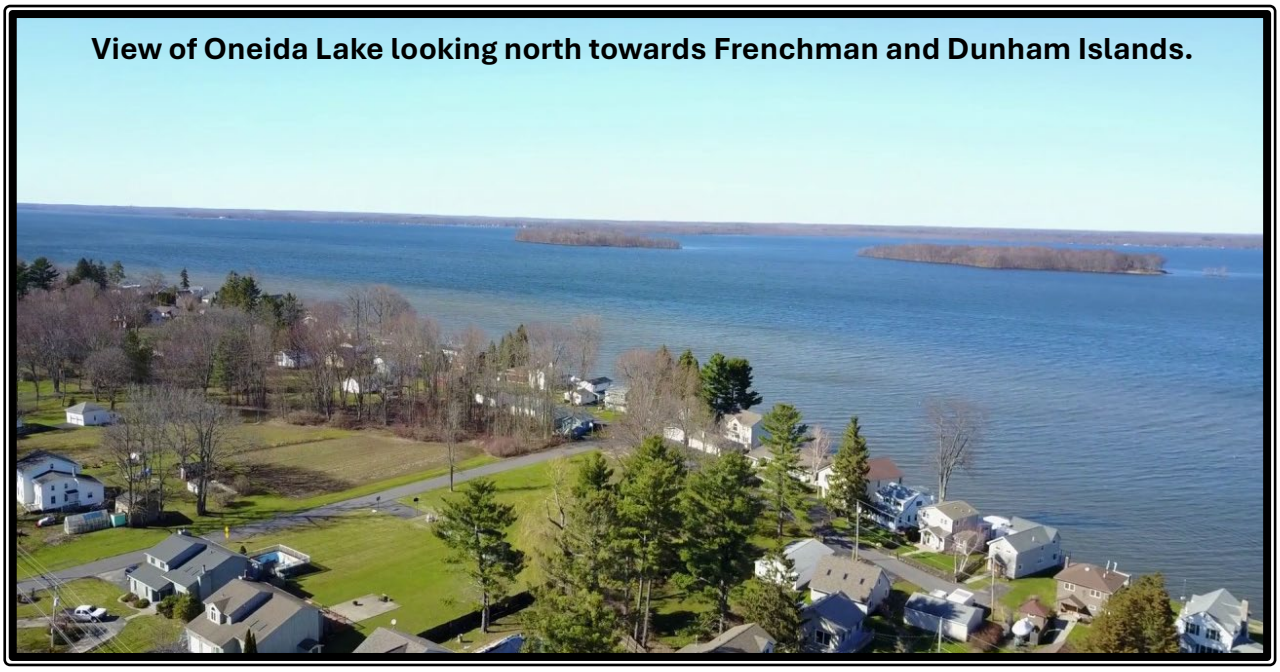
ONEIDA LAKE PROFILE

2025



View of Oneida Lake looking north towards Frenchman and Dunham Islands.

Oneida Lake is the largest lake within the borders of New York State and a jewel of Central New York that provides recreational opportunities for anglers, boaters and swimmers alike. Both locals and visitors come to the lake to enjoy its waters and the fishing opportunities provided by abundant walleye, yellow perch and black bass populations. Researchers at the Cornell Biological Field Station have studied the lake and its fisheries for 70 years, making Oneida Lake one of the best studied lakes in the world. This document reflects these findings and contains general explanations of the lake's biology, history, and contemporary issues. It presents time trends in the physical, chemical, and biological responses to ongoing ecosystem changes, associated with climate change, the arrival of non-native species, and the resurgence of native species. This profile, a collaboration between the Cornell Biological Field Station (CBFS) and the Oneida Lake Association (OLA), is designed to promote an understanding of the ecology of Oneida Lake, and to encourage the preservation of one of North America's finest inland waters.

Cornell University

Oneida Lake ASSOCIATION

HISTORY

Indigenous peoples occupied the land surrounding Oneida Lake for thousands of years prior to the arrival of Europeans. Artifacts that document their lifestyle have been unearthed at Brewerton, Shackelton Point, and other sites near the lake. By the time European settlers arrived, two nations of the Haudenosaunee (Iroquois) Confederacy - the Oneidas and Onondagas – lived in the region. The Oneidas constructed fishing villages near Oneida Creek's mouth and along Fish Creek, near Sylvan Beach. Their annual Atlantic salmon harvest yielded huge quantities of what was then a common Oneida Lake fish. The Onondagas also valued the lake's fishery and netted and speared eels, salmon, catfish, and pike from camps at the Oneida River outlet and near the mouth of Chittenango Creek.

The Oneida Lake region was sparsely settled by Europeans until the early 1800s, when thousands of New Englanders left their farms, seeking better land. Lakeside communities served as commercial centers for the surrounding farm population and as summer retreats. The earliest European settlers arrived in Constantia and Brewerton in the 1790s, in Bridgeport in 1802 and Lakeport in 1811. North Bay was popular with anglers and hunters in the 1850s, while Sylvan Beach's initial growth occurred in the 1870s. The 1880s and 1890s witnessed Sylvan and Verona Beaches' transformation into the "Coney Island of Central New York." Scores of hotels, thousands of vacationers, two amusement parks, and even a boardwalk highlighted summers at "the Beach" during this era. Railroads carried upwards of fifty thousand tourists there on peak weekends.

The Erie Canal, completed in 1825, bypassed Oneida Lake. However, the lake was linked to the Erie Canal by the Oneida River and two smaller canals. The Erie-Barge Canal, an enlargement of the old Erie Canal, was completed in 1918. This canal connected Oneida Lake with the Great Lakes and the Hudson River, making the lake a significant cog in New York's water transportation network. Hundreds of tugs and barges used the lake during the Erie-Barge Canal's peak years, and Brewerton, Cleveland, and Sylvan Beach prospered as canal ports.

