



Summer  
2021

Pennsylvania • League • of • Angling • Youth

# Jump into Lake Ecology



Did you know that Pennsylvania has 76 natural lakes and 2,300 manmade lakes? When **precipitation** occurs, it needs to go somewhere. One place is a lake. A lake is an inland body of water surrounded by land. Lakes are known as **lentic** systems.

Lakes provide habitat for animals, a source of clean water, and recreation for people. Continue reading to learn more about **lake ecology**, benefits and threats, and how you can help protect lakes.

## Vocabulary (*Watch for these words!*)

- **Aquatic macroinvertebrates** - animals that spend part or all its life living in water, lack a backbone, and are large enough in size to be seen with your eyes
- **Benthic zone** - lowest layer of the lake including the sediment surface
- **Lake ecology** - study of how aquatic species interact with living and non-living parts of a lake
- **Lentic** - living in still, non-flowing waters
- **Limnetic zone** - open water area of a lake, beyond the littoral zone
- **Littoral zone** - area close to shore where light reaches the bottom and rooted plants grow
- **Phytoplankton** - small, living plants found in water
- **Precipitation** - water that falls from the clouds in the form of rain, snow, sleet, or freezing rain
- **Profundal zone** - deep water of a lake
- **Spring** - a point at which water flows from the underground to the Earth's surface
- **Zooplankton** - small animals drifting in oceans, seas, and bodies of fresh water

# Lake Types - How Lakes Form

We are going to look at two main types of lakes found in Pennsylvania—natural lakes and manmade lakes.



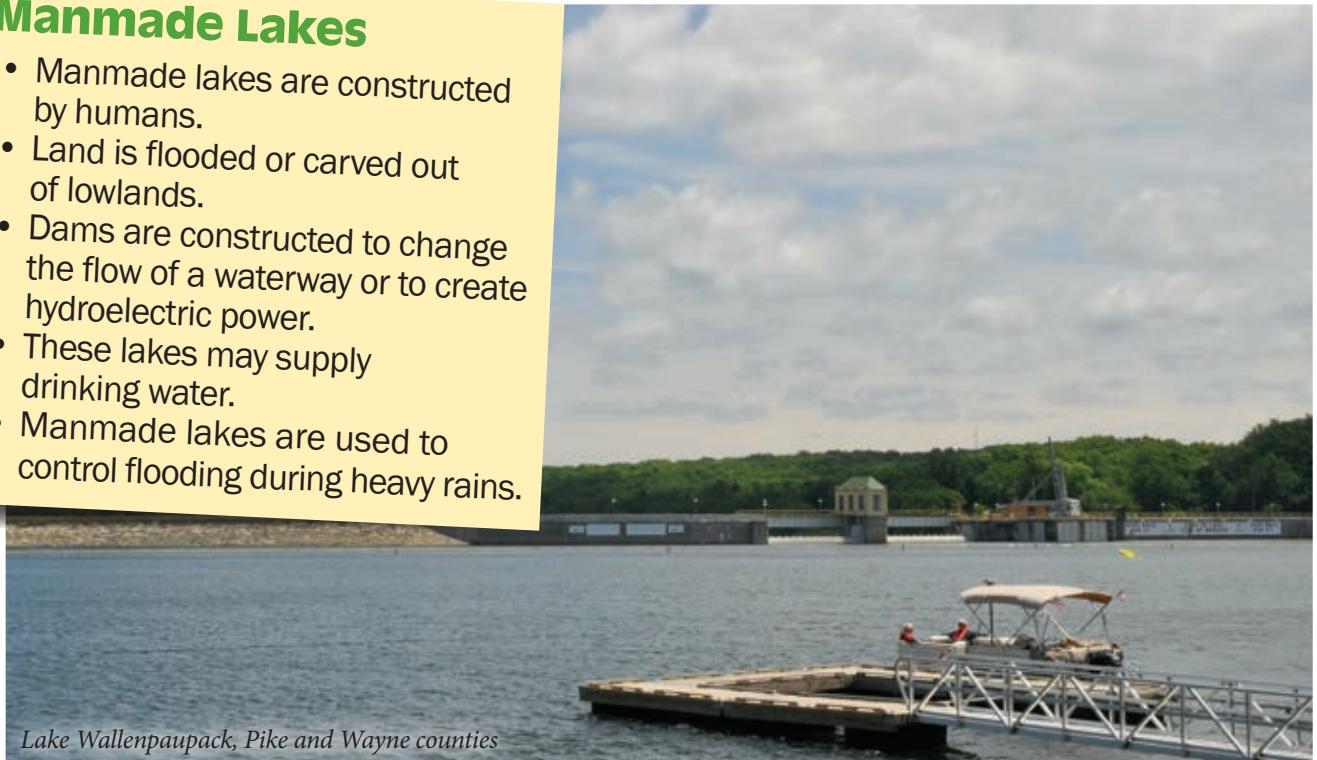
## Natural Lakes

- Natural lakes are lakes formed naturally from glaciers.
- Low areas that collect flowing water form lakes.
- Natural lakes also rely on **precipitation**, **springs**, or flowing water to remain full.

