



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

New York

Remediation of Hazardous Waste Nonpoint Sources Partially Restores Water Quality

Waterbodies Improved

New York's Niagara River flows 38 miles from Lake Erie to Lake Ontario, forming the border between western New York State and the Province of Ontario, Canada. The Niagara River watershed, with its access to inexpensive hydroelectric power and close proximity to rail and shipping routes, was a magnet for heavy industry and chemical manufacturing companies beginning in the early 1900s. By the 1960s, decades of poor management of industrial and hazardous waste had severely impaired Niagara River's water quality. In 1998 New York included the river on its 303(d) list of impaired waters for priority organics. Since then, significant remediation efforts at many sites have improved water quality, prompting New York to propose removing four contaminants from its 2008 303(d) list for both the upper and lower segments of the river.

Problem

The Niagara River's pollution affected both the United States and Canada. In 1987 four environmental agencies—U.S. Environmental Protection Agency (EPA), Environment Canada, New York State Department of Environmental Conservation (NYSDEC), and the Ontario Ministry of the Environment—signed a binational Declaration of Intent (DOI), committing to developing and implementing a plan to reduce concentration of toxic chemicals in the Niagara River. The DOI and work plan together form the Niagara River Toxics Management Plan (NRTMP). Environmental monitoring data collected for the NRTMP identified 18 priority toxics in the Niagara River that exceeded water quality criteria (Table 1).

New York State included the entire length of the Niagara River on its 1998, 2002, 2004, and 2006 303(d) lists for not meeting beneficial uses of aquatic life and fish consumption due to priority organics. These priority organics, the same organic chemicals that are included on the NRTMP priority toxics list, are identified as originating from contaminated sediments and land disposal. Beginning in 2004, New York began listing the upper mainstem and lower mainstem of the Niagara River as two separate segments.

Project Highlights

Through the NRTMP process, the four participating environmental agencies evaluated all potential sources of priority toxics and identified hazardous waste sites as the most significant nonpoint sources of priority toxics loading. A 1988 EPA hazardous waste site study identified 26 clusters

of U.S. hazardous waste sites responsible for approximately 700 lbs/day of priority toxics loadings to the river. In response, hazardous waste remediation programs under Superfund, the Resource Conservation and Recovery Act, and state hazardous waste program authority focused on remediation of these sites. These efforts addressed the most significant nonpoint sources of toxic contamination to the Niagara River.

Results

To date, remediation is complete at 21 of the 26 priority waste site clusters. Remediation costs have exceeded \$400 million, paid mostly by Potentially Responsible Parties. Remedial actions continue at the five remaining sites. The efforts

Table 1. NRTMP Priority Toxics

Chlordane	PCBs*
Mirex/PhotoMirex*	Dioxin (2,3,7,8-TCDD)*
Dieldrin	Octachlorostyrene (OCS)
Hexachlorobenzene (HCB)*	Tetrachloroethylene*
DDT and metabolites	Benzo(a)anthracene*
Toxaphene	Benzo(a)pyrene B(a)P*
Mercury*	Benzo(b)fluoranthene*
Arsenic	Benzo(k)fluoranthene*
Lead	Chrysene/Triphenylene

* Targeted for 50% Niagara watershed point and nonpoint reduction from 1987 baseline.

are working—total priority toxics loads to the river have decreased more than 90 percent, from approximately 700 lbs/day to less than 50 lbs/day. Remediation at sites such as the Cherry Farm/Roblin Steel federal Superfund site (Figure 1), which included capping contaminated sediments, has contributed to this decrease by significantly reducing the amount of priority toxic contaminants reaching the Niagara River from nonpoint sources.

Figure 1. These pictures of the Cherry Farm/Roblin Steel federal Superfund site show the difference between the actively polluting site in 1960 (left) and the post-remediation site in 2001 (right).



Niagara River surface water quality data show that water quality has improved over the past decade in response to the remediation projects. Data show that concentrations of most of the NRTMP priority toxics have decreased significantly, and several are now meeting water quality standards. For example, monitoring data collected from April 2004 through March 2005 at the head of the Niagara River (Fort

Erie) and at the mouth of the Niagara River (Niagara-on-the-Lake) show that annual average concentrations of total chlordane (organochlorine pesticide), p,p'-DDD (organochlorine pesticide metabolite of DDT), octachlorostyrene, and benzo(a)anthracene (a polycyclic aromatic hydrocarbon) are now below New York's water quality standards (Table 2).

As a result, New York has proposed removing these four contaminants from its 2008 303(d) list for both the upper and lower segments of the river. This continues a long-term trend in decreasing concentrations of NRTMP priority toxic chemicals in the Niagara River.

Partners and Funding

Since its inception, implementing the NRTMP in the United States has been a joint EPA Region 2 and NYSDEC water program priority. These agencies played key roles in setting overall NRTMP priorities, developing program work plans, and overseeing environmental monitoring and public reporting of success. Funding support for the Niagara River Toxics reduction efforts came from a variety of sources including Performance Partnership Agreement/Grant (PPG) funds, which include specific program outputs for NRTMP. EPA Region 2 awards Clean Water Act section 319(h) nonpoint source program funds to NYSDEC through the annual PPG process. In fact, Section 319(h) funds have been included in all of New York State's PPG Work Plans since the inception of the partnership process in 1996.

Table 2. The 2004/2005 annual average Niagara River surface water concentrations for contaminants proposed for 303(d) delisting compared to New York's water quality standards

Parameter	NY WQS (ng/L)	Upper 90% confidence interval (ng/L)		Predicted mean (ng/L)	
		FE	NOTL	FE	NOTL
Total Chlordane	0.02	0.009	0.012	0.008	0.011
p,p'-DDD	0.08	0.052	0.015	0.049	0.013
OCS	0.006	ND	0.005	ND	0.004
Benzo(an)anthracene	2.0	0.948	1.960	0.835	1.842

NYWQS = New York Water Quality Standards; ND = Non-detect; FE = Fort Erie (at the head of the Niagara River); NOTL = Niagara-on-the-Lake (at the mouth of the Niagara River); ng/L = parts per trillion (Adapted from Table 3 in the October 2007 NRTMP report)



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