The glass industry supplemented Cleveland's and Bernhards Bay's nineteenth century agrarian economies, while Jewell and West Monroe benefited from being stations on the Oswego-Midland Railroad (later renamed the "Ontario and Western"). The Syracuse to Watertown Railroad connected Brewerton with the state's population corridor, enabling that village's considerable number of commercial fishermen to export their catches. A trolley line brought Syracuse tourists to Lower South Bay, where grand steamboats awaited. Thirty-five licensed steamboats navigated

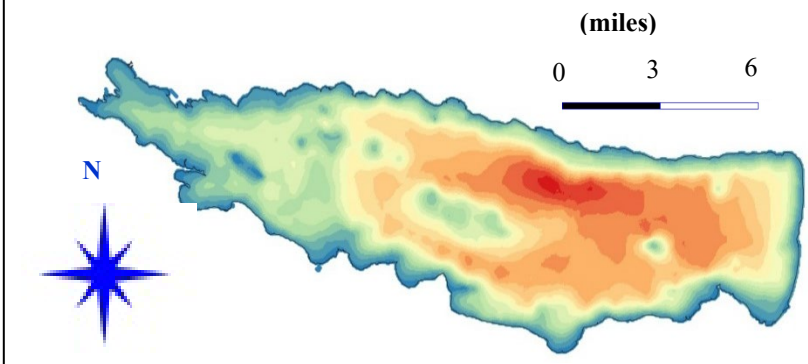
Oneida's waters during this era. Cottage and camp construction altered the lakeshore in the latter 1800s and early 1900s and accelerated as post-World War I prosperity and the "Golden 20's" embraced the United States.

Although slowed by the Great Depression, the development of Oneida Lake's periphery proceeded throughout the twentieth century to the point where few parcels of wild lakeshore remain today. Despite this, productive wetlands still thrive near Toad Harbor, the Cicero Swamp, and the Verona Beach State Park. Woodlands dominate the north shore watershed, while the south shore and west end are rapidly suburbanizing. The completion of Route 81 around 1960 made the lake an easy commute for people working in Syracuse. The Town of Cicero is the fastest growing township in Onondaga County today, and development continues throughout Madison and Oswego Counties. Additional growth is expected as the result of the planned microchip plant in nearby Clay.

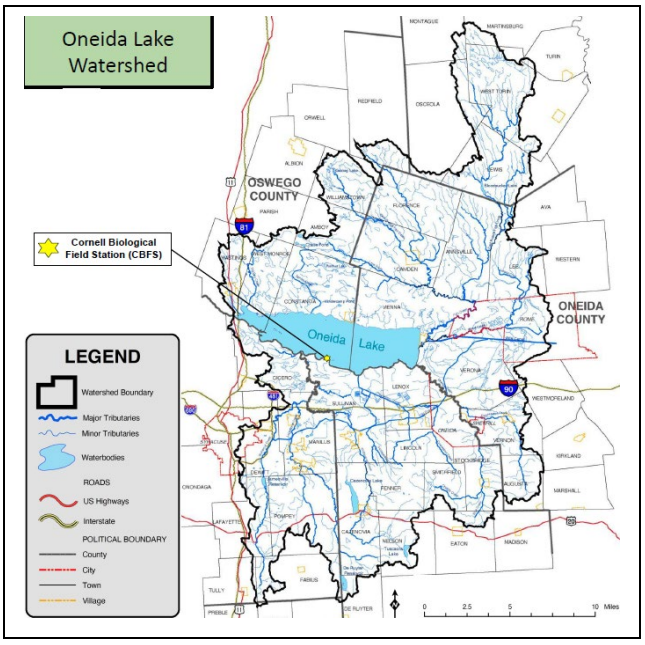
THE LAKE AND ITS WATERSHED

About 13,000 years ago, glacial Lake Iroquois covered the area that current day Lake Ontario and Oneida Lake occupy. The lake drained to the east down the Mohawk River Valley, but as the ice margin receded northward, the lake began draining through the St. Lawrence Valley. Water captured in a glacial depression formed today's Oneida Lake.

The Current Lake. The current Oneida Lake has an area of 80 square miles (207 km^2), a mean depth of 22 feet (6.8 m) and a maximum depth of 55 feet (16.8 m). The bottom is varied with rocky shoals, sandy areas and deeper silty sediments. Nutrient levels and algal production are moderately high, supporting a healthy fish population but also late summer and fall algal blooms in some years. The lake is 20.9 miles (33.6 km) long with an average width of 3.7 miles (6 km) and has an average water residence time of 7.7 months. The lake's shallow depth, large size, and exposure to the prevailing winds cause regular mixing of the entire water column during a large portion of the ice-free season. Other lakes in the area stratify during the summer with warm water at the surface and cold, heavier water towards the lake bottom. Periods of temperature stratification do occur in Oneida Lake and when the lake is stratified, oxygen in the bottom waters is depleted in about two weeks and will stay depleted until the next strong wind event. Hydrodynamic models predict that warming air temperatures will lead to longer periods of temperature stratification and lower bottom oxygen levels in Oneida Lake, but this may not happen if the frequency of storms increase.



