

Contaminant Levels in Hudson River Mammals

Contact: Jeff Loukmas

Research Support Specialist
Cooperative Fish and Wildlife Research Unit
Cornell University
(518) 899-2177 (H)
(518) 899-9083 (O)

Dave Mayack
Conservation Ecologist
NYSDEC
Hale Creek Field Station, Gloversville
(518) 773-7318

JEFF'S HOME ADDRESS:

187 THIMBLE BERRY
MALTA
12020

Overview

This study is being conducted to evaluate the extent of PCB contamination in mink, otter, and muskrat populations downstream of a major point source at Fort Edward, New York. Mink, otter, and muskrat carcasses will be obtained from cooperating trappers and analyzed for organochlorine contaminants in liver and adipose tissues. Contaminant levels in populations upstream of Fort Edward will be compared to levels in populations downstream. Relationships in contaminant burdens with downstream distance from the contaminant source will be explored; upstream levels will serve as a "baseline" for evaluating trends. This study will establish the downstream limit of potential contaminant impact on mammal populations in the Hudson River ecosystem.

A second objective is to determine if the abundance of mink can be related to the distribution of PCB contamination within the Hudson River drainage. Relative abundance of mink should be lower in drainages that flow into a reach of the Hudson River that is highly contaminated with PCBs as compared to drainages that flow to a reach free of point-source releases of PCBs. The abundance of mink will be determined using several indexing techniques for drainages that flow to reaches of the Hudson River immediately upstream and downstream of a major input of PCBs (Fort Edward, New York).

Background

The loading of PCBs in the Hudson River downstream of Fort Edward, New York, is the highest of any major river system in the United States. Analysis of a small number of mink and otter collected from the Hudson River region of New York State suggest that high levels of PCB contamination are present in populations of these mustelids in the Hudson River drainage. Levels of PCBs in mink were greater than levels known to cause reproductive failure in ranch-raised mink. This degree of contamination suggests that reproductive impairment and a consequent decrease in abundance may be present in wild populations of mink in the Hudson River valley. Although PCB levels in mustelids collected from the Hudson River region were the highest of any collected from 8 areas of New York State, the

number animals collected within the Hudson River drainage was too small to define the extent of high-level contamination within the drainage. Additional information on the extent of high-level PCB contamination in semi-aquatic mammal populations (mink, otter, and muskrats) downstream of major point sources of contaminants is needed to define the impact of PCB contamination in the Hudson River ecosystem.

Approach

This study will be accomplished by a research associate under the auspices of the Cooperative Fish and Wildlife Research Unit at Cornell University. NYSDEC will supervise much of the day-to-day tasks associated with this job. Contaminant analysis will be accomplished by a private laboratory.

1. Assessment of Contaminant Burdens

Collection of Specimens

Carcasses will be obtained from cooperating licensed trappers within NYSDEC Regions 4, and 5. Forty trappers from these regions have been contacted and have agreed to participate in providing carcasses. Cooperating trappers will be provided with a toll-free number to report the availability of carcasses. Trappers will be instructed to call as soon as possible after taking animals to make arrangements for pick up of carcasses by staff. Trappers will record date and location of take. Carcasses will be stored in polyethylene bags at -20 C prior to dissection.

Sixty mink, 30 otter and 30 muskrat carcasses will be collected from drainages flowing into the Hudson River from North River to the southern boundary of Albany County. Thirty mink, 15 otter, and 15 muskrat carcasses will be collected from drainages entering the Hudson River upstream of a major point-source of PCB contamination at Fort Edward; numbers of mink, otter, and muskrat identical to those collected upstream will be collected from drainages entering the river downstream of Fort Edward. All carcasses from mink and muskrat taken within 5 miles of the Hudson River will be collected; however, preference for chemical analysis will be given to animals taken within 1.5 miles of the river. For otter, all carcasses taken within 15 miles of the Hudson River will be collected; however, preference for chemical analysis will be given animals taken within 5 miles of the river. The number of carcasses in the sample is primarily determined by carcass availability from trappers. These sample sizes represent the smallest number of carcasses needed to detect a biologically significant difference between study areas.

