inquiries about details and conclusions regarding impairments and sources especially related to Tables 1-1, 1-2.

Response: This chapter was intended to be a brief summary of the Stage I RAP. Please refer to the Stage I RAP for more details on impairments and sources. Stage I is available from NYSDEC.

Comment: The confidence of cause for transboundary impacts should be "known" rather than "probable".

Response: As documented in Stage I, there is no direct information on the net export of contaminants from the Massena AOC. Pollutants are certainly present at levels expected to cause an impairment, however, a direct link with the impairment has never been definitively established because proof of such a link is very difficult. It should be noted that the positive impairment definitions (yes and likely) will be treated similarly for remedial purposes.

Comment: The impairment definition for "degradation of fish and wildlife populations" should be changed from "likely" to "yes".

Response: As documented in the Stage I RAP (page IV-9), there is currently only

indirect evidence of impairment. As more evidence is obtained this and other conclusions made in Stage I could be changed. An investigation to determine if fish or wildlife populations have been degraded and to determine the cause(s) of degradation (if necessary) has been proposed in Stage II.

Comment: In Table 1-2, why are industrial discharges "known sources" and waste sites only "potential sources" of contaminants for many impairment indicators if the report states waste sites are the primary source of PCBs to the AOC?

Response: In general it is a problem of direct effect vs. indirect effect. Industrial discharges which are point sources are monitored and can be directly measured. Waste sites are much more difficult to monitor for effect since they are often nonpoint sources. Since Table 1-2 is a very brief summary of the information documented in the Stage I RAP, the reader should refer to Stage I for more detail on each specific impairment indicator and source.

<u>Chapter 2 - Current Programs and Remedial Options</u>

Comment: Table 2-1 identifies the causes of pollution and the existing programs applied to the sources. This table seems to be final. It should be changed if more pollution is identified.

Response: This table and all aspects of the RAP are subject to change as knowledge of pollution and its causes in the Area of Concern increases in the future. The RAP is not a static document, rather it is a dynamic process that will be continually refined.

Comment: There is no evidence to suggest PCBs and DDE from Cornwall sources cause a use impairment in the AOC.

Response: The Stage I Massena RAP documents potential Cornwall AOC sources including DDT metabolites in suspended sediment samples at Cornwall (pages V-32,33) and a source condition in the north channel of Cornwall Island (page V-14) as evidenced by elevated levels of PCBs in fish.

Comment: The list of communities with combined sewer overflows (page 2-16) includes Alexandria Bay and Cape Vincent which are believed to have separate systems.

Response: Correct, these two communities do have separate systems. However, due to system problems (infiltration, etc.) the sewer acts like a combined system. Therefore, they are considered to be combined systems for

regulatory purposes.

Comment: Although phosphorus is identified as a cause of impairment in Stage I (Table 2-1), phosphorus removal at NY POTWs is not listed as a remedial option to address the impairment.

Response: The Stage I RAP documents that the Massena AOC does not have a eutrophication impairment. Phosphorus is identified in the RAP as a probable cause of impairment due to potential transboundary effects. The cause of this special RAP indicator of impairment is not believed to be St. Lawrence basin dischargers, since phosphorus loading from basin tributaries are dwarfed by upstream inputs (93% of the total phosphorus load to the AOC comes from Lake Ontario - see Table V-8, Stage I). In addition, sampling at the major POTWs in the basin has shown that most facilities discharge phosphorus below or near 1.0 mg/L (the typical phosphorus limit) and the Massena POTW, which is the only POTW in the AOC, routinely discharges below 1.0 mg/L phosphorus. Therefore, since there is not a documented problem and further phosphorus reduction is not likely to have a significant impact, there is no need for special phosphorus requirements in New York's St. Lawrence River basin.

<u>Chapter 3 - Recommended Remedial Strategy</u>

Comment: The remedial program at the Sealand Restoration site has not been completed.

Response: Correct. Appropriate changes have been made to Chapters 2-4.

Comment: Transboundary impacts of remediation are discussed in the hazardous waste section of Chapter 3, but are not mentioned in the sediment section. Due to its importance, it would be useful to add the subject of transboundary impacts to the sediment section.

Response: Agreed. The text has been modified.

Comment: Page 3-3 discusses transboundary impacts. Does this imply there will be particular exchanges with Canada and if so, what will be the mechanism for such exchanges.

Response: Recommendation 2 states that remedial initiatives will be accomplished with full consideration of possible transboundary effects. Such remedial actions will be designed to minimize transboundary impacts. Remediation in the Massena area should eliminate transboundary impacts caused by the current situation and activities will be monitored during remediation to

determine if the remediation itself is causing a problem.

Comment: There is no mention of direct dischargers such as private homes, schools, etc., that discharge untreated sewage into the basin upstream of the AOC.

Response: Discharges from individual residences were not identified in Stage I as a source of impairment. Therefore, they are not addressed in Stage II. However, the Department recognizes that some of these discharges may exist in the St. Lawrence basin and does respond to complaints. Without a specific complaint, enforcement can not occur unless a discharge can be readily identified. Identification may occur when discharges are located in high density (i.e. the Village of Richmond) where monitoring identifies a water quality problem that can be tracked down to a cluster of direct dischargers. Also, it should be noted that "Save The River" operates the "Kingfisher" project in the Clayton-Alexandria Bay area which assists individuals with their sanitary systems (educational materials, site tours, testing and recommendations).

Comment: The criteria for the evaluation of contaminated sediments (page 3-10) should adopt the level of 0.1 ppm that the Mohawks have deemed necessary.