Bathymetric map of Oneida Lake. Color scale from 50 ft (red) to 5 ft (green)



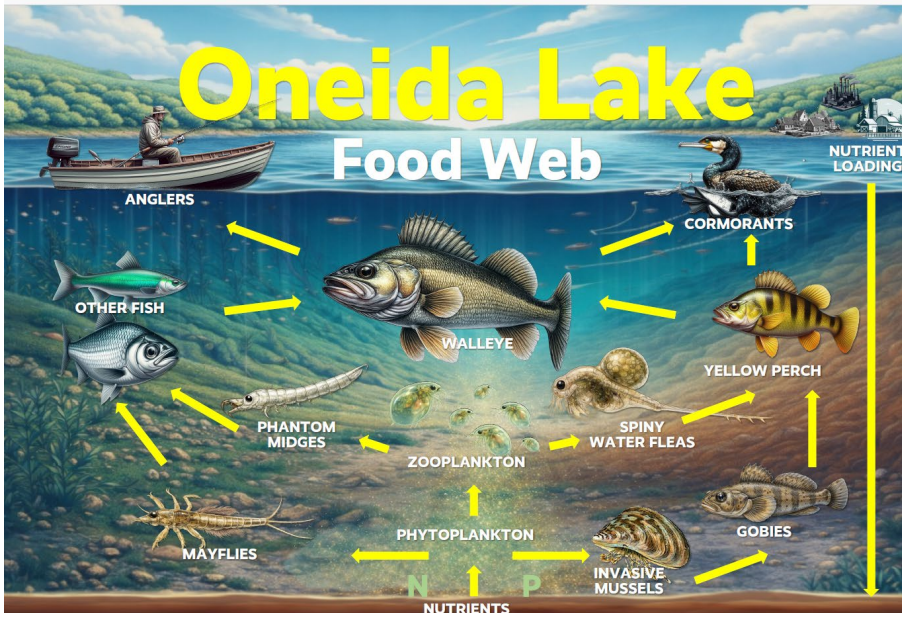
The Watershed. The Oneida Lake watershed, the area of land from which water drains into the lake, is one of the largest of any lake in New York State and is the home of about 260,000 people. Land use in the watershed affects the lake directly through nutrient loading and water flow. Around two thirds of the water that flows into the lake comes from the Tug Hill uplands to the north. This part of the watershed is heavily forested, and its waters are low in nutrients. About 80% of the nutrient loads come from more fertile agricultural lands to the south. Nutrient inputs to the lake declined in the 1970s and 80s due to improvements to sewage treatment plants but have been relatively stable in the 2000s. Higher nutrient loads occur during wet summers. Agricultural lands and urban areas deliver more nutrients and sediment to the lake than forested areas.

Water Levels. Historically, Oneida Lake's water levels fluctuated naturally between 370 and 373 feet (113 - 114 m) above sea level. Water levels increased gradually from October to April and then dropped throughout summer and fall. Adjustments to the lake's water level did not start until improvements were made to the outlet dam at Caughdenoy in 1951. Today, the New York State Canal Corporation is responsible for regulating water levels. The Canal Corporation considers three criteria when making water level decisions for Oneida Lake - minimizing habitat destruction, optimizing the lake's biological productivity, and reducing potential harm to lakeside properties in the open water season. Lake water levels typically range between 368 and 371 feet with peak elevation in the spring, stable levels of 370-371 feet during the summer navigation season, and low water levels in the winter.

Wetlands. Wetlands surround Oneida Lake including the Cicero Swamp to the south, the Toad Harbor-Big Bay area to the northwest, and the Verona/Sylvan Beach area to the east. Wetlands provide habitat for wildlife, spawning areas for fish, act as filters for water entering the lake, and serve as storage tanks after excessive precipitation and snowmelt. Continuing development has resulted in the loss of wetland areas in recent decades, a loss that could reduce water storage capacity and increase the risk of flooding events.

THE FOOD WEB

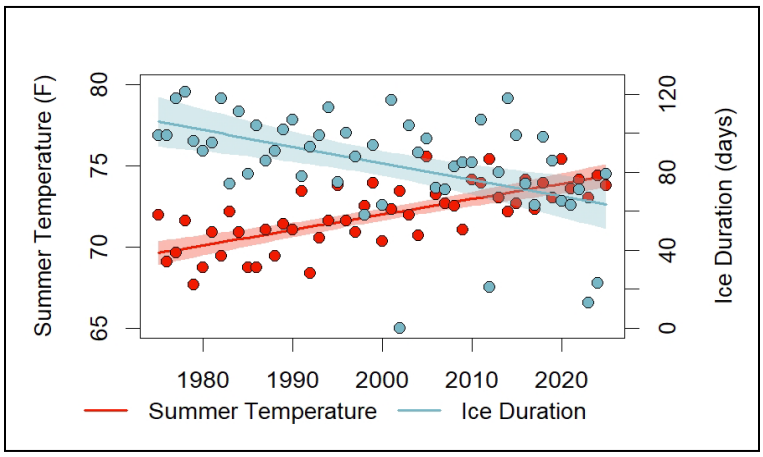
The Oneida Lake food web is a complex network of organisms, each providing a pathway for moving energy through the ecosystem. Algae (phytoplankton), aquatic plants and benthic (bottom-dwelling) algae are the primary producers that convert carbon dioxide into organic molecules and biomass using sunlight, nutrients like phosphorus and nitrogen. Phytoplankton in the water column are consumed by zooplankton (small crustaceans and rotifers) and by benthic filter feeders such as zebra and quagga mussels. Other benthic animals like mayflies, midge larvae and worms feed on detritus produced by decaying phytoplankton. Aquatic plants and benthic algae are food sources for a variety of herbivores such as snails, isopods, and insect larvae. These invertebrates are in turn consumed by fish. Zooplankton are the primary food source for small fish such as emerald shiner, gizzard shad, and young perch. Small fish and benthic invertebrates are important prey for walleye and other piscivores like largemouth and smallmouth bass. Fish are consumed by fish-eating birds and harvested by humans.



The Oneida Lake food web has been shaped by thousands of years of slow environmental change and over two hundred years of more intense human activities such as the construction of the Erie-Barge Canal and the development of the lake's shoreline. Spawning areas for northern pike and pickerel have been drastically reduced through the separation of the lake from nearby wetlands due to water level management designed to prevent spring flooding. Extensive shoreline filling for cottage construction, beginning in the 1920s, eliminated acres of aquatic vegetation important to game fish. The food web has been further altered by the introduction of non-native species and resurgence of some native species (burrowing mayfly, phantom midge). Non-native species such as zebra mussel, quagga mussel, round goby, and spiny waterflea arrived through the canal system. Decreased phosphorus inputs and the filtering of phytoplankton by non-native mussels increased water clarity, affecting the interactions between predators and prey. These changes have altered the dynamics of Oneida Lake's food web and its fishery.