Dissection and sample preparation

A standard necropsy will be performed on all animals including measurements for calculating a health index. Jaws of mink and otter will be removed for subsequent age analysis. Mink and otter gastrointestinal tracts will be examined for presence and identification of food items. Reproductive tracts will be removed and preserved in a suitable

fixative. Adipose tissue will be removed, incorporated into a composite sample, weighed, and homogenized. Similarly, the liver will be removed, weighed, and homogenized. Tissues will be stored in glass bottles at -20 C prior to chemical analysis. All dissections will be done with proper precautions for handling animals potentially infected with rabies. Quality assurance and quality control procedures will be adhered to throughout necropsy and tissue sample preparation.

Chemical Analysis

Adipose and liver tissues from each animal will be analyzed for organochlorine compounds, lipid content, and percent moisture. A private toxicological laboratory will conduct all chemical analyses.

Data Analysis

Contaminant levels in populations upstream of Fort Edward will be compared statistically to levels in populations downstream. Trends in contaminant levels relative to distance from the river will be explored statistically. Contaminant levels will be evaluated relative to potential toxicological effects.

2. Assessment of Mink Abundance

Study Area and Site Evaluation

Two sections of the drainage located along reaches of the Hudson River from North River to Fort Edward and from Fort Edward to Troy will be compared. Twenty stream-road intersection sites downstream of Fort Edward will be selected for placement of track boards. Ten stream-road intersections located within 1.5 miles of the Hudson River and an additional 10 stream-road intersections located 1.5 to 5 miles from the river will be selected as study sites within each study section. Habitat quality of potential sites will be evaluated using a Habitat Suitability Index for mink (USFWS). Using GIS information, sites will be rated according to their proximity to large wetlands that may serve as additional habitat for mink. Sites will be selected according to their potential to provide adequate habitat for mink. Trapper information and information from past NYSDEC surveys for mink sign will also be incorporated into the selection process for sites.

Track Board Survey

Boards are constructed of 0.6 m square pieces of 3 mm hardboard that are sooted with an acetylene torch. Boards are enclosed in a weather-resistant structure constructed of 30.5 cm (I.D.) corrugated polyethylene culvert.

Four track board stations will be deployed at each stream-road intersection site. Track board stations will be located on the bank within 1.5 m of the stream in areas that are potential runs for mink but are not likely to be flooded during high stream stage. Typically, 2 stations

will be located on opposite banks upstream of the bridge and 2 will be located on opposite banks downstream (roughly 100 m from bridge).

Track board stations will be installed during August 1999. Surveys will be conducted at each station once a week from the beginning of September to the end of April. This should permit the detection of mink at stations during dispersal and breeding activities.

A progress report on all activities will be completed on or before 31 March 2000.

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
Bureau of Habitat, 5th Floor
625 Broadway, Albany, New York 12233-4756
Phone: (518) 402-8996 • **FAX:** (518) 402-9027
Website: www.dec.state.ny.us



Erin M. Crotty
Commissioner

Project collaborator,

After 2 successful seasons (1998-2000) of collecting mink, otter, and muskrats in the upper Hudson River watershed for the HR Mammal Contaminant Monitoring Project, we decided to direct our 2000-2001 collection efforts primarily to the lower Hudson drainage. With the support of trappers in the lower Hudson River drainage, we were able to collect an additional 16 mink and 32 otter from the region (Table 1). Our collection distributions are now sufficient to examine contaminant levels in these species throughout the entire watershed. If you donated carcasses last season or if new information became available for animals previously submitted, a detailed data sheet for your animals is included on page 3.

The NYSDEC Bureau of Habitat is continuing studies of contamination in mink and otter carcasses. However, they need carcasses from only a few specific areas of the state. The Bureau will collect only mink caught within 1 kilometer (0.6 miles) or otter captured within 10 kilometers (6 miles) of the Hudson or Mohawk rivers. The Bureau will be contacting trappers in those areas personally.

The only other carcasses that should be saved for NYSDEC are accidental catches from areas closed for otter trapping, or animals showing some deformity or suspicion of disease. Contact your regional NYSDEC office in these situations.

