

Water WoRDs

Updates from the Water Resources Division



[Get notified when this page is updated - subscribe to DEQ Water WoRDs](#)

Monitoring bird populations helps DEQ track water quality

Sometimes monitoring water quality requires getting a little creative.

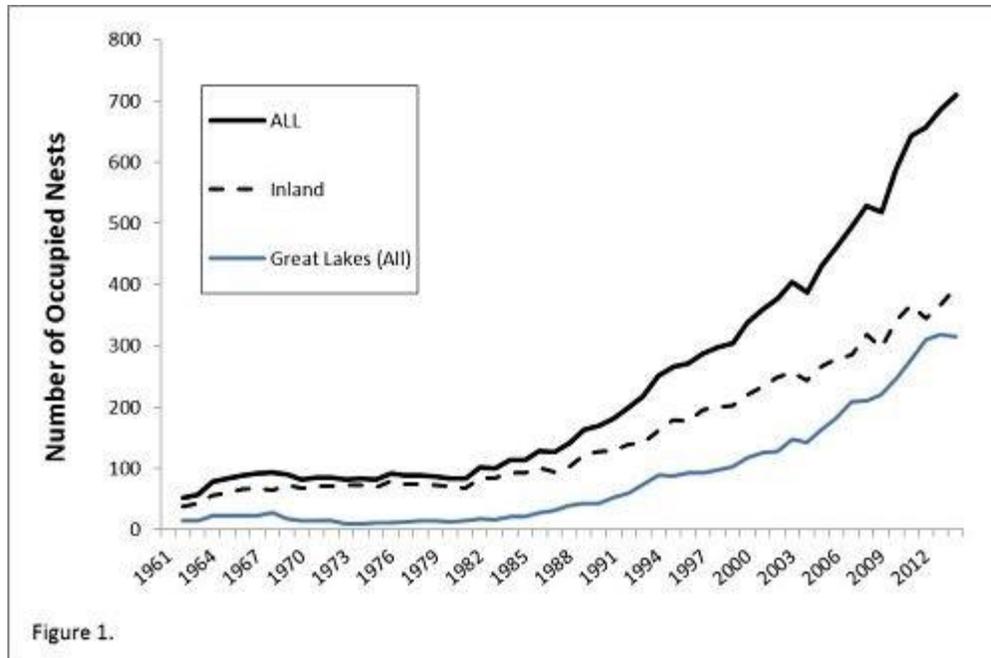
One tool DEQ's Water Resources Division uses to help get an accurate picture of contamination present in fish in the water is monitoring contamination present in birds in the air.

DEQ partners with the Department of Community Health to measure fish contaminant levels to inform the need for fish consumption advisories. Since many types of birds consume fish, partnering with the Department of Natural Resources to monitor bird populations helps assess the quality of the overall environment and determine the success of environmental programs.



DEQ staff has been measuring the concentration of contaminants in bald eagle plasma since 1999. Specifically, staff looks at trends over time and location of the types of contaminants that build up as they move through the food chain, including chemicals like polychlorinated biphenyls (PCBs), dichlorodiphenyldichloroethylene (DDE) and mercury. The DEQ also works with the DNR to continue the statewide measurement of bald eagle productivity first begun in 1961. The Clean Michigan Initiative-Clean Water Funds approved by Michigan's voters to protect and enhance the state's natural resources help pay for this work.

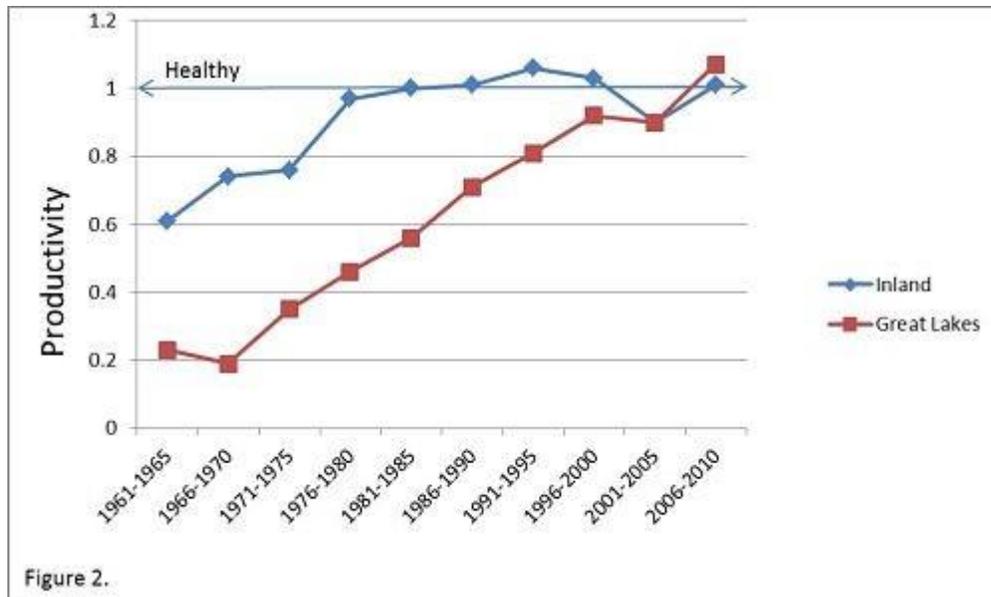
The bald eagle is a good indicator of the health of the aquatic ecosystem because it eats fish, inhabits the top of the food chain, does not migrate outside the Great Lakes region in adulthood, displays great fidelity to its nesting territory, and has been shown to be sensitive to the effects of environmental contaminants such as DDE and PCBs.