ECOLOGICAL CHANGE

Temperature and Ice Cover. Temperature regulates the physiology and production of organisms in lakes and affects what species are present as different animals are adapted to different temperatures. Oneida Lake's water temperatures have been gradually warming while the duration of winter ice cover has been decreasing. Daily temperature measurements by Cornell (red) show that the average June-August water temperature has increased 4°F since 1975. Oneida Lake typically freezes by late December or early January and opens up by mid-March or early April, but as temperatures rise, the lake remains ice-covered for less time. Since 1975, average length of ice duration (blue) has decreased by a month. Five of the six warmest summer temperatures and three of the four shortest ice duration years on record occurred after 2012. These trends are clear indications of ongoing climate change.

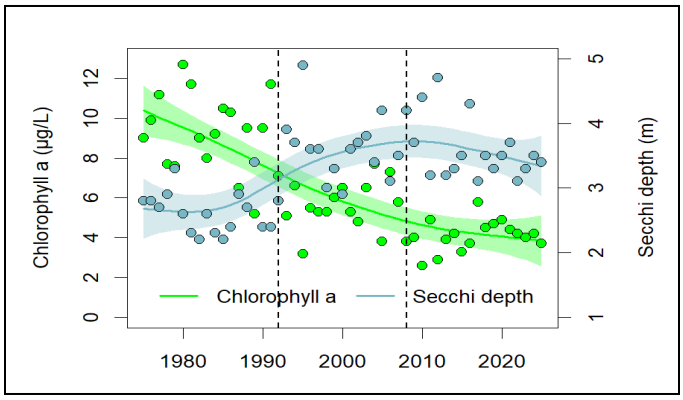


Nutrients. Aquatic plants and animals need phosphorus, and the Oneida Lake food web depends largely on the availability of phosphorus, although nitrogen can also be limiting in late summer-early fall. Excess nutrients can lead to algal blooms including toxic blue-green algae. During the 1960s, large amounts of phosphorus entered the lake from the watershed, leading to summer algal blooms that reduced water clarity and made the lake unsuitable for swimming. In the 1970s, the United States and Canada agreed to reduce phosphorus inputs to the Great Lakes and funding became available for sewer system upgrades, new


Bluegreen surface scum at CBFS, Aug 2, 2013

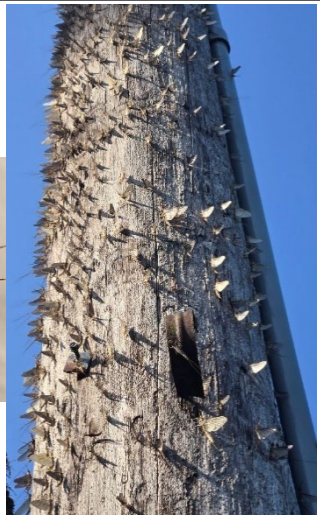
sewer system construction, and the implementation of best management practices on agricultural lands. In addition, phosphorus in detergents was banned in 1973. The result of these actions was a decline in phosphorus levels in the lake from over 100 µg/L to current 20-25 µg/L, making the lake moderately productive. Oneida Lake still experiences summer algae blooms, but they are not as severe or long-lasting as in the past.

Water Clarity. Oneida Lake's waters are clearer now than during the period of high phosphorus and algae blooms. Water clarity is measured by lowering a black and white disk into the lake and recording the depth when it can no longer be seen, a simple method used for over a century (Secchi depth). Transparency increased from the 1970s to the mid-1980s due to phosphorus control and increased further in the 1990s with the establishment of zebra mussels (dashed line in 1992) and later quagga mussels (dashed line in 2008). These mollusks filter algae from the water resulting in increased water clarity, increased abundance of bottom-dwelling organisms, and increased depth with sufficient light to support aquatic plants and benthic algae.



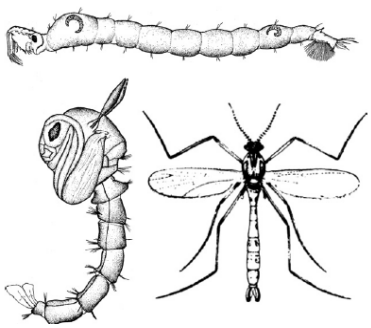
Resurgence of native species

Burrowing mayfly (*Hexagenia*). The burrowing mayfly was largely extirpated from Oneida Lake by the mid-1960s. Because mayflies are sensitive to pollution, poor water quality during that time contributed to their demise. Water quality improved in the last four decades, but mayflies did not start increasing until 2012. The immature animals live in the lake for 2 years. The adults emerge in June and can then be found in large numbers on buildings close to the shores. As these insects die shortly after laying eggs in the lake, bodies accumulate along the shore and may even smell bad during decomposition. This was a common sight in the 1950s and earlier. Interestingly, the presence of mayflies may lead to better survival of both young walleye and young yellow perch in the lake. Mayflies buffer walleye predation on small yellow perch and small walleye, contributing to higher survival of both fish species through their first year of life.



