

Study Plan
For
Mink Injury Determination

Investigation of Mink Occupancy Relative to
Polychlorinated Biphenyl Contamination within the
Hudson River Drainage

Hudson River Natural Resource Damage Assessment

HUDSON RIVER NATURAL RESOURCE TRUSTEES

State of New York
U.S. Department of Commerce
U.S. Department of the Interior

DRAFT FOR PUBLIC REVIEW AND COMMENT

August 2, 2010

Available from:
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
Hudson River NRDA, Lead Administrative Trustee
Damage Assessment Center, N/ORR31
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Executive Summary

Natural resources of the Hudson River have been contaminated through past and ongoing discharges of polychlorinated biphenyls (PCBs). The Hudson River Natural Resource Trustees – New York State, the U.S. Department of Commerce, and the U.S. Department of the Interior – are conducting a natural resource damage assessment (NRDA) to assess and restore those natural resources injured by PCBs.

Many species of mammals rely on the Hudson River, including its floodplain, for habitat, food, and as a breeding ground. Mammals that depend on the river for food and habitat include otter, muskrat, raccoon, beaver, and mink. The Hudson River NRDA Plan identified mink and otter health as an area of biological injury investigation. Mink are the subject of this draft Study Plan for an injury determination effort as part of the Hudson River NRDA

Based on the results of preliminary investigations conducted by the Trustees, including the mink and otter work conducted in the upper Hudson River drainage during the 1998-1999 and 1999-2000 trapping seasons, input from a panel of mammal experts, review of the existing mink and otter toxicology literature, and considering factors such as the life history of mink, preliminary results of the mink PCB-feeding study, and goals of the NRDA, the Trustees have determined that it is appropriate to conduct further investigations focused on mink to be initiated in the year 2010.

Pursuant to the Hudson River NRDA Plan, the Trustees have developed this Draft Study Plan for a mink injury determination effort. This Draft Study Plan focuses on a further investigation of the apparent decrease in abundance of mink in PCB-contaminated areas of the Hudson River.

In the future the Trustees may propose additional work to supplement this effort.

In accordance with the Hudson River NRDA Plan, the Trustees are issuing this Draft Study Plan for public review and comment. Comments should be submitted by September 10, 2010 to:

CONTACT FOR PUBLIC COMMENTS

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1.0 Background

Past and continuing discharges of polychlorinated biphenyls (PCBs) have contaminated the natural resources of the Hudson River. The Hudson River Natural Resource Trustees – New York State, the U.S. Department of Commerce, and the U.S. Department of the Interior – are conducting a natural resource damage assessment (NRDA) to assess and restore those natural resources injured by PCBs (Hudson River Natural Resource Trustees 2002).

Many species of mammals rely on the Hudson River, including its floodplain, for habitat, food, and as a breeding ground. Mammals that depend on the river for food and habitat include otter, muskrat, raccoon, beaver, and mink. The Hudson River NRDA Plan identified mink and otter health as an area of biological injury investigation. Mink are the subject of this draft Study Plan for an injury determination effort as part of the Hudson River NRDA

Injury means a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to release of a hazardous substance, such as PCBs, or exposure to a product of reactions resulting from the release of a hazardous substance. An injury to a biological resource, such as mink, has resulted from the release of a hazardous substance, such as PCBs, if the concentration of the substance is sufficient to cause the biological resource or its offspring to have undergone at least one of the following adverse changes in viability: death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), or physical deformations.

Mink are small carnivorous mammals that are associated with aquatic habitats of all kinds, including rivers, lakes, and wetlands (USEPA 1993). They are opportunistic hunters, feeding on any animal material they can find and kill (Linscombe et al. 1982). Mink appear to select prey primarily based on its availability (Gilbert and Nancekivell 1982) and vulnerability (Eagle and Whitman 1987). The mink diet includes other small mammals such as mice, rats, rabbits and muskrats, aquatic prey including frogs, fish, and crayfish, and terrestrial prey including birds, reptiles such as snakes, insects, and other invertebrates. Mink are exposed to PCBs directly through their diet. Mink are also exposed to PCB-contaminated water and soil or sediments as they build dens and forage for food.

