Executive Summary:

Potential Natural Resource Damage Assessment (NRDA) Related to Polychlorinated Biphenyl (PCB) Discharges into the Hudson River

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From 1947 to 1977, General Electric discharged millions of pounds of polychlorinated biphenyls (PCBs) into the Hudson River at their Fort Edwards and Hudson Falls plants. Adverse effects of PCB contamination are well known. PCBs are persistent in the environment, highly toxic, and increase in concentrations in organisms higher in the food web. About 85% of over 10,000 water samples taken from 200 miles of river since the mid-1970s have contained PCBs, often at concentrations one or more orders of magnitude above state and federal regulatory criteria. PCB presence has caused state officials to institute various recreational and commercial fishery closures and to issue advisories on health effects of fish consumption since 1976.

Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Natural Resource Damage Assessment (NRDA) Trustees may claim damages for injuries to natural resources held in trust for the public. These resources include "land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources." The resources for which NRDA claims may apply include those "belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by" the United States, a State, or an Indian Tribe.

In 1997, Governor George Pataki announced that New York would joining the federal government in establishing the Hudson River Natural Resource Trustee Council to pursue an NRD claim for injuries to natural resources from PCB discharges into the Hudson River. In 2002, the Council issued an NRDA Plan. Since that time, the Trustees have been conducting field studies and issuing reports on PCB injuries.

Scenic Hudson commissioned the research team of Environmental Research Consulting, RPS Group, and Greene Economics to evaluate available data, study existing Trustee reports, and conduct a literature review to gain an understanding of the overall state of Hudson River PCB injuries. The team used generally established injury and damage quantification methodologies to estimate the potential magnitude of NRD. For this report, 77 reports and cited papers from the Trustees were reviewed. An additional 61 PCB studies conducted specifically on the Hudson River, and 206 other studies on PCB effects and toxicology were also identified.

PCB contamination in the Hudson River is over a larger geographic area than in other PCB-contaminated sites that have been or are being evaluated for NRDA claims. Environmental exposures to Hudson River PCB contamination known to cause injuries to the ecosystem and human services (e.g., drinking water, fisheries) began decades ago and will continue for decades into the future. Quantification of the extensive injuries from PCBs in the Hudson should be summed over many years, and the injuries from past years should be compounded forward to adjust to present-day equivalent values. Therefore, the NRDA claim would be expected to be relatively large compared to other NRDA cases, including the largest oil spill settlement to date, that for the 2010 Deepwater Horizon (DWH) spill in the Gulf of Mexico. In contrast to PCBs, hydrocarbons from oil spills that adversely affect biota degrade much more readily, are less toxic, and are metabolized by organisms, mitigating to some extent the effects of large oil spills, such as DWH.

The team's calculated estimates of damages for some of the injuries to Hudson River natural resources due to PCB contamination are summarized in Table 1. Additional damages could be claimed for other resource service losses, such as interim service losses related to fish and invertebrates, ecological communities in the river and floodplain, surface water quality, groundwater, navigation, recreational hunting, subsistence fishing and hunting, contact recreation (swimming and beach use), and recreational boating.

The estimated compensatory damages for past and ongoing injuries to wildlife, drinking water, navigation, and recreational fishing total **$11.4 billion**. The team also estimated the cost of additional dredging in the Upper Hudson River (UHR), as primary restoration to prevent additional injuries from accruing in future decades to centuries throughout the Hudson River. Additional dredging is needed to reduce UHR sediment PCB concentrations such that Hudson River fish meet USEPA's 2002 fish consumption advisory-based remediation goal. Future ecological services would also be restored by the additional dredging, as the thresholds to restore recreational fishing services are below those for protecting wildlife and aquatic biota. Dredging would also restore surface drinking water services in future years. The additional damages for dredging of the Upper Hudson are estimated at **$10.7 billion**. However, lost ecological and human services in the past decades and in the future up until this dredging is completed would still be compensable as part of an NRD claim.

Table 1: Potential Damage Estimates due to Hudson River PCB Contamination

Resource Category	Estimated Damages
Wetland-Dependent Wildlife: Upper Hudson	$5.73 billion
Wetland-Dependent Wildlife: Lower Hudson	$1.65 billion
Drinking Water	$1.4 billion
Navigation (Primary Restoration Only)	> $225 million
Recreational Fishing: Lost Value due to Consumption Restrictions	$1.9 billion
Recreational Fishing: Lost Value due to Closures	$523 million
Total Compensatory Damages	**$11.4 billion**
Dredging of Upper Hudson River to meet Remediation Goal	$10.7 billion
Total	**$22.1 billion**

The settled NRD claim for the DWH was $9.2 billion. For context, a comparison of the two cases is shown in Table 2.

Table 2: Deepwater Horizon NRDA Settlement and Hudson River PCB Comparison

Factor	Hudson River PCBs	Deepwater Horizon Oil Spill
NRDA Compensatory Damages	$11.4 billion (estimated)	$9.2 billion (settled)
NRDA w/Dredging as Primary Restoration	$22.1 billion (estimated)	n/a
Duration of Release	Decades	Three months
Persistence in Environment	Highly persistent (decades)	Degradation in months to years
Toxicity	Highly toxic	PAHs less toxic
Food Web	Biomagnification in food web	PAHs metabolized by organisms
Exposure Period	Decades	Months
Fishery Injuries	Injuries and closures for decades	Recovered by 8 years
Drinking Water Effects	Extensive	None
Geographic Area Affected	Approximately equivalent	