

## Lake Mattamuskeet Frequently Asked Questions

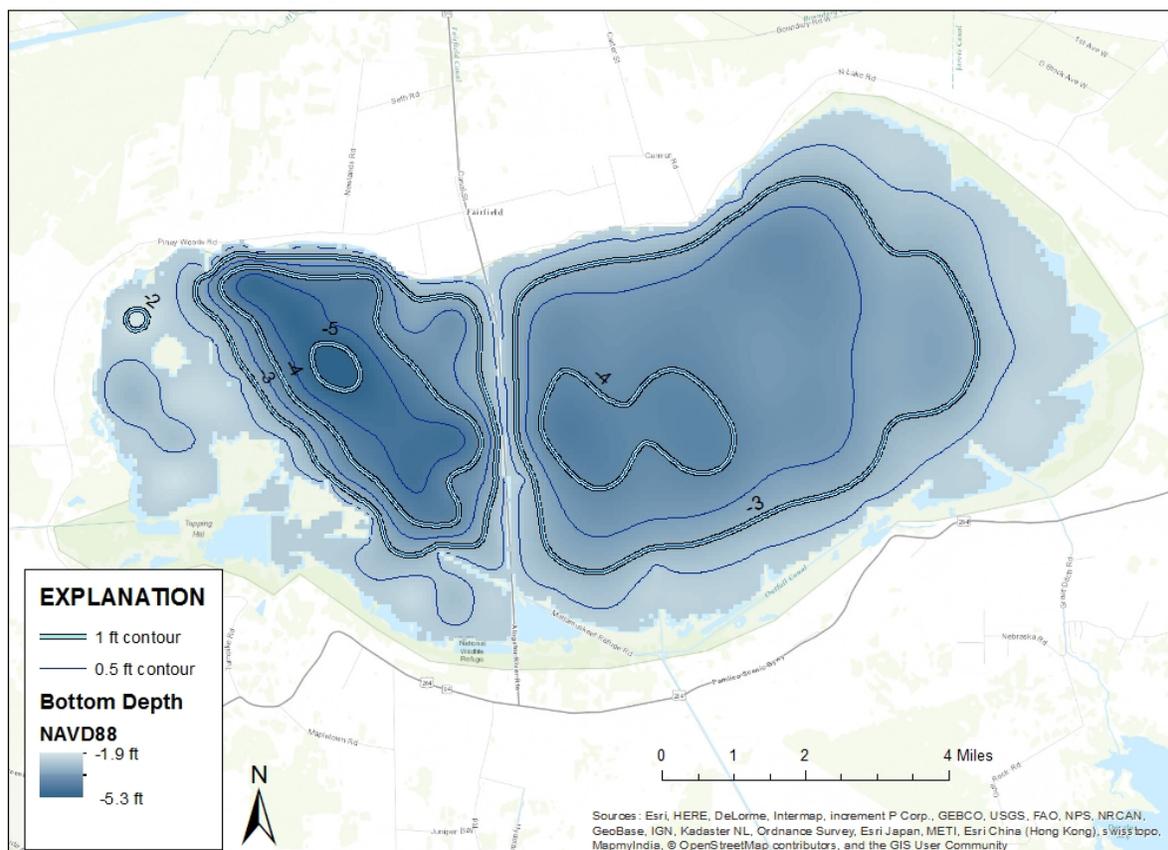
Since so many of these questions refer to monitoring activities in the Lake and Pamlico Sound, you may want to reference the following pages:

- Summary of Lake Monitoring activities:  
<http://nc.water.usgs.gov/projects/mattamuskeet/>
- Summary of Bell Island Pier activities:  
<http://www.arcgis.com/home/webmap/viewer.html?webmap=f52ab347d5e84ccc921b75c34fea42d5&extent=-77.5214,34.7208,-75.2252,36.3212>

### 1. How deep is the lake?

Lake depth varies from a few inches to five feet, with an average depth ranging from two to three feet depending on the season. Water levels are deepest in late fall, winter, early spring and during years with above average rainfall due to evaporation and precipitation. The deepest portions are located in the northwest portion of the lake. (see bathymetric map below). You can access the current water levels by visiting the USGS website ([East](#) and [West](#)) for Lake Mattamuskeet.

Lake Mattamuskeet Bathymetry



## **2. Why is the lake so high/low?**

Lake levels fluctuate on a daily, seasonal and yearly basis. Water levels are primarily determined by climatic conditions. Generally, seasonal lake levels follow a pattern of being lower in the summer due to high evaporation rates and higher in fall, winter and spring due to lower evaporation rates and greater precipitation. Lake levels will increase by a few inches after a heavy rain. During wet years with lots of precipitation, water levels will rise; during drought years, water levels will fall. You can access current water levels by visiting the USGS website for Lake Mattamuskeet ([East](#) and [West](#)).