We do ask that all successful otter trappers save one side of the jaw from otter they catch from throughout the state for the Bureau of Wildlife, noting information on Wildlife Management Unit (WMU), date of catch, sex, and total length. Prior to the trapping season, many trappers will receive a supply of special envelopes for jaws. Other trappers can request envelopes by calling 1-518-478-3010 or contacting your regional NYSDEC office. **Please do not mail jaws in regular envelopes.**

On a personal note, I have accepted a position with the NYSDEC in Albany. I will no longer be directly involved with the HR Mammal Contaminant Monitoring Project, but I will be available to answer questions you may have (or at least guide you in the right direction). My new office number is (518) 402-8980. Dave Mayack is the Project Manager at the NYSDEC Hale Creek field station in Gloversville. His phone number is (518) 773-7318. Final project reports will be available from Dave, upon completion of the study.

Thanks so much for your enthusiastic participation in this project. You've made my job a pleasure and our study a success.

Regards,

Jeff Loukmas
Biologist I(Ecology)
Bureau of Habitat
NYSDEC

Table 1. Mink, otter, and muskrat collection distributions and PCB levels within the Hudson River drainage, 1998-2001.

Counties	Mink			Otter			Muskrat		
	Number collected	Number analyzed	Average PCB level ^a (range)	Number collected	Number analyzed	Average PCB level (range)	Number collected	Number analyzed	Average PCB level (range)
Region 3									
Dutchess	6	[3] ^b		9	[9]				
Putnam				2	[2]				
Ulster	4								
Westchester				6	2 [4]	27.0 (24.9 – 29.1)			
Region 4									
Albany				1	1	18.5			
Columbia	17	7	7.8 (0.1 – 41.3)	10	1 [3]	11.2	3		
Montgomery	7	3	7.4 (2.6 – 15.0)	1	1	168.0			
Rensselaer	41	6 [1]	2.6 (1.1 – 3.9)	6	5 [1]	25.3 (3.3 – 47.9)	37	6	0.1 (0.0 – 0.2)
Schoharie	6								
Region 5									
Essex	8	3	1.2 (0.9 – 1.5)	2	1 [1]	3.8			
Fulton	19								
Hamilton	32	8	1.0 (0.7 – 1.3)	6	6	3.4 (1.5 – 6.2)	1	1	ND
Herkimer				6	6	5.0 (3.7 – 7.2)			
Saratoga	81	40 [1]	7.0 (0.5 – 80.6)	15	9 [1]	77.8 (1.7 – 432.7)	16	9 [1]	0.8 (ND ^c – 2.2)
Warren	56	16	7.1 (0.7 – 43.8)	11	6 [3]	14.8 (1.6 – 48.8)	3	3	ND
Washington	28	19 [2]	13.9 (0.3 – 139.0)	4	2 [2]	4.8 (1.3 – 8.3)	2		

^aPCB levels are reported as µg/g (ppm – parts per million), lipid-adjusted.

^bNumber in brackets is number of animals that will be analyzed for contaminants in 2001.

^cND = not detected.

Specimen #	Date Collected	Sex	Age	Town	County	PCB (ppm)
Mink 1048	1989/1993	M	2.5	Stillwater	Saratoga	6.33
Mink 1049	1989	M	2.5	Stillwater	Saratoga	80.57
Mink 1050	19900830	M	0.5	Stillwater	Saratoga	6.40
Mink 1083	19981223	F		Stillwater	Saratoga	
Mink 1129	19990305	M	1.5	Halfmoon	Saratoga	2.05
Mink 1148	19990621	F		Stillwater	Saratoga	1.188

Chris Marten

NEW YORK COOPERATIVE FISH AND WILDLIFE RESEARCH UNIT
DEPARTMENT OF NATURAL RESOURCES
FERNOW HALL, CORNELL UNIVERSITY
ITHACA, NY 14853

SARATOGA NATIONAL
HISTORICAL PARK

Cooperating Agencies:

CORNELL UNIVERSITY
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WILDLIFE MANAGEMENT INSTITUTE
U.S. GEOLOGICAL SURVEY

DEC 18 2000

Dear project collaborator,

The 1999 - 2000 trapping season resulted in another successful collection of animals for the Hudson River contaminant monitoring project. Thanks to all project participants, especially the trappers who were so helpful with donating carcasses. The following is a general project update. If you supplied animals last season, specific information on these animals can be found on page 3.

