INJURIES TO HUDSON RIVER SURFACE WATER RESOURCES RESULTING IN THE LOSS OF NAVIGATIONAL SERVICES

A Report Issued as Part of the

HUDSON RIVER NATURAL RESOURCE DAMAGE ASSESSMENT

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1.0 EXECUTIVE SUMMARY

The Champlain Canal was opened to boat traffic in 1916 and historically provided an effective means for recreational travel and commercial transport through the Upper Hudson River.[1] To ensure that the Canal continued to perform this valuable role, the State of New York periodically removed sediment that naturally accumulated in the navigation channel. In approximately 1980, however, the State terminated its maintenance activities, with one exception,[2] because polychlorinated biphenyl (PCB) contamination from the General Electric Company (GE) made the cost of disposing of the dredged sediment prohibitively expensive. Over time, sediment has continued to accumulate in the Canal, making navigation more difficult and dangerous. The State, as a natural resource trustee acting on behalf of the public, is responsible for assessing injuries to natural resources from the discharge of PCBs into the river and for determining how to restore lost services such as navigation of the Canal. This report describes how PCBs released by GE have adversely affected the public's ability to use the Upper Hudson River and the Champlain Canal for navigation and documents the legal basis for the State's claim for damages.

1.1 THE TRUSTEES' AUTHORITY

The responsibility for restoring natural resources that have been injured by hazardous substances lies with certain governmental agency heads known as Trustees. Trustees include the heads of certain State agencies, Indian tribes, and Federal government agencies. These officials act as stewards of natural resources and are responsible for holding these resources in trust for the public. The entities represented by the Trustees for natural resources of the Hudson River ecosystem are the U.S. Department of Commerce, the U.S. Department of the Interior (DOI), and the State of New York.

1.2 POLYCHLORINATED BIPHENYLS AND RELEASES OF PCBS TO THE HUDSON RIVER

Commercial production of PCBs began in the United States in 1929. For some years, PCBs were widely used as fire preventatives and insulators in the manufacture of electrical transformers and capacitors. The toxicity of PCBs has been a subject of concern since at least the 1950s. With increasing concerns about the compounds' impacts on human health and the environment, effective January 1977 Congress passed the Toxic Substances Control Act (TSCA), 15 U.S.C. § 2601 et seq., which required the United States Environmental Protection Agency (EPA) to establish labeling and disposal requirements for PCBs. TSCA also mandated a ban on the manufacture and processing of PCBs. As a result of this legislation, virtually all uses of PCBs and their manufacture have been prohibited in the United States since 1979.

PCBs are hazardous substances as defined in Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601(14) (see Table 302.4, 40 C.F.R. § 302.4(a)), and as toxic pollutants under the Clean Water Act, 33 U.S.C. § 1251 et seq. (see 40 C.F.R. § 401.15).

[1]The terms "Upper Hudson River" and "Upper River" refer to the Hudson River and Champlain Canal from the Fenimore Bridge in Hudson Falls (River Mile 197.3) to the Federal Dam at Troy (River Mile 153.9).

[2]Dredging occurred at an uncontaminated location in the Canal at the mouth of the Hoosic River.

PCBs are also classified as a probable human carcinogen by numerous national and international health organizations, such as the EPA, the Agency for Toxic Substances and Disease Registry (an arm of the U.S. Public Health Service) and the World Health Organization (see, e.g., EPA 2002a, at 36). Substantial research has also linked PCB exposure to developmental and other human health problems (id. at 37). PCBs can take many decades to break down in the environment (EPA 2002b, at 2-52).

GE discharged PCB-laden waste waters directly into the Hudson River beginning in 1947 from its plant in Fort Edward, New York, and beginning in 1952 from its plant in Hudson Falls, New York (see Figure 1). These direct intentional discharges continued until 1977. Most of these discharges were not authorized by any permit. Discharges between 1956 and 1975 from point sources have been estimated at about 30 pounds per day or about 11,000 pounds per year (EPA 2000a). New York State Department of Environmental Conservation (NYSDEC) investigations of plant discharges in 1975 also revealed PCB-contaminated storm water discharges to the Hudson River from both plants (NYSDEC 1975). In addition, GE released PCBs to the Hudson River watershed and ultimately to the Hudson River by disposing of manufacturing wastes in nearby landfills and wastewater collection systems such as sewers and municipal wastewater treatment plants (EPA 1997). Altogether, the two GE manufacturing facilities located in Fort Edward and Hudson Falls discharged at least 1.3 million pounds of PCBs into the river (EPA 1991a, 1997).

