



Conserving The Nature of America

Continuous water-quality monitoring at Lake Mattamuskeet:

A foundation for national wildlife refuge water quality partnerships at North Carolina's largest natural lake

The U.S. Fish and Wildlife Service has partnered with the U.S. Geological Survey to establish two automated water-quality monitoring stations at Lake Mattamuskeet to better understand the lake's ecology. Lake Mattamuskeet is divided by the NC Highway 94 causeway (constructed in 1942), which effectively divides the lake into two distinct basins. The western portion of Lake Mattamuskeet is turbid and dominated by phytoplankton while the eastern and larger portion is less turbid and dominated by submerged macrophytes. It is these plants that support a significant waterfowl population. Managers are concerned that submerged macrophyte populations have declined on the west side of the lake and asked for help in determining the extent to which the decline may be due to poor water quality.

The monitoring stations provide data to inform management at Mattamuskeet National Wildlife Refuge and assist others in cooperative assessments of the lake and its living resources. Stations on the east and west side of the lake measure water level, clarity, dissolved oxygen, pH, temperature, salinity, and conductivity. Lake conditions are available in real-time on the USGS's National Water Information System and can be viewed by the public, refuge management, and cooperators. The stations make measurements every 15-minutes, providing resolution essential to understanding how the 41,084-acre lake is influenced by land use, management, seasonal, and climactic changes.



* [National Water Information System links for the two sites:](#)

Mattamuskeet West: http://waterdata.usgs.gov/nc/nwis/dv?referred_module=sw&site_no=0208458892

Mattamuskeet East: http://waterdata.usgs.gov/nc/nwis/dv?referred_module=sw&site_no=0208458893

Several USFWS offices collaborated to fund the stations until fall 2013. Initial support came from the Natural Resource Program Center through an Inventory and Monitoring Water Quality Pilot Project. Those funds were matched by Mattamuskeet NWR, Southeast Regional Office (Wildlife Resources), South Atlantic Migratory Bird Coordination Office, South Atlantic Fish and Wildlife Conservation Office, and Raleigh Ecological Services. Additional project details are on the reverse side of this fact sheet, and more information is available from Michelle Moorman (919-571-4013, mmoorman@usgs.gov) and Tom Augspurgen (919-856-4520 x21, tom_augspurgen@fws.gov).

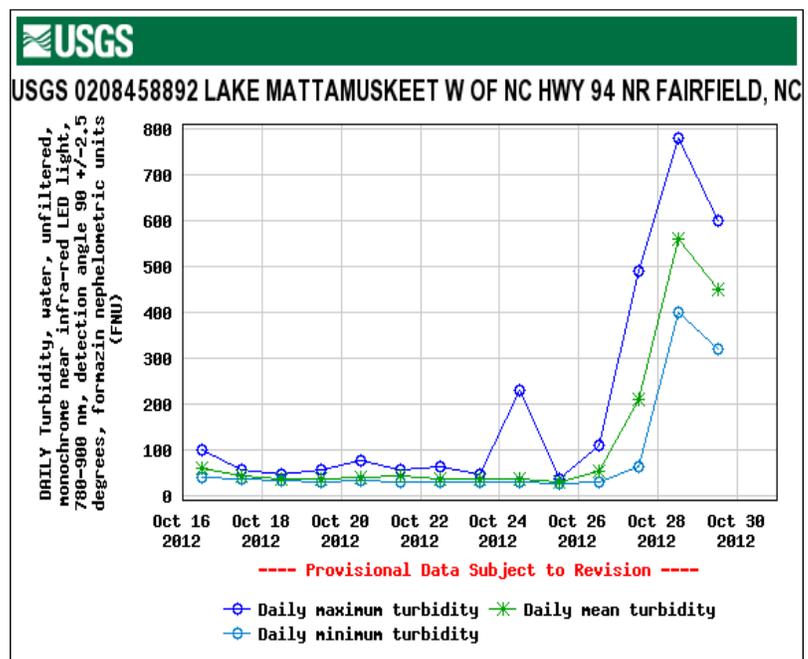
Pollution is one of the public's greatest environmental concerns. The USFWS has been involved with studying contaminant effects on fish and wildlife since its earliest days, and today our Division of Environmental Quality includes contaminants specialists at more than 75 locations around the country.

Using continuous data to understand water quality at Lake Mattamuskeet

Refuge staff and other stakeholders are concerned with the declining submerged aquatic vegetation at Lake Mattamuskeet and the associated impacts to other resources such as waterfowl dependent upon the vegetation. Those concerns and the approaches needed to assess the extent to which water quality is involved in the declining vegetation have been synthesized in a draft 2012 framework, *Science to Support Hydrology and Water Quality Management Decision-Making at Mattamuskeet National Wildlife Refuge*. One observation in this report is that the frequency of water-quality monitoring needs to be increased.

At Lake Mattamuskeet, routine monitoring has been conducted by the North Carolina's Division of Water Quality once every five years from the early 1980s to the present. The results of their assessments suggest the west side of Lake Mattamuskeet is hyper-eutrophic and the east side of Lake Mattamuskeet is eutrophic. Other State agencies, the USFWS, and academic institutions have collected water quality data, but a more frequent and consistent monitoring approach is needed to understand and resolve issues related to water quality. Continuous water-quality monitors help resolve these issues by:

- Providing robust data for potential national core metrics of refuge water quality in real-time as part of USFWS's new Inventory and Monitoring program.
- Facilitating partnered refuge-specific water quality monitoring for other important limnological variables when staff service the instruments.
- Providing real-time information to assist in collection of grab samples for other constituents like Chlorophyll a and nutrients during spring run-off events and algal blooms.
- Ensuring data quality and long-term, on-line, data access in USGS databases.



Provisional data from the monitoring stations documented water clarity impacts of Hurricane Sandy as it passed Lake Mattamuskeet in late October.

USFWS staff will analyze data from the two continuous monitoring stations in combination with the periodic historical monitoring data to gain an improved understanding of how water quality has changed over the past three decades and how water quality at Lake Mattamuskeet is impacted by seasonal and climatic variability.