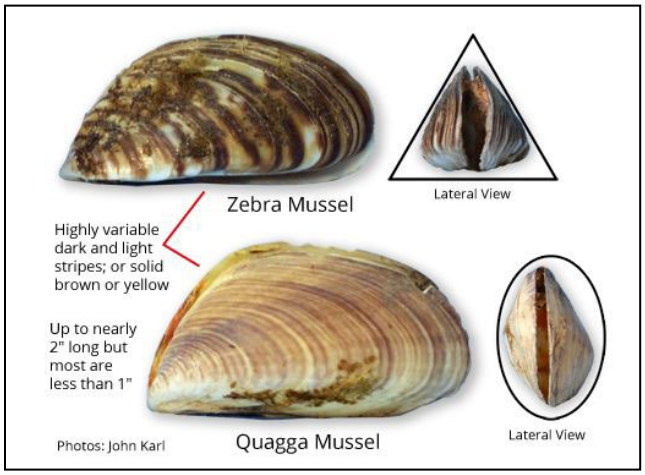
Mayfly larva and adults. Adults on electric pole at CBFS, June 2025

Phantom midge (*Chaoborus punctipennis*). This species of midge has a larva that is a predator on zooplankton. The larvae hide from fish in bottom waters during the day, ideally in waters low in oxygen as the species survive in such conditions while fish do not. During the night, the larvae are ambush predators on zooplankton in the water column. The phantom midge has increased dramatically in the 2020s and can reach densities of 1000 larvae/m^2 in late summer and fall. Elsewhere, they have been implicated in declines in *Daphnia*, similar to the hypothesized effect of the spiny water flea (see below), and the combination of these two species may be causing the decline in *Daphnia* observed in recent years. The increase in *Chaoborus* suggests that periods with low oxygen in deeper water are becoming more common.



Phantom midge larva, pupa and adult female

Non-native species. Several non-native species have become abundant in Oneida Lake, altering the flow of energy through the food web. Early invaders included sea lamprey, faucet snail, Eurasian milfoil, curly pondweed, and white perch. Other non-native fish that have played a prominent role in Oneida Lake's history are common carp, gizzard shad, and freshwater drum.

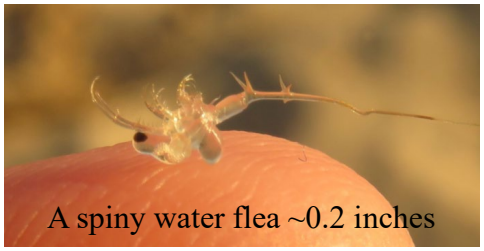


Of all the non-native species introduced to Oneida Lake, the **zebra mussel** (*Dreissena polymorpha*) and **quagga mussel** (*Dreissena bugensis*) have the largest effect on the ecosystem. Zebra mussels were discovered in Oneida Lake in 1991 and by autumn 1992, mussel densities soared to an average of 30,000 small mussels per m^2. Densities declined but total biomass remained high as the remaining mussels grew larger. Benthic invertebrate numbers (mainly amphipods (scuds) and snails) increased in the shallow, clearer habitats where zebra mussels thrive, but zebra mussels caused the loss of three large native mussel species. The new mussels compete with native mussels for food and, perhaps more importantly, colonized atop the native species' shells, effectively preventing them from feeding.

Quagga mussels, close relatives of zebra mussels, were found in Oneida Lake in 2005 and replaced zebra mussels as the dominant species by 2009 representing over 90% of the mussel biomass since 2010. The English name quagga mussel was chosen because the quagga is an extinct relative of the zebra, only with fewer stripes. This mussel is able to live on the soft sediments in the deeper parts of the lake that are not colonized by zebra mussels. Therefore, the total biomass of mussels increased and was higher in 2012-2017 than almost all other years on record. As expected, this led to further declines in phytoplankton, higher water clarity and also a decline in zooplankton compared to the zebra mussel years.

The **round goby,** a small, prolific, bottom-dwelling fish that was first observed in Oneida Lake in 2014, became highly abundant with a population increasing to over a billion fish by 2024. This species is native to the same Black Sea and Caspian Sea regions as zebra and quagga mussels. Round gobies are efficient mussel feeders but also feed on other benthic invertebrates. The establishment of round goby coincided with a 50% decline in quagga mussels and a decline in native benthic organisms like amphipods, snails, leeches, worms, and caddisflies. Gobies also consume fish eggs. Many fish species such as walleye, yellow perch, and smallmouth bass feed on gobies, helping transfer energy from non-native mussels to sport fish.

The **spiny waterflea** is a predatory zooplankton originating from Europe that first appeared in Oneida Lake in 2019. It has a characteristic sturdy spine that serves as protection from predation by small fish. Spiny water flea's preferred food is *Daphnia*, a zooplankton that is important to the survival of young fish. *Daphnia* numbers have declined since the arrival of the spiny water flea. In other lakes, the invasion by spiny water flea has caused declines in growth and survival of young fish and decreases in water clarity due to declines in *Daphnia* which feed on phytoplankton, but neither outcome has yet been observed in Oneida Lake.



A spiny water flea ~0.2 inches

Several **other new species** have colonized Oneida Lake over the years with at least 36 species of mollusks, plants, zooplankton, crustacean fish parasites, benthic invertebrates and fish documented as of 2024. Some of these species have had limited impact on the lake ecology and may stay rare or replace similar native species. But some of these species have large impacts on the lake. They include several submerged and floating plants that can be a nuisance for boat traffic and have strong effects on the shoreline habitat. Some of those species have been in the lake for a long time, like Eurasian milfoil. Others have arrived more recently, like water chestnut (in 1999), European frogbit (in 2004), and starry stonewort (in 2005). Water chestnut can be problematic as it clogs waterways and can cause oxygen deficits below the floating beds which limits the use of those areas by fish. Given the potential for adverse effects on Oneida Lake, it is important to prevent the spread of non-native species by cleaning boats and fishing gear when transporting between lakes and removing new infestations of water chestnuts every year.

Water chestnut and European frogbit, two invasives.

WATER BIRDS

Throughout the year, Oneida Lake supports thousands of waterfowl and other birds, hosting migrating and resident species alike. Scores of bird species nest near the lake to take advantage of the fish, insects, crayfish, mollusks, and vegetation it provides. Gulls, terns, cormorants, geese, ducks, bald eagles, ospreys, kingfishers, herons, and sandpipers nest by the lake, and many more species of waterfowl, including diving ducks, loons and swans, use Oneida Lake as a stopover during migrations.