Additional PCBs have entered the Hudson River via the migration of PCB-contaminated oils through bedrock at the Hudson Falls plant site and through the material placed under an outfall pipe at the Fort Edward plant site. In 1991, these seeps were augmented by the partial failure of the Allen Mill gate structure near GE's Hudson Falls plant (EPA 2000a). This failure resulted in a release of PCB-contaminated oils and sediments there.

NYSDEC has previously demonstrated that non-GE sources of PCBs in the Upper Hudson contributed negligible amounts of PCBs to the river (NYSDEC 1976 at 22), and EPA has found that the GE plant sites are the single largest contributor of PCBs to the entire river.[3]

1.3 NAVIGATION IN THE UPPER HUDSON RIVER AND MAINTENANCE DREDGING

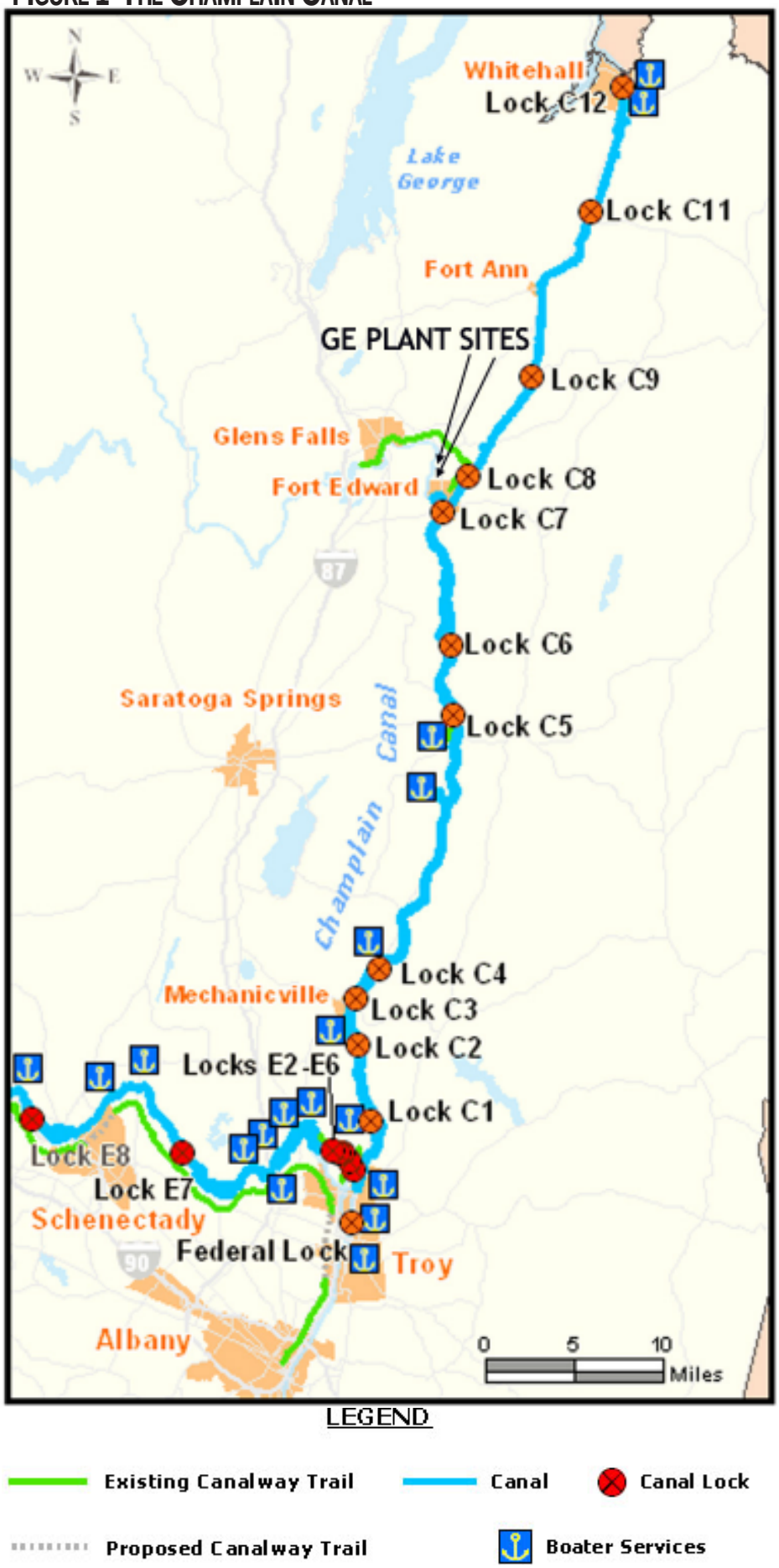
The Upper Hudson River was made suitable for navigation by the construction of the Champlain Canal linking Troy and Lake Champlain (see Figure 1). The Champlain Canal was opened to traffic in the spring of 1916. The New York State Department of Public Works was originally charged with responsibility to maintain the Canal. In 1967, that responsibility was transferred to the New York State Department of Transportation (NYSDOT) and, in 1992, to the New York State Thruway Authority, and then to its subsidiary, the New York State Canal Corporation (Canal Corporation). Canal L. § 6(1).