## **3. Is the Refuge holding water?**

No, the Refuge does not hold water, but hydrological conditions sometimes result in little outflow. In the late 1800's and early 1900's, four canals connecting the lake to the Pamlico Sound were built for the purpose of draining the lake. This project was unsuccessful because the bottom of Lake Mattamuskeet is below sea level. In order to maintain the freshwater lake, the U.S. Fish and Wildlife Service (USFWS) installed flap gates on each of these four canals.

Flap gates are designed to restrict saltwater from entering the lake when water levels in the Pamlico Sound are higher than water levels in Lake Mattamuskeet. The gates allow freshwater to flow from Lake Mattamuskeet to the Pamlico Sound when water levels are higher in the lake than the sound. If water levels are higher in the Pamlico Sound than in Lake Mattamuskeet, the gates are designed to remain closed, lessening saltwater from entering the lake.

## **4. How salty is Lake Mattamuskeet?**

Lake Mattamuskeet is primarily freshwater. Salinities vary depending on the amount of precipitation the lake receives, but are generally less than one part per thousand. Many farmers use lake water to irrigate and fill impoundments. Salinities in the lake have declined markedly over the last few years as the flap gates have been repaired or replaced. You can check the current salinity level by visiting the USGS website ([East](#) and [West](#)). Salinities are measured every 15 minutes and the data can be viewed online in real-time.

## **5. Can the Refuge pump water out of the lake?**

No, the Refuge does not manage lake water levels. However, the Refuge can utilize the pumps and water within the lake to fill the surrounding impoundments.

## **6. How is the lake's water quality?**

Lake Mattamuskeet's water quality is poor, and it is not meeting certain State of North Carolina water quality standards. Existing conditions are not conducive to survival of the submerged grasses important for wildlife. Scientists have documented a decline in water quality when examining data from 1981 through 2015. Water quality will need improvement to meet standards and support submerged grass restoration.

## **7. What has happened to the grass (also known as submerged aquatic vegetation, or SAV) in the lake?**

Refuge surveys have documented a decline in submerged aquatic vegetation since the late 1980s. Initial declines in SAV occurred on the western side of the lake in the 1990s, but, since 2013, we have also documented steep declines on the eastern side as well. We suspect that SAV is declining primarily as a result of poor water clarity. Decreases in water clarity have most likely resulted from increasing levels of

phytoplankton and suspended sediments in the water column that shades the SAV.

Why has this occurred? There are probably many reasons. Over the past 20 years we have observed a significant increase in the nutrients, nitrogen, and phosphorus in the lake. These nutrients stimulate plant growth, specifically algae, which can produce algal blooms. Algae contains pigments that reduce water clarity and are capable of producing toxins that can be harmful for both human and ecological health. In addition, once the SAV dies, there are fewer plants to absorb nutrients from the sediments and to stabilize bottom sediments. Also, in shallow lake systems like Lake Mattamuskeet, high winds will churn up sediments, causing decreased water clarity. Finally, increases in populations of bottom-feeding fish, like common carp (an introduced species from Europe), may churn up sediments which result in decreased water clarity.

All of these actions can make a shallow lake transition from a clear lake full of submerged aquatic vegetation to a turbid lake full of algae. The USFWS and N.C. Wildlife Resources Commission (NCWRC) are collaborating with other stakeholders to improve water quality at Lake Mattamuskeet.

### **Management:**

#### **8. As I understand from the federal Presidential Executive Order, the original Refuge purpose is for “birds and other wildlife.” Why are Refuge purposes listed primarily for waterfowl?**

The purposes of a National Wildlife Refuge are derived from the Executive Order, legislation, or any other document that establishes, authorizes or expands a Refuge.

Mattamuskeet National Wildlife Refuge (Mattamuskeet NWR) was established in 1934 by Executive Order 6924, and the purchase of the land (funded by the Federal Emergency Relief Administration) was authorized under the Migratory Bird Conservation Act of 1929. Originally named the “Lake Mattamuskeet Migratory Bird Refuge,” the project was approved and on December 3, 1934, the United States purchased from New Holland Corporation “a tract of land in Hyde County, North Carolina to be acquired as a migratory bird Refuge.” This was the same year that President Roosevelt signed the Duck Stamp Act of 1934 in the midst of the Dust Bowl era, when there was great concern for the plight of migratory waterfowl across the nation. On the heels of several pieces of national legislation focused on migratory ducks and geese through the 1910s and 1920s, scores of National Wildlife Refuges were established for migratory waterfowl through the 1940s and beyond.