The Trustee agencies have assessed PCB concentrations in mink from the Hudson River. PCB concentrations in liver (normalized for the amount of fat, or lipids, in each sample) range from 0.13 ppm to 139 ppm in mink (NYSDEC 2001, 2002). PCB concentrations in liver on a wet weight basis range from 0.0082 to 3.34 ppm in Hudson River mink (NYSDEC 2001, 2002).

Analysis of mink collected from 1998 to 2000 for hepatic PCB burdens as Aroclors indicated concentrations were elevated for animals collected from the main channel of river sections contaminated with PCBs or tributaries entering those sections. Maximum PCB levels in mink exceeded criteria for reproductive impairment and criteria for potential health impairment (Leonards *et al.* 1994; Smit *et al.* 1996). Approximately half the mink collected during 1998-2002 within one home range (6 km) of the main-stem of the Hudson River had elevated levels of PCBs in their livers; mink with elevated levels of PCBs in their livers were not recovered beyond 5 km from the main-stem Hudson River. In addition to elevated contaminant burdens, a lower take of mink relative to trapping effort was evident for trap sites located within one home range

(6 km) of PCB-contaminated sections of the Hudson River between Hudson Falls and Troy compared to sites at least one home range from the river or upstream of Hudson Falls (Mayack and Loukmas 2001).

Those preliminary investigations of mink exposure to PCBs were undertaken to assist the Trustees in determining the extent to which mink in the Hudson River are contaminated with PCBs, to determine if additional pathway and injury assessment studies focused on mink should be conducted as part of the Hudson River NRDA, and for potential use in the design of future studies to assess the health of Hudson River mink.

In January 2002, the Trustees assembled an expert panel to review the exposure and effects information compiled by the NYSDEC for mink and otter, and to provide guidance to the Trustees on appropriate next steps for determining whether PCBs are causing adverse biological effects in Hudson River mammals, particularly mink and otter. The Hudson River NRDA Plan noted that the Trustees planned to build upon the existing mink and otter studies, potentially conducting further studies to determine PCB effects in mink and otter from the Hudson River.

In 2006, the Trustees initiated a mink-PCB feeding study (Hudson River Natural Resource Trustees, 2006) as part of the mink injury determination. The results of that study are currently undergoing review by the Trustees. Pursuant to the Hudson River NRDA Plan, the results of that study will be peer reviewed and then released to the public.

2.0 Introduction

Based on the results of preliminary investigations conducted by the Trustees, including the mink and otter work (Mayack and Loukmas 2001; NYSDEC 2001, 2002), input from a panel of mammal experts, review of the existing mink and otter toxicology literature, and considering factors such as the life history of mink, preliminary results of the mink PCB-feeding study (Hudson River Natural Resource Trustees, 2006), and goals of the NRDA, the Trustees have determined that it is appropriate to conduct further investigations focused on mink to be initiated in the year 2010.

Pursuant to the Hudson River NRDA Plan, the Trustees have developed this Draft Study Plan for a mink injury determination effort. This Draft Study Plan focuses on a further investigation of the apparent decrease in abundance of mink in PCB-contaminated areas of the Hudson River (Mayack and Loukmas 2001). PCB-contaminated areas of the Hudson River may be functioning as “sinks” for mink.

In accordance with the Hudson River NRDA Plan, the Trustees are issuing this Draft Study Plan for public review and comment. The Trustees are interested in receiving feedback on this Draft Study Plan. To facilitate this process, the Trustees are asking the public and the party or parties responsible for the contamination to review this Draft Study Plan and provide feedback on the proposed approach. Comments should be submitted by September 10, 2010. These comments will help the Trustees plan and conduct an assessment that is scientifically valid and cost effective and that incorporates a broad array of perspectives.