The New York Constitution, Art. 15, § 1, provides in pertinent part: "The legislature shall not . . . abandon . . . the now existing or future improved barge canal, the divisions of which are the Erie canal, . . . [and] the Champlain canal . . . ." Thus, navigation is a "committed use" of the Upper Hudson River.[4]

[3] In its Phase 3 Report Feasibility Study (page 1-42), EPA states: "In the freshwater Hudson, GE-related contamination represents 80 to 100 percent of the in-place and water-borne contamination. In the Upper Hudson, this percentage is quite close to 100 percent. In the saline Hudson, GE-related contamination represents perhaps 50 percent of the in-place and recently deposited PCB inventory" (EPA 2000b).

[4] The term "committed use," which is a prerequisite for certain injuries, see, e.g., 43 C.F.R. § 11.62(b)(1)(iii), is defined in 43 C.F.R. § 11.14(h) as "either: a current public use; or a planned public use of a natural resource for which there is a documented legal, administrative, budgetary, or financial commitment established before the discharge of oil or release of a hazardous substance is detected."

FIGURE 1 THE CHAMPLAIN CANAL



Due to natural sedimentation, the navigational channel in the Champlain Canal requires periodic maintenance dredging to make the channel deep enough for navigation. The Canal Corporation is required by regulation to maintain a 200-foot wide main channel in the river sections of the Champlain Canal with a water depth of 12 feet[5] as specified in the New York State regulations (21 NYCRR §155.2). Tug boats, for example, typically require 10-12 feet of draft, and barges require at least that much (Army Corps of Engineers 1990, Appendix B, at B-7).

NYSDOT regularly performed such dredging in the Champlain Canal until approximately 1980. At that time the presence of PCBs and the regulatory requirements for disposal of PCB-contaminated sediments made the cost of maintenance dredging prohibitively expensive. For example, according to the Canal Corporation, the unit cost for navigational dredging in uncontaminated waterways with onsite disposal is only approximately $6 per cubic yard, in the case of hydraulic dredging, and approximately $35 per cubic yard, in the case of mechanical dredging. However, the cost of dredging, treating and disposing of PCB-contaminated sediments is over $300 per cubic yard (mechanical).