Wantry, Long, and Little Islands, south of Constantia, are designated an “important bird area” by the Audubon Society of New York. These isles are home to five different species of colonial nesting waterbirds (common terns, ring-billed gulls, herring gulls, black-backed gulls, and cormorants). Colonial water birds are generally long-lived species that nest in large groups for better defense against predators. Oneida Lake’s colonial water birds generally feed on fish and crayfish.

Common terns are the smallest colonial waterbird breeding at Oneida Lake, yet they migrate the farthest every year. Cornell biologists have marked terns with leg bands and geolocators, and they found that these dove-sized birds fly thousands of miles from South America each year to return to Oneida Lake to breed. They nest on low-lying islands and can be seen throughout the lake diving for fish from heights of 20 to 30 feet. Common terns are a "threatened" species in New York State so their nesting islands are protected to prevent unauthorized visits that can lead to chick loss from predators. The population size is limited by the availability of breeding habitat and in 2025 stands at ~350 pairs.

Double-crested cormorants are probably the most recognizable colonial water bird on Oneida Lake because of their large body size and the publicity surrounding their population growth. Numbers of double-crested cormorants have been increasing throughout the Great Lakes since the early 1980s, and Oneida Lake’s colony likewise expanded from a single pair in 1984 to over 360 pairs in 2000. They prefer to nest in trees but will nest on the ground after trees die due to the guano produced by the birds. These birds consumed large numbers of Oneida Lake’s sub-adult walleyes and yellow perch, contributing to the decline of adult populations of these fish in the 1990s. More on the effect of cormorants on the fish populations is presented below.

THE FISH AND THE FISHERY

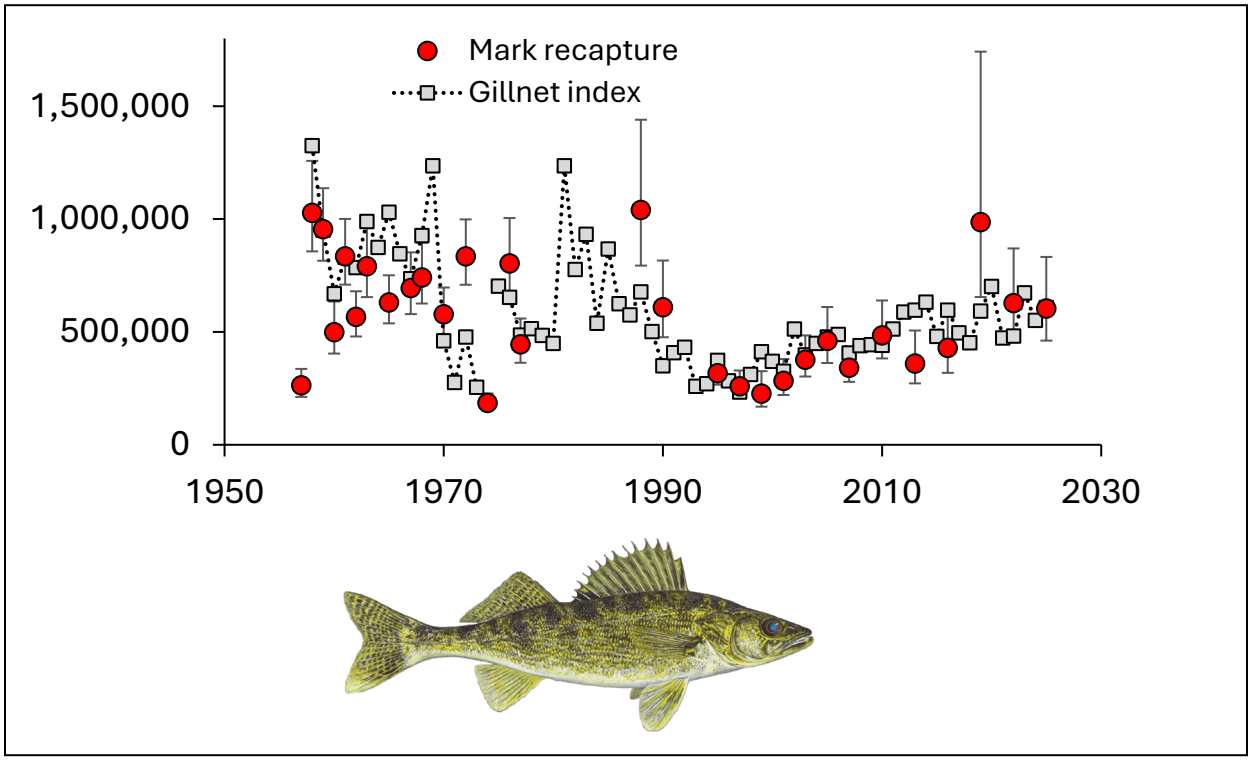
Oneida Lake's present-day fish population differs markedly from that encountered by European settlers. Historical records suggest Indigenous peoples harvested eels and salmon, using weirs to trap eels leaving the lake to spawn in the ocean and using brush dams to catch salmon migrating upstream to spawn in the lake's tributaries. Salmon and eels were also speared at night from canoes, lit by torches. By the early nineteenth century, dam construction on tributaries and the Oswego River began to block fish migration that would lead to the eventual disappearance of salmon and eels.

Another significant change to the fishery resulted from the completion of the Erie Barge Canal in 1918 and the need to manage water levels as part of canal maintenance. The combination of barriers and water level stabilization changed the lake's fish population dramatically. New dams and locks restricted movements of migratory species such as eels. The draining of wetlands and marshes decreased spawning areas for northern pike and pickerel. Lakeside development, which accelerated in the 1920s, eliminated emergent aquatic plant vegetation near the shores, another significant area for pike and pickerel propagation.

