

Rochester Embayment Remedial Action Plan

Chapter 6

Summary of Linkages Between Impaired Uses, Pollutants Causing Impaired Uses, and Sources of Pollutants and Remaining Questions

This chapter was prepared primarily with information that is detailed in chapters 4 and 5 of the Stage I RAP. The purpose of this chapter is to summarize the linkages and remaining questions in a relatively easy to read format. For more detailed information on why the use impairments have been designated, see chapter 4. For information on the known or possible sources of pollutants, see chapter 5.

A. Summary of Linkages Between Impaired Uses, Pollutants Causing Impaired Uses, and Sources of Pollutants:

1. The following chart is a summary of the water quality problems, their sources, and the pollutants causing the problems.

ROCHESTER EMBAYMENT USE IMPAIRMENTS, CAUSES AND SOURCES

INDICATOR (USE IMPAIRMENT)	LOCATION G. River	LOCATION L. O./Embmt.	CAUSES (Known)	CAUSES (Possible)	SOURCES ¹ (Known)	SOURCES (Possible) ²
Restrictions on fish and wildlife consumption	Yes	Yes	PCB		Atmospheric deposition	Electrical equipment in storage
					Electrical equipment still in use	
					Junkyards	
					Landfills, dumps	
		Mirex		Recycling through sediments, water, air		
				Niagara River area		
				Oswego area		
			Dioxin		Atmospheric deposition/ incineration	
			Chlordane (Irondequoit Bay)		Niagara River area	
					Past agricultural and residential use	
Tainting of fish and wildlife flavor	Unknown	Unknown		Phenols		Atmospheric deposition. Industrial and Municipal wastewater
Degradation of fish and wildlife populations	Yes (for mink; unknown for other species)	Yes (for mink; unknown for other species)		PCB	Atmospheric deposition	Electrical equipment in storage
					Electrical equipment still in use	
				Junkyards		
				Landfills, dumps		
				Recycling through sediments, water, air		
				Mercury		Atmospheric deposition
Fish tumors or other deformities	Unknown	Unknown		PAHs in sediments		Ash fill Asphalt runoff Coal tar Atmospheric deposition Petroleum product spills
Bird or animal deformities or reproductive Problems	Yes (mink)	Yes (mink)		PCB (see Degradation of fish & wildlife populations)		
Degradation of benthos	Yes	Unknown	Oxygen depletion		CSOs and other past discharges (lasting effects in sed.) ³	
					Industrial Wastewater	
					Stormwater	
				Copper	Nonpt. sources	
					Industrial and Municipal Wastewater	
		Iron	Nonpt. sources			
			Landfill dumps			
		Nickel	Nonpt. sources			
			Industrial and Municipal Wastewater			
			Silver	Kodak		

NOTES:

¹SOURCES (known) lists known sources of the pollutants in question, but does not attempt to prioritize the importance of those sources. The relative magnitude of the sources can be determined for some pollutants but not for others. A more complete discussion of this is included in Chapter 5. When a particular point source is listed (e.g. Kodak), it appears from preliminary calculations to account for most of the loading other than that accounted for by nonpoint sources. Other point sources that appear to contribute a very small percentage of the total loading are not listed. Treatment plants discharging to the lake are not listed here, since their effluent is discharged where it is designed to have a minimal effect on the embayment.

²SOURCES (Possible) includes those sources that have already been identified as possible contributors to the impairments listed. Others may be identified as a result of further study.

³Combined Sewer Overflows (CSOs) are listed as sources of pollutants in several categories, even though the CSOAP program has now diverted most of the combined sewage to the Van Lare treatment plant and future overflows are expected to be rare. The reason CSOs are listed is that the impairments have been identified based on data collected during the past several years, when CSOs were a contributing factor. Some impairments may diminish in the future due to the CSOAP program. But of necessity, the table reflects information from the recent past. Data on operation of the CSOAP system will be collected in accordance with permit requirements and for review and analysis.

INDICATOR (USE IMPAIRMENT)	LOCATION G. River	LOCATION L. O./Embmt.	CAUSES (Known)	CAUSES (Possible)	SOURCES (Known)	SOURCES (Possible)
Degradation of benthos (cont'd)				PCB	Atmospheric deposition Electrical equipment still in use Junkyards Landfills, dumps Recycling through sediments, water, air	Electrical equipment in storage
Restrictions on dredging activities	Yes	No	Oxygen depletion		CSOs and other past discharges (lasting effects in sed.) ³ Industrial wastewater	
			Fecal coliform		Stormwater CSOs ³	
			Ammonia		Stormwater Stormwater Wastewater	
			Turbidity (sediment)		Agricultural runoff Construction sites CSOs ³ Dredging Natural causes Streambank erosion Urban stormwater Agricultural runoff	
Eutrophication of undesirable algae	N/A ⁴	Yes	Excess nutrients (phosphorus)		Atmospheric deposition CSOs ³ Dredge spoil On-site waste disposal systems Municipal and Industrial Wastewater effluent Urban stormwater Agricultural runoff	
Drinking water taste and odor problems	N/A ⁵	Yes	Algae (phosphorus)		Atmospheric deposition CSOs ³ Dredge spoil On-site waste disposal systems Municipal and Industrial Wastewater effluent Urban stormwater Agricultural runoff	
			Turbidity and temperature changes		Urban stormwater Weather conditions	

NOTES:

³Combined Sewer Overflows (CSOs) are listed as sources of pollutants in several categories, even though the CSOAP program has now diverted most of the combined sewage to the Van Lare treatment plant and future overflows are expected to be rare. The reason CSOs are listed is that the impairments have been identified based on data collected during the past several years, when CSOs were a contributing factor. Some impairments may diminish in the future due to the CSOAP program. But of necessity, the table reflects information from the recent past. Data on operation of the CSOAP system will be collected in accordance with permit requirements and for review and analysis.