But for the presence of PCBs, NYSDOT and the Canal Corporation would have maintained the navigational channel in accordance with the State Constitution and regulation.[6] According to a NYSDOT Comment dated October 22, 1991 on the EPA Phase I Report in connection with the Hudson River PCB Reassessment Remedial Investigation/Feasibility Study (reprinted in EPA 1991b as Comment S-2.1):

> The PCB contaminated sediments have caused us not to comply with our duties in the Champlain Canal portion of the Barge Canal. More specifically, the canal channel below Ft Edward has between 275,000 and 300,000 cubic yards of refill [or silting] that can not be dredged because of the PCB contamination. This has caused many complications.
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> In past years the barges have plowed their way through the yearly refill as best they could. The refill has recently become so wide, the barges can no longer push the sediments. This has limited the amount of draft, thus cargo the barges can carry. This is having a very negative effect on the commercial traffic on the canal and is rapidly approaching effecting [sic] the recreational traffic (fixed keel sail boats). The Champlain Canal is mandated to support traffic with a 12 foot draft. The PCB contamination is prohibiting this.
>
> South of the Northumberland Bridge, the land cut canal enters the Hudson River and becomes a canalized river. This intersection with the canalized river was designed at a flat angle so the vessels had a gradual transition into the currents of the canalized river. There is now a large PCB contaminated shoal at the intersection that has forced the northbound vessels to perpendicularly enter the canalized river from the land cut. Since the build up of the shoal, the Northumberland Bridge pier has been struck twice by the [barge] Mobil Champlain and thus the bridge was closed.[7]
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> * * * *
>
> Contaminated sediments are continually settling out in our canal and are increasingly restricting our canal.

[5] This depth is calculated in relation to a fixed 'canal datum' or elevation based on nearby spillway surface elevations.

[6] The Canal Corporation, like its predecessor, NYSDOT, is responsible for maintaining the Erie Canal and other major waterways besides the Champlain Canal. If its limited budget had been used for PCB-contaminated dredging areas, many other critical projects in those waterways could not have been undertaken because of the high costs of dredging and disposal of PCB-contaminated dredge spoils in the Champlain Canal.

[7] Subsequent to the submission of the NYSDOT Comment, it also became apparent that there are problems traveling southbound in this stretch, including vessels striking the concrete pilings attempting to steer into the landcut and vessels being drawn dangerously toward the dam by the current.

Each year the Canal Corporation publishes a Notice to Mariners of reduced depth in the canals for which it is responsible. In 2005 the Notice alerted mariners to numerous reaches within the Champlain Canal where the draft was shallower than the mandated 12-foot depth. There are 57 reaches throughout the Canal, and each of them was measured in three locations (west, middle and east). Over 72% of the measurements were less than 12 feet. In fact, 21% of the total were 9 feet or less. In one reach, between Route 197 Bridge and Ft. Edward Yacht Basin, the draft is only 3 feet.

This year, the Canal Corporation identified reaches containing approximately 500,000 cubic yards of sediment that must be dredged from the Upper Hudson River in the future. The remedy to be administered by the EPA requires navigational dredging to be conducted in certain areas (EPA 2002a, at iii). However, the navigational dredging currently anticipated to be done pursuant to EPA's Record of Decision will not address a significant portion of the navigational dredging identified by the Canal Corporation for navigational dredging.

2.0 INJURY DETERMINATION AND EVALUATION

The surface waters of the Hudson River have been injured by the discharge of PCBs in three principal ways.[8]

(1) There has been an adverse chemical change in the sediments of the Upper River, which has caused navigational dredging and disposal costs to be prohibitive;

(2) The surface water of the Hudson River constitutes a pathway to the injury of other resources in the river, such as fish, which have been the subject of consumption advisories and regulatory closures; and

(3) There have been exceedances of water quality criteria and standards in the Hudson River.

One of the consequences of the injury to surface water in the Upper Hudson River is the loss of navigational services.