To that end, the Trustees request that you carefully consider this Draft Study Plan and provide any comments you may have to:

CONTACT FOR PUBLIC COMMENTS

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3.0 Purpose and Objective

The purpose of this work is to inform the Trustees regarding injury to mink and guide their future efforts to identify pathways and specific injuries to mink from PCBs, as defined in regulations written by the U.S. Department of the Interior contained in Title 43 of the Code of Federal Regulations Part 11, Natural Resource Damage Assessment. This work will also be used to help determine whether future studies will be performed, and if so, to help in their design.

This Draft Study Plan describes a field study to compare occupancy, as measured by the proportion of scent stations visited by mink, in PCB-contaminated areas (habitat adjacent to the main-stem Hudson River) with occupancy in areas of no or minimal PCB contamination (habitat at least one home range from the main-stem Hudson River).

4.0 Methods

4.1 Scent Station Study

Scent-station surveys are uniform, repeatable, efficient indices to the abundance of mammalian populations (Linhart and Knowlton, 1975; Long et al. 2008; Roughton and Sweeny, 1982; Travaini et al., 1996).

The study will be conducted in the upper Hudson River drainage (between Hudson Falls and Waterford. The Mohawk River drainage (between Herkimer and Amsterdam) will serve as a reference area and will be evaluated similarly.

The study will be conducted over a two-year period using unique sets of scent stations for each year. Proposed sites for scent stations will be evaluated using maps, aerial images, GIS data and on-site inspection of habitat by personnel knowledgeable about habitat appropriate for mink. The habitat suitability of mink of each proposed site that has permission for access will be scored using a protocol based on the Habitat Suitability Index of Allen (1986). For each year of the study, 100 sites suitable for scent stations will be initially identified and evaluated.

Digital cameras and enclosures containing track plates and scent attractant will be deployed at selected sites. Two enclosures equipped with sooted track plates, tubes with scent attractant and digital cameras in protective housings located to photograph mammal activity at each enclosure will be deployed at each site. Track-plate enclosures will be based upon a box design by Zielinski and Kucera (1995). At each site, two cameras will be deployed to intercept potential

travel routes used by mink. Photographs and track imprints on track plates will provide evidence of visitation by mink and other species. Scent stations will be monitored weekly for data collection for two three-month field seasons. The field season will run from approximately August 15th to November 15th.

Site acquisition work is planned to begin in Fall 2010, with further investigation and refinement of site selection in Spring-Summer 2011, such that scent station work can begin in late summer 2011. Statistical analysis of the study's results will be conducted using appropriate techniques.

As this investigation entails injury assessment, the Trustees are performing a peer review of the proposed investigation. A draft work plan, prepared by the PIs, is undergoing peer review and changes may be made as a result of the peer review process. We are seeking public review and comment on this document as part of the public review of this draft Study Plan, in accordance with the Hudson River NRDA Plan.

In the future the Trustees may propose additional work to supplement this effort.

5.0 Quality Assurance/Quality Control

This study is being conducted in accordance with the Quality Assurance Management Plan for the Trustees' Hudson River NRDA (Hudson River Natural Resources Trustees, 2002).

As noted in the Trustees' Responsiveness Summary for the NRDA Plan (Hudson River Natural Resource Trustees, 2003), for each data collection effort that is part of the Hudson River NRDA and is identified in the NRDA Plan, the Trustees will develop a project-specific QA Plan which may be an independent document or may be incorporated into the project Study Plan. Such a QA Plan, in combination with the information on QA management described in the NRDA Plan (Hudson River Natural Resource Trustees, 2002), will ensure that the requirements listed in the National Contingency Plan and applicable EPA guidance for quality control and quality assurance plans are met. The final Study Plan for the investigation will include a project-specific QA Plan.

Strict Chain of Custody procedures will be used throughout the study. All track-plate samples, digital photographs and field data collected under this Study Plan will be maintained under Chain of Custody upon collection, through processing, analysis, shipment and storage. All track plates and digital photographs will be analyzed with appropriate methods and references approved by the Trustees.

6.0 Special Provisions

Permits will be required from the National Park Service to conduct a portion of the field study on National Park Service land. Written permission will be required to enter private lands or lands under the jurisdiction of State agencies or authorities other than New York State Department of Environmental Conservation to conduct a portion of the field study on those lands.

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