⁴This impairment is not applicable in the Genesee River because flowing rivers are not subject to the process of eutrophication.

⁵The Lower Genesee River is not used as a source of drinking water.

INDICATOR (USE IMPAIRMENT)	LOCATION G. River	LOCATION L.O./Embmt.	CAUSES (Known)	CAUSES (Possible)	SOURCES (Known)	SOURCES (Possible)
Beach closings	N/A ⁴	Yes	Algae (phosphorus)		Agricultural runoff Atmospheric deposition On-site waste disposal systems Municipal and Industrial Wastewater effluent CSOs ³ Dredge Spoil Urban stormwater CSOs and stormwater (Genesee River) ³	
			Fecal coliform		Decomposing algae (see above) Dredging (distributes bacteria from sediments) Sewer cross-connections Stormwater runoff (West Sub-basin)	
			Turbidity (sediment)		Agricultural runoff Construction sites CSOs ³ Dredging Natural causes Streambank erosion Urban stormwater	
Degradation of aesthetics	Yes	Yes	Algae (phosphorus)		Agricultural runoff Atmospheric deposition CSOs ³ Municipal and Industrial Wastewater On-site waste disposal systems Dredge Spoil Urban stormwater	
			Turbidity (sediment)		Agricultural runoff Construction sites CSOs ³ Dredging Natural causes Streambank erosion Urban stormwater	

NOTES:

³Combined Sewer Overflows (CSOs) are listed as sources of pollutants in several categories, even though the CSOAP program has now diverted most of the combined sewage to the Van Lere treatment plant and future overflows are expected to be rare. The reason CSOs are listed is that the impairments have been identified based on data collected during the past several years, when CSOs were a contributing factor. Some impairments may diminish in the future due to the CSOAP program. But of necessity, the table reflects information from the recent past. Data on operation of the CSOAP system will be collected in accordance with permit requirements and for review and analysis.

⁴There are no beaches on the Lower Genesee River.

INDICATOR (USE IMPAIRMENT)	LOCATION G. River	LOCATION L.O./Embmt.	CAUSES (Known)	CAUSES (Possible)	SOURCES (Known)	SOURCES (Possible)
Degradation of Aesthetics (continued)			Litter		CSOs Dredging Littering Storm sewers	
			Dead fish below Lower Falls		Natural die-off Fish cleaning	
			Chemical seeps at Lower Falls			Creosote from beams in RG&E tunnel Buried tank from old furniture factory or other industrial use Former dump in gully
Added costs to agriculture or industry	Yes	Yes	Zebra Mussels		Exotic species	
				Turbidity		Weather
Degradation of phytoplankton and zooplankton populations	Yes	Unknown		Eutrophication (excess nutrients)	Agricultural runoff Atmospheric deposition CSOs On-site waste disposal systems Municipal and Industrial Wastewater Urban stormwater	
				Predation		Zebra mussels
				Phenols		
Loss of fish and wildlife habitat	Yes	Yes	Filling/drainage of wetlands		Development near shoreslines	
			Removal of riparian vegetation		Development near shoreslines	
			Sedimentation		Natural causes Urban stormwater Agricultural runoff Streambank erosion	
				High water conditions		Boat traffic in Braddock Bay may disturb tern nests.

B. Summary of Remaining Questions

The following chart summarizes the data gaps and research needs required to make complete assessments of some impairments or pollutant sources. This chart concludes Stage I of the Rochester Embayment Remedial Action Plan. Stage II will outline the specific remedial actions that need to be taken to improve water quality conditions and restore beneficial uses determined to be impaired in the Stage I RAP.

	<u>Use Impairment</u>	<u>Data Gaps/ Research Needs</u>	<u>Ongoing Studies</u>	<u>Chapter</u>
1.	Added costs to agriculture or industry	Effect of zebra mussels on both water quality and the food chain.	None	3
2.	Degraded fish and wildlife populations	Baseline data assessing the abundance and condition of native species within the AOC.	None	3
3.	Degraded fish and wildlife populations.	"Fishless" segment of the lower Genesee River. What is the extent, location, and timing of this segment?	NYSDEC study in 1992-1993	4
4.	Degradation of Benthos	Whether the Lake Ontario portion of the embayment suffers from degradation of benthos.	None since 1976	4
5.	Degradation of Benthos	More specific tests in order to determine exact relationship between contaminants in Genesee River and Benthic community.	None	4
6.	Degraded fish and wildlife populations	Impact of zebra mussels on zooplankton and phytoplankton populations.	None	4
7.	Loss of fish and wildlife habitat	Whether toxins or boat traffic are responsible for decline of black tern populations in Braddock Bay.	None	4

	<u>Use Impairment</u>	<u>Data Gaps/ Research Needs</u>	<u>Ongoing Studies</u>	<u>Chapter</u>
8.	Tainting of fish and wildlife flavor	Whether fish in the AOC have a chemical odor.	1992 DEC survey of the Genesee River	4
9.	Fish tumors or other deformities	An investigation into liver tumors is needed.	None	4
10.	Degradation of aesthetics	Source of the foaming in Sandy Creek.	None	4
11.		An explanation for the discrepancy in atmospheric deposition among testing sites.	None	5
12.		Additional study should be conducted to validate the phosphorus loadings of the Genesee River and treatment plants.	None	5
13.		An estimation of cadmium loading from vehicle tires.	None	5
14.		Air loading data for cyanide.	None	5

NEXT STEPS:

These remaining data gaps will be considered in the development of the Stage II RAP, along with an analysis of remedial measures that will be considered for implementation to remediate the impaired uses identified in chapter 4.

The Stage II RAP preparation has already begun and is expected to be complete by the end of 1993.