By the 1940s, a fishery once dominated by bass, walleye, yellow perch, pickerel, eels and bullheads had transformed to primarily a walleye and yellow perch fishery, with smallmouth and largemouth bass also popular with anglers. These fisheries have endured, affirming Oneida Lake's reputation as one of the premier walleye and bass destinations in the nation. The walleye fishery is enhanced by a continuous stocking program of larval walleye from New York State's Oneida Fish Cultural Station at Constantia beginning in 1897.

During the 1950s, anglers began reporting large fluctuations in Oneida's walleye catches, and many worried about the walleye population's health and survival. Two significant events occurred because of this concern. First, the Oneida Lake Association, led by President Millard Rogers, successfully lobbied for a law, passed by the legislature in 1960, which banned the sale of walleye. Second, a research program was established by the New York State Conservation Department (now the Department of Environmental Conservation, NYSDEC) to examine the factors affecting the lake's fish populations. This program was led by Dr. John Forney who initiated the now seven decades of studies on Oneida Lake by the Cornell Biological Field Station. Theses studies documented 71 species of fish in Oneida Lake, 63 of which have been observed since 1990. Twenty-four species are common., including walleye, yellow perch, white perch, gizzard shad, emerald shiners, white sucker, brown bullhead, channel catfish, largemouth and smallmouth bass, chain pickerel, northern pike, bluegill, pumpkinseed, rockbass, freshwater drum, common carp, logperch, trout perch, banded killifish, tessellated darter, lake sturgeon, bowfin and round goby. The increase in round goby correlate with a decline in tessellated darter and trout perch in recent years. Other changes over time included declines in burbot and white bass and extirpation of cisco, with the burbot and cisco decline likely the results of increased summer temperatures as these fish do not tolerate warm temperatures well. In this profile, we provide details on a few fish species – walleye, yellow perch, smallmouth and largemouth bass, and lake sturgeon.

Walleye. Walleye is the most abundant predator in Oneida Lake, feeding on a variety of other fish species as well as invertebrates like mayflies. The species has large eyes adapted to feeding at night, hence the name. Walleye spawn in early April in several streams and on shoals in the lake. Spectacular walleye runs can be seen at the first dam of Scriba Creek, close to the Oneida Fish Cultural Station in Constantia. Eggs hatch in a few weeks and larvae smaller than ½ inch drift to



the lake proper and start feeding on zooplankton, before turning to larger invertebrates and fish as they grow. After about 4 years, walleye mature and reach 15 inches harvestable size. Early studies indicated that anglers accounted for most of the adult walleye mortality, and that prey abundance had a dramatic effect on walleye survival, as well as their vulnerability to angling. In years when prey fish were scarce, walleye were easier to catch. However, adult walleye also cannibalized their young during those times resulting in fewer adult walleye in the years that followed. In years with abundant young yellow perch, white perch, or gizzard shad, fishing was poor and young walleye survived, providing more adults in subsequent years.

Oneida Lake is one of the premier walleye fisheries in New York State and the goal of Oneida Lake's walleye management program is the continuation of this high-quality recreational fishery. This requires sufficient walleye recruitment to account for angler harvest and an adult walleye population in balance with their prey base. To achieve this, NYSDEC adjusts size and creel limits in response to changes in walleye abundance and the predicted survival of young fish. The Oneida Fish Cultural Station in Constantia stocks 150 million 3-day-old walleye fry annually to support management goals. The population of adult walleye has ranged from as few as 200 thousand to over a million over the past seven decades.

In the 1990s, several years of low walleye recruitment combined with cormorant predation on young walleye substantially reduced adult walleye numbers. In response, state and federal agencies

implemented a cormorant management program in 1998 and expanded it in 2003. NYSDEC limits cormorant numbers to 100 birds during the nesting season and uses hazing to reduce the number of days cormorants stay on the lake during migration times. This has decreased cormorant consumption of sub-adult walleye considerably. This program, combined with a brief period of restricted walleye harvest regulations, the rebound of mayflies, and increased forage fish abundance led to a recovery of walleye numbers in recent years. Angler catch rates remain high and the Oneida Lake walleye fishery continues to be very popular.

Yellow Perch. Yellow perch is one of the most abundant fish in Oneida Lake, providing forage for adult walleye as well as a popular fishery for adult perch. The perch spawn in the spring when water temperatures reach around 46 F, laying an egg mass protected by a gelatinous sheath often draped over vegetation or other structures. Egg mortality is low and more than a billion larvae can

hatch in early May. These small fish feed first on copepods, then turning to *Daphnia* before also consuming bottom invertebrates and later small fish. Young perch are a favorite food of predators such as walleye and bass.

The adult yellow perch population has ranged from 600,000 to over 5 million fish over the past 70 years. Low populations throughout the 1990s were likely due to several factors. Increased water clarity may have made perch fry more vulnerable to predation by larger fish. Cormorant predation may also have played a role in reducing the survival of age 1 and older perch. For example, cormorant consumption estimates (1995-2000) on yellow perch were impressive, with the birds eating an average of 600,000 sub-adult yellow perch annually. However, yellow perch populations in recent years have increased and are near record highs. This may be related to increased survival of young fish related to increases in mayflies and round gobies, reduced cormorant predation, and increased year-class production. Yellow perch continue to provide excellent fishing and are very popular with ice anglers.

Smallmouth and Largemouth Bass. Smallmouth and largemouth bass have been popular sport fish in Oneida Lake since the nineteenth century. Males of both bass species build nests in June, a cleared out area sometimes under docks. Smallmouth bass tend to build nests deeper than largemouth bass. Females may spawn in several nests and males can attract multiple females. The males then protect eggs and young from predators. As the young bass grow, they first feed on zooplankton, then benthic invertebrates and fish. Smallmouth bass in particular have a taste for crayfish.