*Moraine State Park, Butler County*

## Manmade Lakes

- Manmade lakes are constructed by humans.
- Land is flooded or carved out of lowlands.
- Dams are constructed to change the flow of a waterway or to create hydroelectric power.
- These lakes may supply drinking water.
- Manmade lakes are used to control flooding during heavy rains.



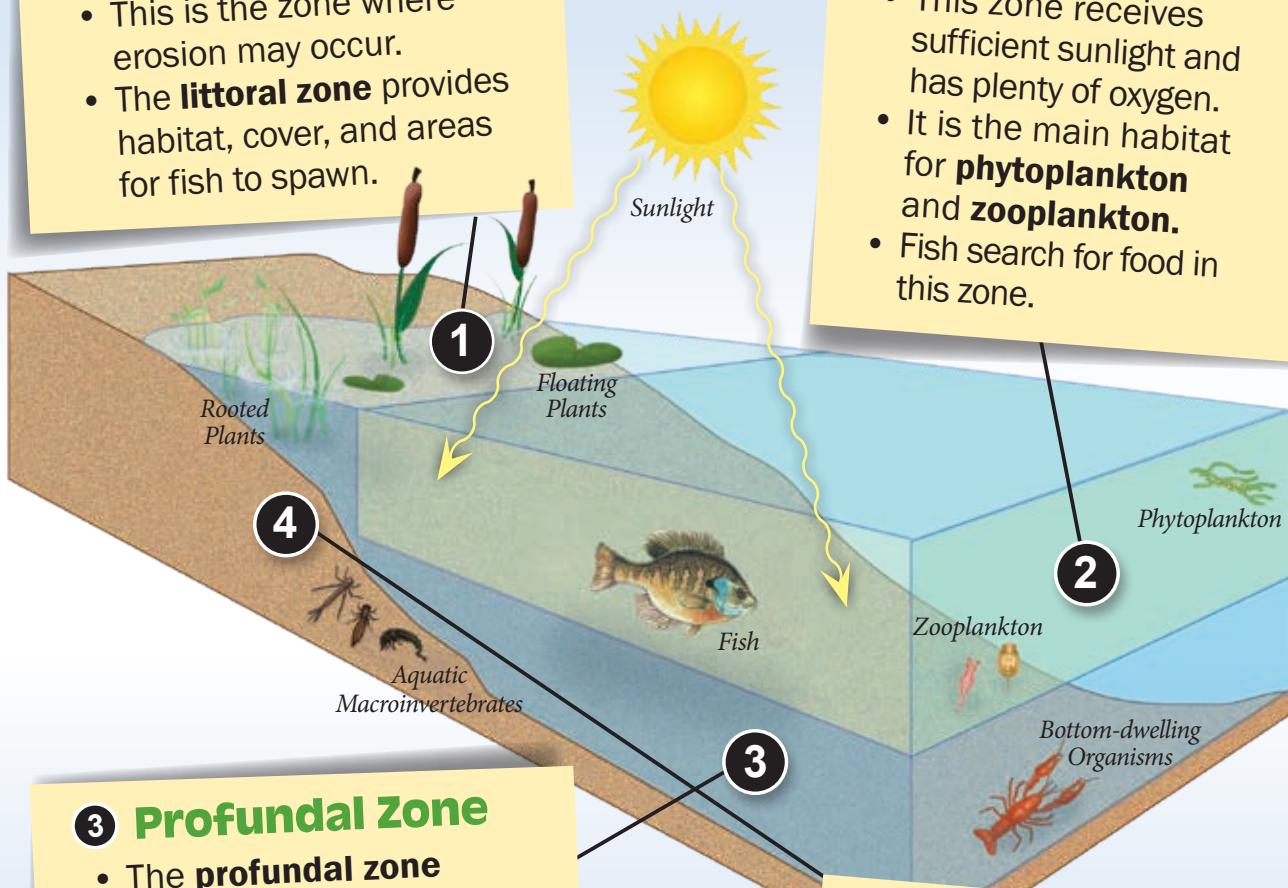
*Lake Wallenpaupack, Pike and Wayne counties*

# Lake Zones

Lakes come in different shapes and sizes. Let's look at the zones found in a lake.

## ① Littoral Zone

- Light reaches the bottom of the **littoral zone**.
- Rooted plants may grow in the littoral zone.
- This is the zone where erosion may occur.
- The **littoral zone** provides habitat, cover, and areas for fish to spawn.



## ③ Profundal Zone

- The **profundal zone** is the deep area of a lake where sunlight cannot reach.
- It is vegetation-free.

Learn more about plankton and aquatic insects at [www.fishandboat.com/LearningCenter/ActivitiesAndEducationPortal/Critters/Pages/default.aspx](http://www.fishandboat.com/LearningCenter/ActivitiesAndEducationPortal/Critters/Pages/default.aspx).

## ② Limnetic Zone

- The **limnetic zone** is the open water area of a lake, beyond the **littoral zone**.
- This zone receives sufficient sunlight and has plenty of oxygen.
- It is the main habitat for **phytoplankton** and **zooplankton**.
- Fish search for food in this zone.