Mattamuskeet NWR lies in the middle of the Atlantic Flyway and is an internationally important stop-over and wintering area for hundreds of thousands of waterfowl using this migration route. While Mattamuskeet NWR also provides habitat for shorebirds, wading birds, raptors and land birds, and many other species of wildlife, its historical and current significance to waterfowl is well documented.

#### **9. What agency is primarily responsible for the management of the Refuge?**

The USFWS and NCWRC have entered into a Memorandum of Understanding (MOU). This agreement clearly outlines the distinct roles of the two agencies and the lands they manage, and it identifies specific programs on which they will work closely together to fulfill the purpose of the Refuge and objectives of its Comprehensive Conservation Plan. These joint programs include improving the lake’s water quality and enhancing public access to the lake for a variety of recreational uses.

**10. How will the MOU between the USFWS and the NCWRC benefit the management of the Refuge?**

The MOU builds on the 2014 Memorandum of Collaboration between the two agencies by defining a framework for co-managing multiple projects aimed at addressing the health of Lake Mattamuskeet's ecosystem, identifying research needs and habitat restoration opportunities and putting in place facilities and infrastructure improvements for enhanced public access.

The agencies will work together, sharing capacity and resources through defined co-management responsibilities to collaborate on specific projects such as invasive species management and water quality enhancement. Together we will improve opportunities for hunting, fishing and other public uses. The benefit to the Refuge will be consistent with its publicly-reviewed Comprehensive Conservation Plan and original authorized purpose.

This collaboration will leverage more resources to implement landscape-scale management needed for sustaining wildlife populations and improving lake water quality, while providing compatible recreational and educational opportunities.

**Wildlife and Public Use:**

**11. What can I do here?**

Mattamuskeet provides numerous opportunities for wildlife observation and fishing. Other activities available are hunting, photography, hiking, boating, canoeing and environmental education.

**12. Is the Refuge shifting focus from waterfowl to fisheries?**

No. Mattamuskeet NWR was established to protect and conserve migratory birds and other wildlife resources through the protection of wetlands. While noted for its waterfowl, the Refuge also provides habitats for a diverse fishery resource that includes popular recreational freshwater species such as largemouth bass, black crappie, and channel catfish. Atlantic blue crab are also present in the lake and support a high-level of crabbing effort. Fisheries management has been conducted in various forms on the lake for over the last several decades. Many of the habitat requirements important for waterfowl are also critical for fish, most notably high-quality submerged aquatic vegetation. The Refuge's primary purpose has not and will not change, but the Refuge is also committed to enhance and conserve other wildlife species and their habitat while providing opportunities for compatible wildlife-dependent recreation.

**13. Will Refuge management actions continue to focus on waterfowl?**

Yes. On average 50% of the waterfowl recorded during the annual waterfowl surveys in January (2010-2015) for the coastal regions of North Carolina occurred on Lake Mattamuskeet. We know well the regional, national and international significance of the Refuge for conserving migratory waterfowl. We are proud of that and remain committed to ensuring the purpose of the Refuge is carried out.

**14. What are the waterfowl numbers in the Refuge and are the numbers increasing or decreasing over recent years?**

Overall, waterfowl numbers on the Refuge and surrounding private lands fluctuate from year to year and

are influenced by continental trends in breeding populations (i.e., how many birds survive to enter the fall flight south), habitat conditions and weather. The most current survey, conducted in January 2015, indicates that overall waterfowl numbers on the Refuge were 15% below the previous 5-year average, 10% above the previous 10-year average and well above the long-term (1961-2014) average. Since 1961, NCWRC and USFWS have conducted an aerial survey of wintering waterfowl on the Refuge and across coastal North Carolina each January.

#### **15. Where is the best place to see wildlife (birds)?**

Mattamuskeet's East Main Drive is a 5-mile long gravel road bordering the southern shore of Lake Mattamuskeet. A variety of mammals and birds can be seen along this drive, as well as along the 3-mile long entrance road to the refuge headquarters. In addition, there is a short nature trail near the headquarters and miles of grassed dikes crisscrossing the entire refuge. In winter, thousands of waterfowl can be seen up close.

Another popular place for viewing is from an overlook on Highway 94. An interpretive panel and viewing scope are located on the overlook.

