# Fact Sheet
# HUDSON RIVER NRDA
# PCBs In Catbird Eggs

HUDSON RIVER TRUSTEES
ASSESSING AND RESTORING YOUR NATURAL RESOURCES


The Hudson River Natural Resource Trustees – the National Oceanic and Atmospheric Administration, the U.S. Department of the Interior, and New York State (the Trustees) – are conducting a Natural Resource Damage Assessment (NRDA) to determine how PCBs released from the General Electric Company (GE) plants at Fort Edward and Hudson Falls, New York harm the Hudson River's natural resources.

The Hudson River and surrounding area support more than 150 species of birds, including species of waterfowl, wading birds, shorebirds, songbirds, and rare species such as the bald eagle, peregrine falcon, and osprey (McGowan and Corwin 2008). Trustees have collected PCB exposure data in multiple species of Hudson River birds. Results of the 2015 Gray Catbird Egg Exposure Investigation are now available.

**Summary of Data Report**
In 2015, the Trustees collected Gray Catbird (*Dumetella carolinensis*) eggs from along the Hudson River to determine PCB exposure in this species. That study measured the extent and severity of PCB contamination in these bird eggs. Total PCBs in Gray Catbird eggs ranged from 0.03 to 8.03 ppm (fresh wet weight).

**Why are we studying Gray Catbirds?**
Birds exhibit a varying range of sensitivity to dioxin-like contaminants, including certain types of PCBs. Researchers have identified three different levels of such sensitivity to PCBs (defined as Type 1, 2, and 3). The level of such sensitivity to the toxic effects of PCBs is determined by the aryl hydrocarbon receptor (AHR). Of the more than 80 bird species that have been genotyped for the AHR receptor, five have been identified as the most sensitive, or Type 1, species. None of the species that the Trustees have collected data on so far have been Type 1. The Gray Catbird is a Type 1 species that breeds and forages in the Hudson River floodplain. This report offers the first data on PCB concentrations in eggs of a Type 1 bird species collected from the Hudson River.

**How do we measure toxicity using a TEQ?**
Toxic Equivalence (TEQ) values allow for comparison of relative toxicity across dioxin-like compounds which bind to the AHR. Multiplying a measured concentration of a dioxin-like PCB congener by the congener-specific Toxic Equivalency Factor (TEF) produces the toxic equivalency (TEQ) value for that congener. The TEF is a substance-specific value which indicates the toxicity of a substance relative to Dioxin (TCDD). The TEQ values for each dioxin-like congener measured in a sample can be summed to give a total value (ΣPCB-TEQs), which provides a measure of the potential AHR-mediated toxicity in the sample (Van den Berg et al. 1998, 2006).

**What did we find?**

**Data Collection:** Eighteen (18) sites between Bakers Falls (Hudson River Mile 196.9) and Lower Schodack Island (Hudson River Mile 132) were included in the study. Gray Catbird nests were found at all sites. A total of 34 eggs were analyzed for contamination.

**Results:** PCBs contributed the overwhelming majority of TEQs in all samples, ranging from 78.8-100% of total TEQs. Total PCBs in Gray Catbird eggs ranged from 0.03 to 8.03 ppm (fresh wet weight). Total PCB TEQs ranged from 4.26 to 578.77 ppt (pg/g fresh weight). Although concentrations tended to be higher in river sections in closer proximity to the former GE plants, no clear decreasing trend in PCB concentrations was detectable with increasing distance from the plant sites. Data from Gray Catbird eggs collected along the Hudson River demonstrate clear PCB exposure of a Type 1 species.

**Relevance to Injury:** This data report presents PCB TEQs in Grey Catbird eggs. The scientific literature provides the median lethal dose for PCB 126 in Gray Catbirds as 1.57 ng/g (Eng et al. 2017). Multiplying this concentration of PCB 126 by the congener-specific TEF of 0.1 (Van den Berg et al. 1998, 2006) converts this into a toxic equivalency (TEQ) value equaling 0.157 ng/g, which is equivalent to 157 pg/g (ppt). Comparing this TEQ to PCB TEQ levels found in these eggs, 7 of the 29 Gray Catbird eggs collected exceed that threshold, suggesting the potential for embryomortality, an injury to these birds.

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