## ④ Benthic Zone

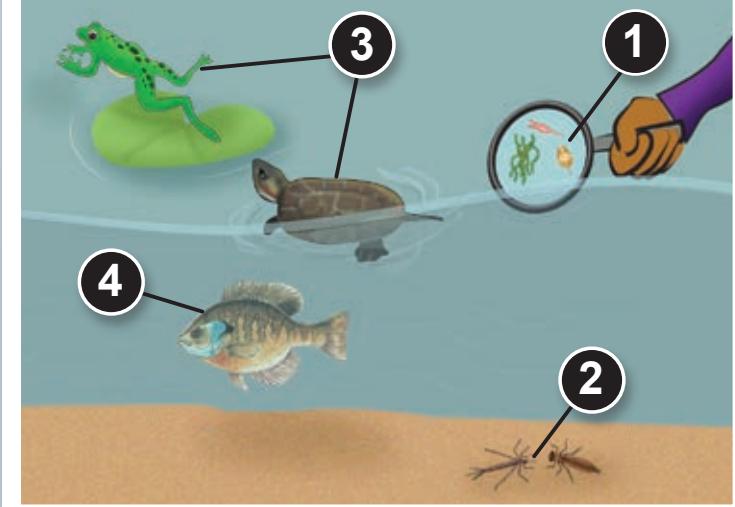
- The **benthic zone** is the lowest level or bottom of a lake.
- This zone includes the soil and sediment.
- It includes habitat for some **aquatic macroinvertebrates**.

# Life in the Lake

**Phytoplankton** and aquatic plants begin the food chain in a lake. **Phytoplankton** and aquatic plants get energy from the sun through photosynthesis. **Phytoplankton** and aquatic plants then provide food and nutrients for aquatic animals.

## What Lives in This Lake?

- ① Phytoplankton and zooplankton
- ② Aquatic macroinvertebrates
- ③ Reptiles and amphibians
- ④ Fish



Learn more about the feeding ecology of aquatic macroinvertebrates:  
[www.fishandboat.com/LearningCenter/  
ActivitiesAndEducationPortal/Critters/  
Documents/feedingfrenzy.pdf](http://www.fishandboat.com/LearningCenter/ActivitiesAndEducationPortal/Critters/Documents/feedingfrenzy.pdf).

## Food Chain

Here is an example of how energy flows through a lake food chain.



# Benefits and Threats

## Lake Benefits

- Health benefits to society
- Drinking water
- Irrigation
- Fish and wildlife habitat
- Recreation like fishing and boating
- Floodwater control
- Hydroelectricity
- Beautiful places to explore and watch fish and wildlife



Habitat structures on Lake Nessmuk, Tioga County.



*Northern Map Turtles*

## Threats to Lakes

- Humans can impact lake health.
- Vegetation and tree removal on lakes opens up shoreline erosion.
- Aquatic vegetation removal removes nutrient sources and cover for animals.
- Aquatic Invasive Species (AIS) outcompete native species.
- Climate change and weather events impact **lake ecology** and erode lake shorelines.
- Pollution harms lake food chains.

## Clean Your Gear!

Before leaving this waterway, check for and remove any aquatic life (plants and animals), mud, and other organic debris.



*New Zealand mudsnails are Aquatic Invasive Species (AIS).*

Learn more about pollution and water quality at [www.fishandboat.com/Transact/AnglerBoater/AnglerBoater2019/Documents/play-04-fall-watercycle.pdf](http://www.fishandboat.com/Transact/AnglerBoater/AnglerBoater2019/Documents/play-04-fall-watercycle.pdf).

Learn more about healthy water in aquatic ecosystems at [www.fishandboat.com/LearningCenter/ActivitiesAndEducationPortal/AquaticHabitat/Documents/play-2018-WaterWaterReadAllAboutIt\\_Allpages.pdf](http://www.fishandboat.com/LearningCenter/ActivitiesAndEducationPortal/AquaticHabitat/Documents/play-2018-WaterWaterReadAllAboutIt_Allpages.pdf).

# How Can YOU Help?

There are many ways to help keep Pennsylvania's lakes healthy.



## Lake Helper

- Purchase a fishing license.
- Follow fishing regulations, including seasons, sizes, and creel limits.
- Support the Pennsylvania Fish and Boat Commission's (PFBC's) efforts to install habitat structures.
- Clean your gear to prevent AIS.
- Leave the lake cleaner than when you arrived.
- Participate in a watershed or roadway cleanup. Learn more at [www.keepitbeautiful.org/keep-pennsylvania-beautiful-clean-it](http://www.keepitbeautiful.org/keep-pennsylvania-beautiful-clean-it).



# Healthy Lake Activity

After learning about lake ecology, healthy lakes, and food chains, help determine

the food chain in this lake by circling the components of a lake food chain.



**Produced by:** the Bureau of Outreach,  
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**Written by:** Adam Spangler

**Editor:** Spring Gearhart

**Design and illustrations:** Andrea Feeney  
and Ted Walke

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- Angler
- Large mouth Bass
- Bluegill
- Aquatic Macroinvertebrates
- Zooplankton
- Phytoplankton
- Sun

## Answer Key