The DOI Regulations define "injury" in part as ". . . a measurable adverse change, either long- or short-term, in the chemical or physical quality . . . of a natural resource resulting either directly or indirectly from exposure to . . . a release of a hazardous substance . . . ." 43 C.F.R. § 11.14(v). The Upper Hudson River and its sediments are both a "natural resource," 42 U.S.C. § 9601(16); 43 C.F.R. § 11.14(z) ("natural resources" include "land, . . . water, . . . and other such resources . . . "), and a "surface water resource," 43 C.F.R. § 11.14(pp).[9]

The Hudson River has sustained measurable long-term changes in chemical quality resulting from the historical and ongoing releases of PCBs from the GE plants in Hudson Falls and Fort Edward. Specifically, the releases of hazardous substances have caused measurable, elevated PCB concentrations in surface water and sediment.

[8] "Surface water resources" are defined in the Natural Resource Damage Assessment regulations adopted by the U.S. Department of the Interior, 43 C.F.R. Part 11 (the DOI Regulations), to include ". . . the sediments suspended in water or lying on the bank, bed or shoreline. . . ." 43 C.F.R. § 11.14(pp).

[9] The Upper Hudson River constitutes "waters of the United States." Leblanc v. Cleveland, 198 F.3d 353, 360 (2d Cir. 1999).

These changes are adverse because they have impaired the ability of the State to meet its obligation to maintain the committed navigational use of the Upper Hudson River, as required under State law, due to the greatly increased cost of dredging sediment and disposing of associated dredge spoils. Due to the added costs resulting from PCB contamination, navigational dredging that is necessary to maintain the committed use of this resource has been postponed by the Canal Corporation, resulting in the failure of the channel dimensions to meet the State-mandated specifications (12 feet deep and 200 feet wide) throughout the Upper Hudson River. This has adversely affected the navigational use of the canal by preventing many types of vessels from safely navigating the canal. Thus, the change in the chemical quality of the Upper River sediments as a result of becoming contaminated with PCBs has been "adverse" within the meaning of the DOI Regulations.

Added dredging costs: Under applicable State and Federal regulations, navigational dredging of the contaminated Hudson River sediment must be conducted in a manner that monitors for and controls resuspension of contaminated sediment, monitors for and controls residual contaminated sediment that would be exposed to the water column following dredging, and properly manages and disposes of the dredged sediment. See 40 C.F.R. § 761.61 & § 761.3 (definition of "PCB remediation waste") and 6 NYCRR § 371.4(e). These requirements, including water column monitoring and other special procedures, significantly increase the cost of dredging PCB-contaminated sediments.

Added disposal costs: The presence of PCBs in dredged sediments above specified concentrations (nominally 50 ppm, but in practice as low as 32 ppm[10]) requires transport to and disposal in a landfill meeting the requirements of TSCA or incineration, 40 C.F.R. § 761.61(b)(2), or, if contaminated at lower levels,[11] in a non-TSCA landfill. By contrast, clean sediments can be reused without any disposal cost. Such disposal significantly increases the total cost of a dredging project where sediments are contaminated above those levels.

The Trustees, therefore, conclude that the surface waters of the Hudson River have been injured as a result of measurable adverse changes in the chemical quality of the Upper Hudson River caused by PCB releases. See generally, Matter of the Complaint of Montauk Oil Transportation Corp., 1996 U.S. Dist. LEXIS 8500 (S.D.N.Y, 90 CIV. 5702 (KMW), June 18, 1996) (surface waters injured and public use temporarily lost by closure of waterway to maritime traffic caused by oil spill give rise to natural resource damages claim).

There are two additional, independent bases for considering whether an injury has occurred to surface water with a resulting loss of navigational services. The surface water of the Hudson River constitutes a pathway to the injury of other resources in the river, such as fish, which have been subjected to consumption advisories and regulatory closures. Under the DOI Regulations, 43 C.F.R. § 11.62(b)(1)(v), surface waters are injured if biota are injured by exposure to hazardous substances in surface water, banks or sediments. Biological resources can be injured in several ways, including by the release of a hazardous substance resulting in concentrations in surface waters, banks or sediments sufficient to cause the biological resource to exceed levels of that substance for which an appropriate State health agency has issued directives to limit or ban consumption of the resource, 40 C.F.R. § 11.62(f)(1)(iii).