Physical and biological changes in the lake since the mid-1980s likely benefited bass, resulting in their increased abundance. Clearer waters led to increased near-shore vegetation that provides valuable bass habitat, and higher summer temperatures may have increased production and growth of young bass. However, smallmouth bass production has been low in recent years, and adult numbers have declined to pre-1980s numbers. This lower recruitment coincided with the arrival of the round goby, a known nest predator. However, largemouth bass numbers have remained high.

Bass routinely account for around one-third of the fishing effort on the lake, and competitive bass fishing has increased since the 1980s. Oneida's high-quality bass fishing attracts anglers from around the Northeast and across the country, and Oneida Lake has been the site of several major tournaments in the last decades. The increased popularity of Oneida's bass fishing has become an important stimulus for the area's tourism economy.

Lake Sturgeon. Initially scorned by European settlers because of the damage they did to fishing nets, lake sturgeon became the most valuable commercial species in the Great Lakes when the demand for caviar grew in the late nineteenth century. They were reduced to very low populations in most of the Great Lakes drainages due to over-fishing and dam construction that blocked access to spawning areas. Lake sturgeon is now a threatened species in New York State.

In 1995, the NYSDEC began a restoration program, stocking Oneida Lake and other locations with small sturgeon. Sturgeons have grown large in Oneida Lake feeding on bottom invertebrates including mussels, and small fish. Sturgeons do not mature until they are 10-15 years old but can live over 100 years and reach greater than 250 pounds. As of 2024, the largest fish recorded was a 26-year-old, 74 inches long, 159 lb fish caught (and released) in 2022 – see picture. Lake sturgeon spawn in the spring in tributaries to Oneida Lake, and netting surveys have captured over 40 naturally spawned juveniles. Adult sturgeons sometimes swim great distances, and some fish tagged in Oneida Lake have moved through locks and dams as far away as the Niagara River. The future looks bright for sturgeon

populations, as they are becoming large and their numbers are increasing thanks to successful management protections and stocking programs.

Angling and Fish Harvest. Creel surveys conducted since 2002 show that Oneida Lake's rich fish resources generate between 200,000 and 500,000 angler-hours annually during the open water season. Ice fishing inspires up to 70,000 hours of additional effort, depending on the duration of safe ice conditions. Around 70 percent of Oneida Lake's anglers target walleye in any given year, and total annual catches range from 45,000-190,000 fish. Studies from Oneida Lake indicate that angler success has as much to do with prey abundance as walleye abundance, and catch rates decline when prey abundance is high. The total annual harvest of yellow perch is split about evenly between the open water and winter seasons during good ice conditions. Oneida Lake's smallmouth and largemouth bass attracted media attention in the early 2000s and are now the second most popular fish among the lake's summer and fall anglers. Almost all bass are released after capture.

Oneida Lake's fish resources are truly invaluable to the CNY region, providing opportunities for tens of thousands of anglers. With continued stewardship, the fishery should thrive for future generations.

ABOUT THIS DOCUMENT

The Oneida Lake Profile 2025 was created by Cornell University staff (Lars Rudstam, Kristen Holeck, Tony VanDeValk, Tom Brooking, Randy Jackson, Jennifer Arnold, Zoe Almeida) and directors of the Oneida Lake Association (Ed Mills, Amy Hetherington). Some of the text and pictures are from the 2006 Profile written by most of the same authors plus Jeremy Coleman, Rebecca Schneider, Howard Goebel, and Jack Henke. Funding was provided by NYSDEC and Cornell's Brown Endowment. We thank John Harmon and Patricia Cerro-Reehil for helpful comments. More information and annual updates are in the annual reports available on the NYSDEC website and in the many chapters of the Oneida Lake book from 2016 published by the American Fisheries Society. We hope the profile provides readers with insights into the ecosystem and fishery of this wonderful lake.

Cornell Biological Field Station at Shackelton Point is a Cornell University facility and part of the College of Agriculture and Life Sciences and the Department of Natural Resources and the Environment. The station was bequeathed to Cornell University by Charles S. Brown and started operations in 1956, making 2025 the 70th year of this long-term data series. Three directors have led the station (John Forney 1956 to 1992, Ed Mills 1992 to 2009, Lars Rudstam 2009 to 2026) with the fourth, Olaf Jensen, starting in 2026. The Oneida Lake dataset is one of the best long-term datasets on a North American lake and the longest continuous dataset on percid fishes in the world. Data from Oneida Lake inform managers and our understanding of lake ecology and fisheries both in Oneida Lake and across the world. More information is on CBFS web site (https://cals.cornell.edu/biological-field-station-shackelton-point) and Facebook page https://www.facebook.com/cbfs.oneidalake/).

The Oneida Lake Association (OLA) is a conservation organization founded in 1945 dedicated to protecting Oneida Lake in New York. With over 2,000 members, the OLA's mission focuses on protecting the lake's fisheries, wildlife, and natural resources through science-based conservation, management, education, and outreach. The organization addresses critical lake issues including double-crested cormorant management, fisheries management, invasive species control, shoreline development, sedimentation, climate change, boating safety, lake access, and water level management. The OLA maintains extensive member engagement through multiple channels – annual meetings, bi-annual Oneida Lake Bulletins, award-winning e-newsletters, social media (Facebook and YouTube), and website (www.oneidalakeassociation.org). Led by a dedicated Board of Directors, the OLA works collaboratively with numerous partner organizations to maintain open dialogue on lake management issues. As the only organization solely focused on Oneida Lake's protection, it serves as the primary advocacy voice for this significant New York natural resource committed to preserving Oneida Lake for current and future generations.

You are encouraged to join the OLA and support its efforts to inform, educate, protect, sustain, and promote Oneida Lake. Visit www.oneidalakeassociation.org and complete the membership form to join OLA today.

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Oneida Lake ASSOCIATION