From November 1998 - April 2000 a total of 239 mink, 70 muskrats, and 46 otters were collected within the New York State Department of Environmental Conservation Regions 3, 4 and 5 (Table 1).

Table 1. Number of mink, muskrats, and otters collected from counties within NYS DEC Regions 3, 4 and 5, 1998 - 2000.

County	Species					
	Mink		Muskrat		Otter	
	1998 - 1999	1999 - 2000	1998 - 1999	1999 - 2000	1998 - 1999	1999 - 2000
Herkimer	0	0	0	0	6	0
Hamilton	35	4	1	0	6	0
Essex	1	0	0	0	0	1
Warren	35	23	3	0	0	7
Saratoga	16	61	24	1	2	12
Washington	17	8	0	2	1	1
Albany	0	0	0	0	1	0
Rensselaer	13	27	23	14	3	2
Columbia	12	5	3	0	1	0
Fulton	11	8	0	0	0	0
Montgomery	5	2	0	0	1	0
Schoharie	3	3	0	0	0	0
Westchester	0	0	0	0	0	2
Total	148	141	54	16	21	25

We selected 106 mink, 46 otters, and 20 muskrats from this sample (1998 - 2000) for contaminant analysis. Liver samples from these specimens are currently being analyzed for PCBs, organochlorine pesticides, and metals (mercury, lead, cadmium). Initial PCB data from 1998 - 1999 have been received (Table 2). The initial PCB data for the 1999 - 2000 specimens should be available before June 2001. A comprehensive analysis of this data may not be available until 2002 - I'll keep you updated.

Table 2. Average total Aroclor PCB levels (lipid-adjusted) in 63 mink, 21 otters, and 6 muskrats from counties within NYS DEC Regions 3, 4 and 5, 1998 - 1999.

County	Species					
	Mink		Muskrat		Otter	
	Average Total PCBs (ppm)	Range	Average Total PCBs (ppm)	Range	Average Total PCBs (ppm)	Range
Herkimer					4.97	3.69 - 7.20
Hamilton			ND ^a		3.41	1.51 - 6.20
Essex	0.97	0.69 - 1.29				
Warren	1.20	0.89 - 1.451				
Saratoga	4.78	0.71 - 13.11	ND			
Washington	10.51	0.60 - 80.57	ND		101.17	1.98 - 200.37
Albany	1.94	0.29 - 3.86			8.31	
Rensselaer					18.54	
Columbia	2.75	1.07 - 3.87			39.09	30.96 - 47.87
Montgomery	2.47	0.12 - 7.36			11.24	
	7.43	2.59 - 15.00			168.00	

^a Not detected

(Note: Our initial health effect criteria are: PCB levels <9 ppm = no/minimal effect, 9 - 21 ppm = potential negative health effects, 21 - 50 ppm = probable negative health effects, >50 ppm = potential reproductive failure).

For the 2000 - 2001 trapping season, we are interested in mink from the southern reach of the Hudson River watershed (south of Columbia and Greene counties) and otter from the entire watershed. If you would like to contribute carcasses to the study, or have any questions about the project, please feel free to call me at 800-341-5772.

Regards,



Jeff Loukmas
Research Support Specialist
Cooperative Fish and Wildlife Research Unit
Cornell University

Specimen #	Date Collected	Sex	Town	County	PCB (ppm)	Cadmium (ppm)	Lead (ppm)	Mercury (ppm)	Gut Contents
Mink 1048	1989/1993	M	Stillwater	Saratoga	6.33	0.254	0.097	1.7	
Mink 1049	1989	M	Stillwater	Saratoga	80.57	0.206	0.095	0.641	
Mink 1050	19900830	M	Stillwater	Saratoga	6.40	0.021	0.03	0.22	
Mink 1083	19981223	F	Stillwater	Saratoga					
Mink 1129	19990305	M	Halfmoon	Saratoga	2.05	0.058	0.055	2.28	
Mink 1148	19990621	F	Stillwater	Saratoga	1.188	0.297	0.06	3.01	

Mink 1083 was not analyzed. Mink 1049 had the highest PCB levels from the 1998 – 1999 mink sample.