The number of bald eagles declined drastically after World War II due primarily to the eggshell-thinning effects of DDE, the main breakdown product of the widely used pesticide DDT. The bald eagle population increased after DDT was banned in the U.S. and Canada during the early 1970s, but the recovery was not uniform. Eagles nesting along the Great Lakes and along rivers open to spawning runs of fish from the Great Lakes still suffered reduced reproduction rates since Great Lakes fish contained elevated levels of contaminants like DDE. Even as levels of DDE decreased, the effects of substances like PCBs became more apparent.

But in the decades since, the Michigan bald eagle population has continued to recover. Every March and April, DNR pilots fly around the state to determine the number of occupied bald eagle nests. A nest is considered occupied if an adult, an egg, or an eaglet is present. The number of eagle nests in Michigan has increased from 52 in 1961 to 710 in 2013 (Figure 1). This is an amazing recovery.

Occupied nests are only the first step to recovery, though. For there to be a sustainable population, sufficient numbers of eaglets need to successfully leave the nest. Therefore, a healthy bald eagle population is defined as having an average of at least one successfully fledged young per occupied nest. Every May and June, DNR pilots fly around the state again to determine the number of young fledged from the occupied nests observed during previous flights. The information from the two flights combined with work on the ground is used to determine bald eagle productivity.



The years 2006-2010 marked the first five-year period where bald eagles nesting in both inland and Great Lakes territories had productivities greater than one (Figure 2).

Additionally, today's fledgling birds have lower contaminant levels than those of the 1970s. Blood samples from a wing vein of 5- to 9-week-old eaglets show decreasing levels of substances like PCBs and DDE. In addition, current feather samples show lower mercury levels than when samples were first analyzed in the 1980s.

In addition to the eagle monitoring program, DEQ's WRD staff began measuring contaminant levels in the eggs of herring gulls in 2002. Herring gulls are good candidates for monitoring because eggs can be collected from nesting colonies without adversely affecting population levels, adults remain in the Great Lakes region all year, gulls display fidelity to their breeding colonies, and the Canadian Wildlife Service has successfully monitored contaminants in herring gull eggs for many years. s show decreasing levels of substances like PCBs and DDE. In addition, current feather samples show lower mercury levels than when samples were first analyzed in the 1980s.

Monitoring is currently conducted in colonies on Bellow Island in Lake Michigan, Little Charity Island in Saginaw Bay, Five Mile Island in St. Marys River, Huron Island in Lake Superior, and Detroit Edison on Lake Erie. In all of these colonies, PCBs, DDE, dioxins/furans and mercury have decreased over time.

Both the bald eagle and herring gull populations are healthier because the fish they are eating are less contaminated. The fish are less contaminated because the water is less contaminated. It's all connected, and it's all good news for Michigan.

Meet the staff

Dennis Bush has worked as a toxicologist for the state of Michigan for more than 20 years. He earned a bachelor's degree in fisheries and wildlife and a master's degree in toxicology from Michigan State University. His primary responsibility at the DEQ is to supervise the Water Toxics Unit of the Water Resources Division. Some of the responsibilities of his unit include determining the concentration of chemicals in surface water protective of human health, aquatic life and wildlife; overseeing the fish contaminant, wildlife contaminant, volunteer water monitoring, and beach monitoring components of the DEQ's WRD monitoring strategy; and providing toxicological support for the surface water and groundwater programs.