- **Zooplankton** (microscopic aquatic animals suspended in the lake water) are the most important food source for early life stages of fish.

    - A total of 14 species, as well as nauplii and copepodites, were identified in Onondaga Lake in 2002. The dominant cladocerans were *Daphnia galeata* and *Bosmina longirostris.* Other cladocerans included *Eubosmina coregoni*, *Alona sp*., *Chydorus sp*., *Leptodora kindtii*, and *Diaphanosoma leuchtenbergianum*. *Cercopagis pengoi* was again detected in 2002; this invasive species was first reported in 2000 but was not detected in the 2001 samples. This predatory invader has potential to exert strong influence on the zooplankton community (Ojaveer et al. 2000). The dominant copepods during the year were *Leptodiaptomus siciloides, Diacyclops thomasi,* nauplii and copepodites. Several species were found in lesser abundance ; *Acanthocyclops vernalis*, *Mesocyclops edax*, *Diaptomus minutus*, and *Diaptomus sicilis*.

- **Phytoplankton** (algae) serve as food for zooplankton. However, too much algae can make the lake appear green and unattractive, and depletes oxygen in the lower waters as it decomposes.

    - The phytoplankton community of Onondaga Lake is comprised of Bacillariophyta, Chlorophyta, Chrysophyta, Cryptophyta, Cyanophyta, Euglenophyta, Pyrrhophyta, "miscellaneous microflagellates", and Xanthophyta (the yellow-green algae; which were documented for the first time since 1996). The two dominant cyanobacteria found in the 2002 algal blooms were *Oscillatoria amphibia* (density) and *Aphanizomenon flos-aquae* (biomass). The most frequently occurring algal species of other taxonomic groups, determined by the highest average abundance and / or biomass were: *Stephanodiscus parvus* (density) and *Stephanodiscus niagarae* (biomass) (Bacillariophyta)*; Pyramichlamys dissecta* (density and biomass) (Chlorophyta); *Erkenia subaequiciliata* (density and biomass) (Chrysophyta); *Rhodomonas minuta* (density) and *Cryptomonas rostratiformis* (biomass) (Cryptophyta); *Euglena* sp. (Euglenophyta); *Peridinium umbonatum* (density) and *Ceratium hirundinella* (biomass) (Pyrrhophyta); and *Pleurogaster lunaris* (density) and *Tribonema sp.* (biomass) (Xanthophyta).

- Zooplankton and phytoplankton are surveyed annually in Onondaga Lake. Zooplankton density was high in Onondaga Lake in 2002, consistent with the high abundance of nutrients and algal biomass in the lake.

- **Game fish** are an important biological and recreational resource. They are at the top of the aquatic food web and are a good indicator of the health of the lake.
- Game fish such as largemouth and smallmouth bass are widespread in the lake. Other gamefish, such as walleye and northern pike, were present but much rarer than bass. Panfish, such as yellow perch, pumpkinseed, and bluegill, were common in nearshore areas.
- **Planktivores** are fish that feed on zooplankton and phytoplankton. Planktivores are eaten by game fish.
- Common planktivores in Onondaga Lake include white perch, alewife, and gizzard shad.
- **Juveniles** are fish in the early stages of development. They feed on zooplankton and macroinvertebrates, and are eaten by game fish.
- A survey of the fish community of Onondaga Lake is conducted every year. Since 2000, a total of 36 species of fish have been caught in the lake.
- The 2002 fish survey results show that the lake is dominated by warmwater species that are tolerant of pollution.

- **Macroinvertebrates** are aquatic insects, snails, and worms that live in the lake sediments. They feed on algae and zooplankton, and help decompose dead plant material, releasing important nutrients back into the water.
- Macroinvertebrates do not move around like fish, so they are good indicators of water quality conditions.
- A healthy community of macroinvertebrates is dominated by species sensitive to pollution.
- Macroinvertebrates are surveyed every two years in the streams that flow into Onondaga Lake and every five years in the shallow areas of the lake.
- Results of the macroinvertebrate sampling of the lake's nearshore zone in 2000 reveal differences in the macroinvertebrate community between the northern and southern ends of Onondaga Lake. As expected, the macroinvertebrate community in the northern end of the lake is less affected by the pollutant inputs that dominate the southern basin (wastewater, contaminated and/or saline groundwater, and sediment).

- **Macrophytes** (rooted aquatic plants) provide shelter for fish and help stabilize bottom sediments.
- Too many macrophytes can interfere with recreation.
- A 40% macrophyte cover in shallow areas is the goal for a healthy Onondaga Lake. This will provide good spawning and nursery areas for fish. Current levels are below this goal.
- Macrophyte surveys are conducted every five years. Aerial photographs are taken yearly to assess plant cover.
- Results from the 2000 baseline survey show that the number of plant species in Onondaga Lake and the percent of the lake bottom covered with plants have increased since a simialr survey was competed in 1991. However, many of the shallow areas of the lake still support only sparse levels of auqtic vegetation.

- **Nutrients** are the basic building blocks of the food web.
- Nutrients, such as phosphorus and nitrogen, support the growth of algae and macrophytes in the lake.
- Phosphorus is naturally present in all waters and is an essential nutrient for life. In most lakes, phosphorus is the limiting nutrient for algal growth; that is, algae will grow until the available phosphorus is used up. Until recently, phosphorus concentrations in Onondaga Lake were so high that algal growth was limited by other factors, such as light levels. Reductions in phosphorus loading achieved since the mid-1990s have shifted the lake to a phosphorus limited system. This is evidence of improving water quality conditions.
- Nitrogen is essential for plant growth but can also be present in forms that are toxic to fish, such as ammonia and nitrite. With improved Metro effluent quality, concentrations of these toxic forms of nitrogen are decreasing and habitat is improving for sensitive early life stages of fish and other aquatic animals.
- Monitoring for these nutrients is part of the biweekly water quality program in Onondaga Lake.