#### **16. How can I hunt on the refuge?**

Mattamuskeet hosts both a waterfowl and white-tailed deer [hunt program](#). Only a limited number of permits are issued each year by lottery. The lottery is open to any properly licensed U.S. citizen.

#### **17. How is the fishing on the Refuge?**

Lake Mattamuskeet and its associated drainage canals offer fishing opportunities from a boat or the bank. Given the shallowness of the main lake (much less than 2 feet deep in most areas) most of the fishing effort is limited to bank fishing from the canals or along N.C. 94 that bisects the lake. Fishing in the canals can be good at times, especially during the months of March, April, and May. Fish tend to concentrate in the canals either to spawn or to seek areas of deeper water when lake levels are low. The five culverts along N.C. 94, along with two fishing piers, are popular fishing and crabbing locations, offering bank anglers an opportunity to fish the middle of the lake without a boat.

Despite concerns regarding water quality and depth, fishing at the Refuge remains a popular activity. Anglers spent more than 200,000 hours fishing Lake Mattamuskeet in 2014. Anglers reported that the most sought after fish species at the Refuge were black crappie, channel catfish, white perch, and largemouth bass; anglers also reporting catching common carp, bluegill, yellow perch, white catfish, American eel, bowfin, and longnose gar.

Fisheries reports developed by NCWRC for largemouth bass and black crappie can be found online: <http://www.ncwildlife.org/Fishing/LearnResources/MonitoringSurveys.aspx>

#### **18. What fisheries surveys and research are being conducted at Lake Mattamuskeet?**

Declines in relative abundance of sport fish have been documented over the last decade. The NCWRC conducted extensive sampling to consider appropriate management efforts to improve these fisheries. Fish biologists with NCWRC annually monitor sport fish in Lake Mattamuskeet and its associated canals using boat mounted electrofishing and trap nets in the spring and fall. Annual monitoring reports are available online: <http://www.ncwildlife.org/Fishing/LearnResources/MonitoringSurveys.aspx>

Seasonal declines of water levels in the main lake, particularly in the summer months, limits fish accessibility to shoreline habitats and may impact movement between the lake and deeper canals. One example of a recent survey dealt with movement dynamics of largemouth bass. Largemouth bass were tagged with Passive Integrated Transponders (PIT) that contained a unique numeric code. Upon recapture, the known location of each individual could be compared with the initial tagging location to assess movement. Since the initiation of the PIT tagging project in spring 2014, more than 500 largemouth bass have been tagged and movement between the lake and canals has been documented. In order to get a better idea of what factors cause largemouth bass to move between the lake and canals, NCWRC is implementing an acoustic tagging project that will define small scale movements and changes in water depth on a seasonal basis.

#### **19. Where is the best place to fish?**

Lake Mattamuskeet is a very shallow lake allowing only small boats access to approximately 40,000 acres of prime warm water fishing. In addition to the lake, there are miles of canals available for bank fishing. Favorite species to catch are largemouth bass, white perch, crappie, sunfish, catfish and blue crabs. **The lake is open to fishing year round. Fishing from boats in canals and the lake is permitted from March 1 through November 1.**

#### **20. How is the crabbing in the Refuge?**

Crabbing for blue crab is a popular recreational activity at Lake Mattamuskeet, and the crabs at the lake are highly regarded for their large size. Blue crabs enter through canals connected to the Pamlico Sound, and likely utilize the lake as a [mating area](#) due to the lower salinity requirements associated with this portion of their life cycle.

Crabbing is popular in the late spring months through the end of summer. Hand lines are the preferred crabbing method, occurring primarily at the southernmost culverts on N.C. 94, Lake Landing, and Central Canal. Many crabbers fish right from the flap gates, where crabs can often be seen congregating. During a creel survey in 2014, crabbers spent an estimated 148,986 hours catching roughly 221,000 crabs. Of the blue crabs caught at the Refuge, 93% were harvested.

Crabbing at Lake Mattamuskeet is subject to a state regulation of a carapace length limit of five inches from tip to tip and a federal Refuge regulation of a daily limit of 12 blue crabs per licensed individual. Note Refuge boundaries when crabbing for regulation compliance:

[http://www.fws.gov/uploadedFiles/Mattamuskeet%20Fishing%20Regulations\(1\).pdf](http://www.fws.gov/uploadedFiles/Mattamuskeet%20Fishing%20Regulations(1).pdf)

#### **21. Is a fishing license required to catch crabs?**

Yes, since July 1 2008, a freshwater fishing license is now required to catch crabs. A youth under 16, accompanied by a properly licensed adult, can fish/crab under the privileges of the adult's license. Contact the [NC Wildlife Resources Commission](#) for more information.