Response: NYSDEC has developed a draft document entitled "Cleanup Policy and Guidelines" (June 1991) which contains draft cleanup criteria for aquatic sediments. This criteria is based on the organic carbon content of the sediments and water quality limits for the protection of fish consuming wildlife. For a typical 3% organic carbon content in sediment the criterion for PCBs would be 0.042 ppm. A copy of this draft document is available from NYSDEC.

Comment: The Air Toxics section should include political pressure from the State and local governments and the Citizens Advisory Committee on other State and Federal governments to pass and implement more protective air laws and regulations.

Response: The purpose of this Remedial Action Plan is to clean-up the Massena Area of Concern. Action in other States and Countries is beyond the plan's scope. Other planning efforts such as the 25 Year Plan for the Great Lakes and the Lake Ontario Toxics Management Plan better serve this type of political purpose. Please note that passage of the new Clean Air Act will help to combat this problem on the U.S. side of the border.

Comment: The Air Toxics section should include nonpoint source air sources. Specifically, the State and Federal governments should develop regulatory

programs for nonpoint source air sources such as pesticide drift, etc.

Response: As is discussed in the text of Chapter 2, New York State is developing fugitive emission regulations to address air discharges that are not captured by pollution control systems. Also, area sources that are deemed to be a problem are regulated (emissions from a large area may be captured and controlled, thus creating a point source). However, if a source can not be quantified, then it is difficult to control. In addition NYSDEC pesticide regulations have provisions that prohibit pesticide drift. Since nonpoint air sources have not been determined to be a problem in the AOC, no changes were made relevant to this comment.

Comment: Specific fish and wildlife goals should be established as part of Stage II.

Response: Specific goals can not be set at this time because there has not been a detailed assessment of current fish and wildlife populations. However, such an investigation is recommended (#15) as part of the ongoing Stage II process. This investigation will determine the level of impairment, its causes and establish management goals to support healthy populations of desired fish and wildlife.

Comment: There are other significant data gaps such as our lack of knowledge of the sources of AOC contaminants (a mass balance study is needed) and the "fetotoxicity" of various toxics.

Response: Stage II concentrates on investigations to more thoroughly define the International Joint Commission's impairment indicators. It is likely that additional data and/or investigations will be needed during RAP implementation. However, the Natural Resource Damages Assessment Plan will be identifying additional data needs. Future RAP annual reports may also identify necessary investigations. Additional text has been added to the investigations Chapter to clarify this issue.

Comment: The transboundary investigation should factor in cross-stream loadings.

Response: Agreed. The investigation has been modified.

Comment: Numerous comments were received on the appropriateness of including the St. Lawrence Aquarium and Ecological Center in the RAP:

a) It is not relevant to the purpose/objectives of the RAP.
b) It is not problem specific.
c) It is not needed to fill data gaps since there are other research facilities available.

d) Its importance to RAP implementation is overstated since this facility will only operate six months of the year.

Response: The St. Lawrence Aquarium and Ecological Center proposed for the Massena area is not critical to clean-up efforts in the Area of Concern. Therefore, the development and construction of this project will no longer be a remedial recommendation of this plan. Removal of this project from the RAP document is not a reflection, either positive or negative of the relative merits of the proposed aquarium and ecological center.

Comment: There are no habitat recommendations.

Response: Several potential habitat improvement recommendations were developed and discussed. However, most of the recommendations centered on areas outside the Area of Concern. Based on advice from the Citizens Advisory Committee, these recommendations were determined to be inappropriate for the RAP. The Natural Resources Damages process discussed in Chapter 3 will address habitat related problems. An assessment plan is currently being developed to determine the nature of the problem. Therefore, it is premature to recommend habitat related solutions until the full extent of the problem is known. Eventually the Natural Resource Damages process will result in a restoration plan to restore and/or replace the injured natural resource.

Chapter 4 - Commitments

No Comments

Chapter 5 - Implementation and Monitoring

Comment: The environmental monitoring section should include air monitoring since this is an important pathway.

Response: Agreed. Air monitoring has been added to Chapter 5.

Comment: The RIBS program will fall short as a long term monitoring strategy to assess if remedial programs have succeeded in restoring the AOC.

Response: Agreed. The RIBS was not designed for this purpose, rather it will provide trend analysis for the basin and determination of ambient water quality with respect to standards. There are many other monitoring components for the Area of Concern discussed in this chapter. A summary of the most important components are reviewed in a new paragraph at the end of the summary section.

Comment: The need for long range planning and shoreline and land-use zoning and other controls to protect the river and its shoreline from inappropriate haphazard, and unwise development should be discussed in much greater detail. The current pending sale of approximately 5,000 acres of New York Power Authority land just upstream in Waddington, NY should be discussed in much more detail. Possible proposed shoreline protective greenbelt legislation for this area and possibly the entire U.S. shoreline should also be discussed.

Response: It is agreed that planning activities should be discussed in more detail in the RAP. Therefore, new sections describing activities and commitments under New York's Coastal Zone Management Program have been added to Chapter's 3 and 4.

The sale of the Power Authority Land and potential greenbelt legislation are beyond the scope of this RAP since they are outside of the Area of Concern. Please note that the St. Lawrence County planning Board has developed recommendations for the use of the Power Authority land (Directions for Change: Land Use Analysis and Recommendations for Surplus Properties of the New York Power Authority-1987). Also, an inter-agency task force has been established to consider land use issues connected to this land. This was discussed in Stage I of the RAP.

Chapter 6 - Public Participation

No Comments