

March 2008



Contaminants in Maine Bird Eggs

Summary of a new report by BioDiversity Research Institute

What we found

In the summer of 2007 we studied historical and emerging harmful contaminants in Maine bird eggs from species ranging from swallows to eagles. These eggs represented a wide range of habitats in Maine, including both fresh and saltwater environments, and forested and upland areas.

We found mercury, flame-retardants, and industrial repellents as well as banned transformer coolants and pesticides in all 23 species of birds. Many of the contaminant levels recorded were above those documented to have adverse effects. We did find, however, that contaminants banned 30 years ago are decreasing in the environment.

We found mercury, flame-retardants, industrial repellents, transformer coolants, and pesticides in birds that live on Maine's ocean, salt marshes, rivers, lakes, and uplands.

What do our results mean?

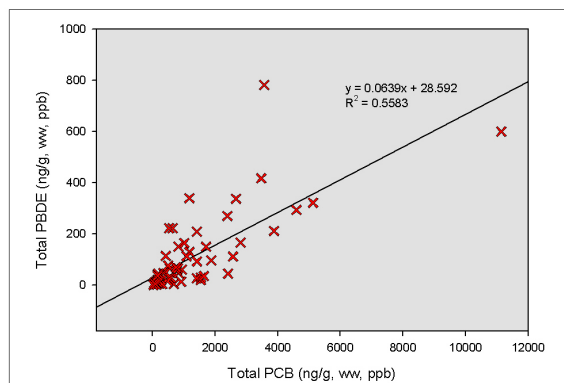
Laboratory studies demonstrate that these compounds have negative neurological and reproductive effects, impacting the immune system, liver, and hormones. Combined, they can interact to cause even greater toxicity. Since we found that birds with high levels of one contaminant tended to have high levels of other contaminants, these compounds may cause top predators, such as bald eagles and peregrine falcons, to have greater difficulty hunting and caring for young.



Ginger Gumm

Common loon

Common loon, Atlantic puffin, piping plover, belted kingfisher, great black-backed gull, peregrine falcon, and bald eagle had the highest contaminant levels. Overall, eagles carried the greatest load and, for many compounds, had levels multiple times higher than other species.



When transformer coolants (PCBs) are high, flame retardants (PBDEs) are also high.

Primary findings

- Banned and new harmful contaminants were found in all Maine bird eggs tested.
- Industrial stain and water repellants (PFCs) were found for the first time in Maine birds.
- Contaminants were found above adverse effects levels.
- Contaminants were found in birds living on the ocean, salt marshes, rivers, lakes, and uplands.
- Birds found in southern coastal Maine tended to have the highest contaminant levels.
- Eagles had the highest contaminant levels.
- Birds with high levels of one contaminant had high levels of other contaminants.
- The flame retardant *deca* was found in eight species.
- Overall, banned contaminants are lower today than in the past.



Bald eagle



Doug Hitchcox

Piping plover

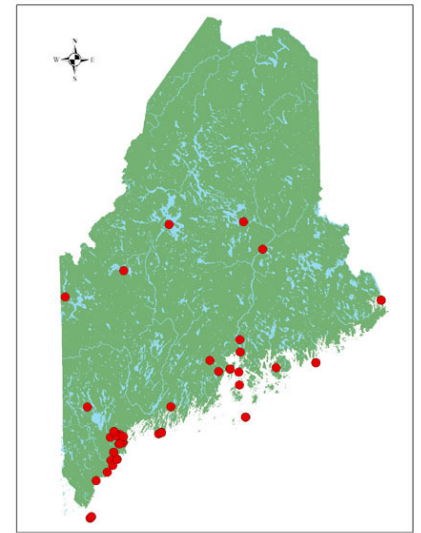
Birds studied

- American kestrel
- Arctic tern
- Atlantic puffin
- Bald eagle
- Belted kingfisher
- Black guillemot
- Common eider
- Common loon
- Common tern
- Double-crested cormorant
- Great black-backed gull
- Glossy ibis
- Herring gull
- Least tern
- Leach's storm-petrel
- Osprey
- Peregrine falcon
- Piping plover
- Red-winged blackbird
- Snowy egret
- Tree swallow
- Virginia rail
- Willet

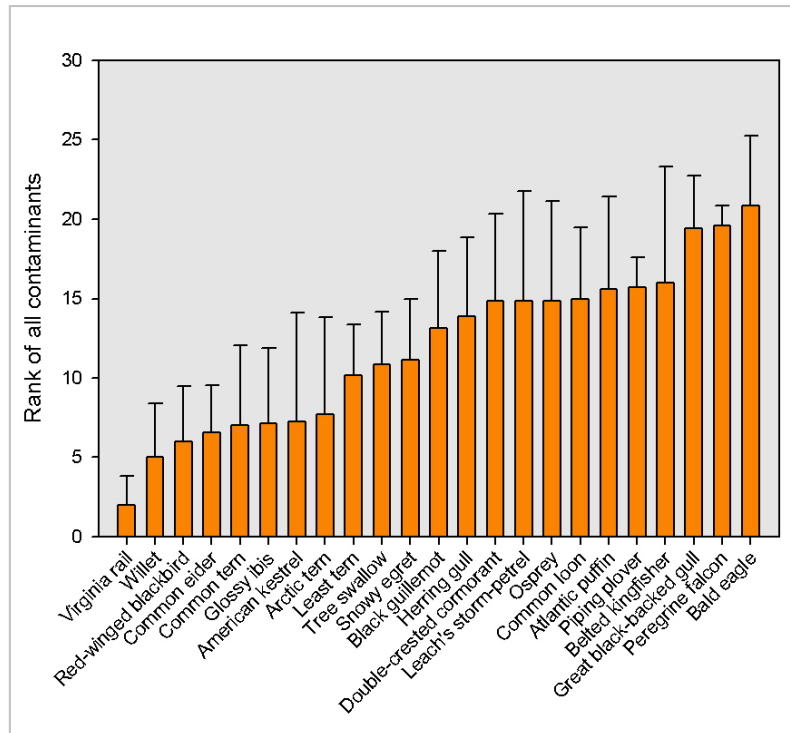
For a copy of the complete report please visit www.briloon.org or contact BioDiversity Research Institute, 19 Flagg Meadow Road, Gorham ME 04038 (207) 839-7600

Contaminant sources are global and local

We found contaminants in all bird eggs sampled, including those from Leach's storm-petrel, a species that feeds hundreds of miles offshore. Similar to studies documenting contaminants in Arctic and Antarctic birds, our findings confirm that wide-ranging global pollutants are present in rain and snow. We also found that mid-coast and southern coastal Maine had higher contaminant levels than elsewhere in the state. This suggests that contaminants are not only available from a global pool, but may have local sources, such as release from consumer products in developed areas, incinerators, and water treatment facilities.



Sampling sites



Birds that eat insects and small fish tend to have lower contaminant levels than birds that eat larger fish and other birds.

This project was only possible through generous support from the Casco Bay Estuary Partnership, Maine Community Foundation, Maine Department of Environmental Protection's Surface Water Ambient Toxics Monitoring Program (SWAT), Maine Outdoor Heritage Fund, John Merck Fund, U.S. Fish and Wildlife Service, and collaborators.



Susan Schubel

Atlantic puffin

Contaminants measured and negative effects

- Mercury: neurological, reproductive
- Banned transformer coolants (PCBs): immunological, reproductive, organ function
- Flame retardants (PBDEs): developmental, endocrinal, organ function
- Industrial stain and water repellants (PFCs): developmental, reproductive
- Banned pesticides (OCs): egg-shell thinning, reproductive