Our Water
Keeping it Clean

North Dakota Department of Environmental Quality

National Lakes Assessment

Monitoring the Health of Our Lakes, Ponds and Reservoirs

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The National Lakes Assessment (NLA) is one of three National Aquatic Resource Surveys used in North Dakota to assess the status of, and changes to, aquatic resources such as rivers and streams, wetlands, and lakes and reservoirs.

Lakes and reservoirs provide countless environmental, social and economic benefits. They provide water for drinking, recreation, cultural practices, wildlife habitat, agriculture and energy.

Continued support of the many ways we use and interact with lakes requires understanding their condition. The NLA provides a "State of the Lakes" for the nation and answers important questions such as:

- How healthy or unhealthy are our nation's lakes?
- What are the most common issues in unhealthy lakes?
- What is the relationship between stressors and the condition of lakes?
- How are lake conditions changing in time?

The NLA has been conducted every five years since 2007.

In 2022, the North Dakota Department of Environmental Quality will survey an estimated 40 water bodies across North Dakota as part of approximately 1,000 lakes and reservoirs surveyed across the lower 48 states.

Water bodies are randomly selected from the National Hydrography Dataset. They include permanent, natural and man-made water bodies greater than one hectare in surface area (roughly two football fields). Scientists collect information from key biological, physical, human use and trophic indicators at each lake.

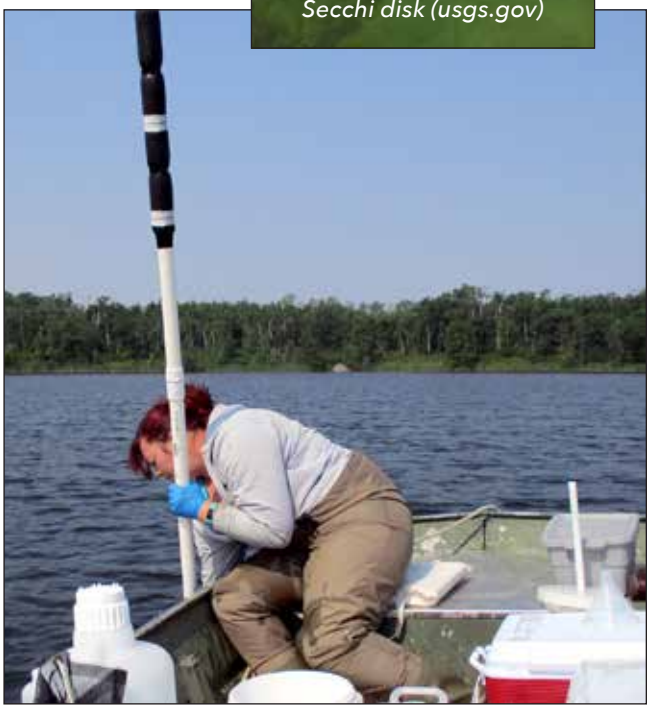
Trophic Status
The trophic status of lakes represents the level of nutrient production or growth. Eutrophic lakes have high productivity levels, oligotrophic lakes are low in productivity and mesotrophic lakes fall between the two.

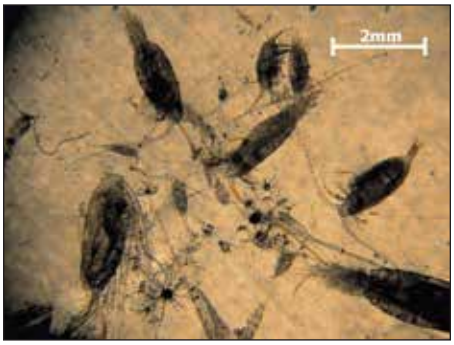
Environmental scientists determine a lake's productivity by measuring water quality criteria, including chlorophyll-a (used by algae during photosynthesis), Secchi disk transparency (water clarity) and water chemistry (nitrogen, phosphorus).

Lake productivity changes naturally through time. However, activities such as agriculture and urbanization can contribute excess nutrients and accelerate trophic changes.

Stratification, or layering, in a lake also influences its health. Layers form when colder, more dense water sinks below warmer, less dense water. Without mixing, oxygen levels in the water can become limited. Depth measurements of temperature, pH and dissolved


Secchi disk (usgs.gov)


Environmental Quality staff collecting NLA samples.



Common zooplankton (epa.gov)

oxygen indicate what conditions are available to aquatic life.

Biological Indicators
The amount and variety of organisms in a water body indicate its health. For example, many benthic (bottom-dwelling) macroinvertebrates (bugs we can see) and zooplankton (tiny animals suspended in the water) are sensitive to habitat changes and stressors and are easy to sample and identify.

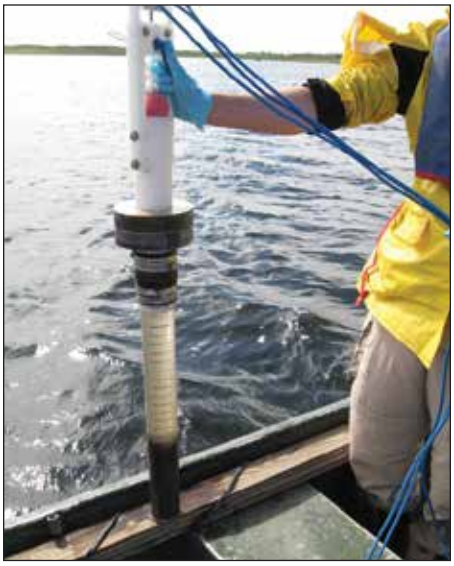
Physical Habitat
Physical habitat condition, especially where land and water meet, is critical to the overall health of a water body. Habitat assessments include an extensive list of observations, from sediment composition to canopy cover, that help identify disturbed areas and those susceptible to future impacts.


Algal bloom on a North Dakota lakeshore.

Human Use
People use lakes for recreation such as swimming, fishing and boating. Measuring levels of toxins (microcystin), bacteria (E. coli) and pesticides (Atrazine) helps identify pollution sources and determines if a water body is safe for human use. Runoff from poorly managed agriculture and grazing areas can contribute excess nutrients, bacteria and chemicals to water bodies, making them unsafe to recreate in and creating aesthetically unpleasant conditions.

Other Indicators
Lakebed sediment tells a story of the water's history. Sand and silt grains settle and deposit on the lake bottom, along with other materials such as organics (bacteria, algae) and chemicals (metals, pesticides). Sediment cores are collected and analyzed to identify water quality impacts and conditions through time.


Pelicans lift off from a North Dakota lake.


Sediment sampling, 2012 NLA.

As NLA cycles continue, additional indicators are developed and implemented. Dissolved gas and environmental fish DNA (eDNA) data collection began in the 2017 NLA. Dissolved gas measurements (methane, carbon dioxide, nitrous oxide) help inform ongoing national research on lake emissions. The collection of eDNA supports development of future NLA indicators.

Alongside other states and tribes, North Dakota is helping to evaluate the condition of our nation's lakes, ponds and reservoirs. Information gathered from the NLA surveys helps identify widespread stressors to water resources and shapes actions for improvement.

For more information on the NLA, contact the Watershed Management Program at 701-328-5210.

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