

# FACT SHEET

## HUDSON RIVER

### Mink Injury Publication



HUDSON RIVER TRUSTEES

ASSESSING AND RESTORING YOUR NATURAL RESOURCES

The Hudson River Natural Resource Trustees— the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of the Interior (DOI), and New York State (the Trustees) – are continuing to determine how polychlorinated biphenyls (PCBs) released from the General Electric Company (GE) plants at Fort Edward and Hudson Falls, New York harm the natural resources of the Hudson River and the surrounding ecosystem.

The Trustees investigated the effects of PCB contamination on American mink (*Neovison vison*), a predatory semi-aquatic mammal. Mink serve as an indicator of the health of aquatic ecosystems because of their documented sensitivity to PCBs. Earlier this year, Nature’s open access journal *Scientific Reports* published the results of a peer reviewed multi-year study comparing density of mink in the Hudson River and the Mohawk River systems. The publication, [Large-scale variation in density of an aquatic ecosystem indicator species](#), is now available online.

#### Summary of Publication

During 2013 and 2014, experts compared estimates of mink density in the Hudson River, which has extremely high levels of PCB contamination, and in the nearby Mohawk River where there are lower PCB levels. Mink density is substantially lower in the Hudson River system, with about 40% fewer mink in the Hudson River study area than in the Mohawk River study area. These differences are not attributable to landscape features. Study results show that PCBs have harmful effects on aquatic ecosystems, including mink, and these effects are likely to be profound and long-lasting, such as depressing the population levels of mink.

#### Why study Hudson River mink?

Previous studies have shown that PCBs can injure mink. For example, wild mink collected along the Hudson River contained relatively high concentrations of PCBs in their bodies (Mayack and Loukmas 2001). Captive mink fed a diet that included Hudson River PCB contaminated fish at environmentally relevant concentrations exhibited significant adverse effects, including but not limited to increased severity and frequency of jaw lesions, reduced kit growth and increased kit mortality (Bursian et al. 2013a, 2013b).

#### How do we measure mink populations?

The objective of this study was to quantify differences in mink density between the highly contaminated Hudson River system and a neighboring, hydrologically independent Mohawk River system with lower contamination levels. Experts used scat detection dogs to locate mink scat, and then identified individual mink from DNA extracted from the scat. Spatial capture-recapture models, which account for imperfect detection and a mink’s probable use of its habitat, estimated the population density using the location data of individual mink. This approach creates estimates of mink density across large spatial scales, which allows comparisons to be made between the two major river systems.





### Data Collection:

In 2013 and 2014, researchers collected more than three thousand mink scats across almost three hundred sample sites (some sampled in both years) in both river systems. Experts analyzed the scat genetically to identify individual mink where possible.

### Results:

In the Hudson River study area, 108 mink were detected over the two years of the study (44 female, 39 male, and 25 undetermined). In the Mohawk River study area, 208 mink were detected (85 female, 70 male, and 53 undetermined).

Mink density estimates were 1.12 mink/km<sup>2</sup> (2013) and 1.18 mink/ km<sup>2</sup> (2014) in the Hudson River study area and 1.84 mink/ km<sup>2</sup> (2013) and 1.97 mink/ km<sup>2</sup> (2014) in the Mohawk River study area. This equates to approximately a 40% decrease in mink density along the Hudson River compared to the Mohawk River.

**Relevance to Injury:** The 2018 publication provides compelling evidence that the density of American mink is adversely affected by PCB contamination. The results of this study, combined with the kit mortality of mink fed Hudson River fish documented by Bursian et al. (2013a, 2013b), and data showing high PCB concentrations in tissue of mink and their prey collected from the Hudson River (Mayack and Loukmas 2001) provide multiple lines of evidence of past, current and future injury to mink from PCBs. The Trustees may seek to restore mink through the Natural Resource Damage Assessment and Restoration process by, for example, seeking protection for land along rivers and streams or improving mink access to habitat with clean food and water.

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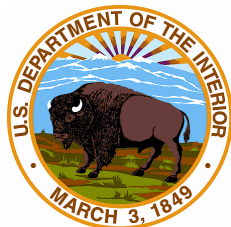
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### Fact Sheet References

Bursian, S.J., J. Kern, R.E. Remington, J.E. Link, S.D. Fitzgerald. 2013a. [Dietary exposure of mink \(\*Mustela vison\*\) to fish from the upper Hudson River, New York, USA: effects on reproduction and offspring growth and mortality](#). Environmental Toxicology and Chemistry 32(4):780-793.

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