[10] Landfill operators have informed EPA that they require incoming material to test below the TSCA limit, i.e., at or below 32 ppm Total PCBs, to have greater certainty that contravention of Federal regulations will not occur.

[11] According to New York State guidance, contaminated sediments containing 0.1 ppm Total PCB require special disposal (NYSDEC, 2004).

In a June 2001 report entitled "Injuries to Hudson River Fisheries Resources: Fishery Closures and Consumption Restrictions," the Trustees determined that the recreational fishery resource of the Hudson River has been injured by virtue of the fact that the levels of PCBs in the fish have caused the State to issue fish consumption advisories and regulatory closures of the fishery. The consumption advisories have continued since 1976, in one form or another, over the entire length of the river below Hudson Falls. The elevated levels of PCBs in the fish that caused the advisories to be put in place have resulted from exposure of the fish to other resources which contain PCBs, including surface water, banks, and sediments of the Hudson River.

As a result, the Trustees conclude that the elements of the injury-to-biota definition of surface water injury set out at 43 C.F.R. § 11.62(b)(1)(v) have been met for the entire length of the Hudson River PCB Superfund Site. Because the consumption advisories and regulatory closures have continued since 1976, the injury has existed over that same period. It is likely that the advisories and closures, and the resulting injury to the surface water, will continue well into the future.

One of the services that the surface waters of the Hudson River provide is navigation. The injured surface waters (sediments) have caused a loss of navigational services because PCB sediment concentrations prevent maintenance dredging required for navigation, and the navigational channel in the Champlain Canal has become too shallow to support navigation by many recreational and commercial vessels.

Finally, the surface water of the Hudson River from Hudson Falls to the Battery in Manhattan has been injured in a third way as a result of the ongoing release of PCBs because PCB concentrations in the river exceed Federal and State water quality criteria that have been established to protect designated uses of the river. See 43 C.F.R. § 11.62(b)(1)(ii) and (iii). For example, the average PCB concentration in the water column, i.e., from the surface of the river to its bottom, for a three-month period in the summer of 1998 (June through September) at the Thompson Island Dam-West station was 134 nanograms per liter (ng/l). This level far exceeded the EPA water quality standard of 14 ng/1 for freshwater aquatic life (EPA 2002a at 24). The Trustees are in the process of preparing a report comprehensively documenting exceedances of Federal and State water quality criteria developed for protection of aquatic life, piscivorous wildlife, and for human consumers of fish.[12]

While the service loss addressed in this report is navigational, other service losses associated with injury to surface waters in the Hudson River (e.g., from exceedance of water quality criteria and standards) may be addressed in future reports.

3.0 DAMAGE DETERMINATION AND RESTORATION

The public is entitled to be compensated for the loss of navigational services that would have been provided by this injured resource between the time of the discharges and the time when those resources are fully returned to their baseline condition, 43 C.F.R. § 11.83(c). The Trustees will estimate the amount of damages associated with this natural resource injury in future reports. Analyses will likely include the incremental cost attributable to PCB contamination of fully restoring the navigational services previously provided by the Champlain Canal and maintaining those services in the future. Additional damage determinations will also be considered.

[12] In addition, as noted above, at a number of locations the sediments in the navigational channel of the Upper Hudson River contains PCBs at levels above 50 ppm. Such concentrations were determined by NYSDEC to be sufficient to cause the sediment to be listed as a hazardous waste. 6 NYCRR § 371.4(e)(1). Therefore, under the DOI Regulations, 43 C.F.R. § 11.62(b)(1)(iv), the sediment was injured for that reason as well.

4.0 CONCLUSION

The Hudson River Natural Resource Trustees conclude that the surface water resources of the Hudson River are injured due to historical and on-going releases of PCBs. The public's ability to use the Champlain Canal for navigation has been severely curtailed because the release of PCBs has caused the suspension of required maintenance due to the prohibitive expense associated with the handling and disposing of PCB-contaminated dredge spoils. The injury to the resource and the restrictions on its use are expected to continue into the future as long as PCB-contaminated sediments that substantially increase the cost of dredging remain in the navigational channel.

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