

PILA Y

PENNSYLVANIA
FISH & BOAT COMMISSION

Summer
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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.

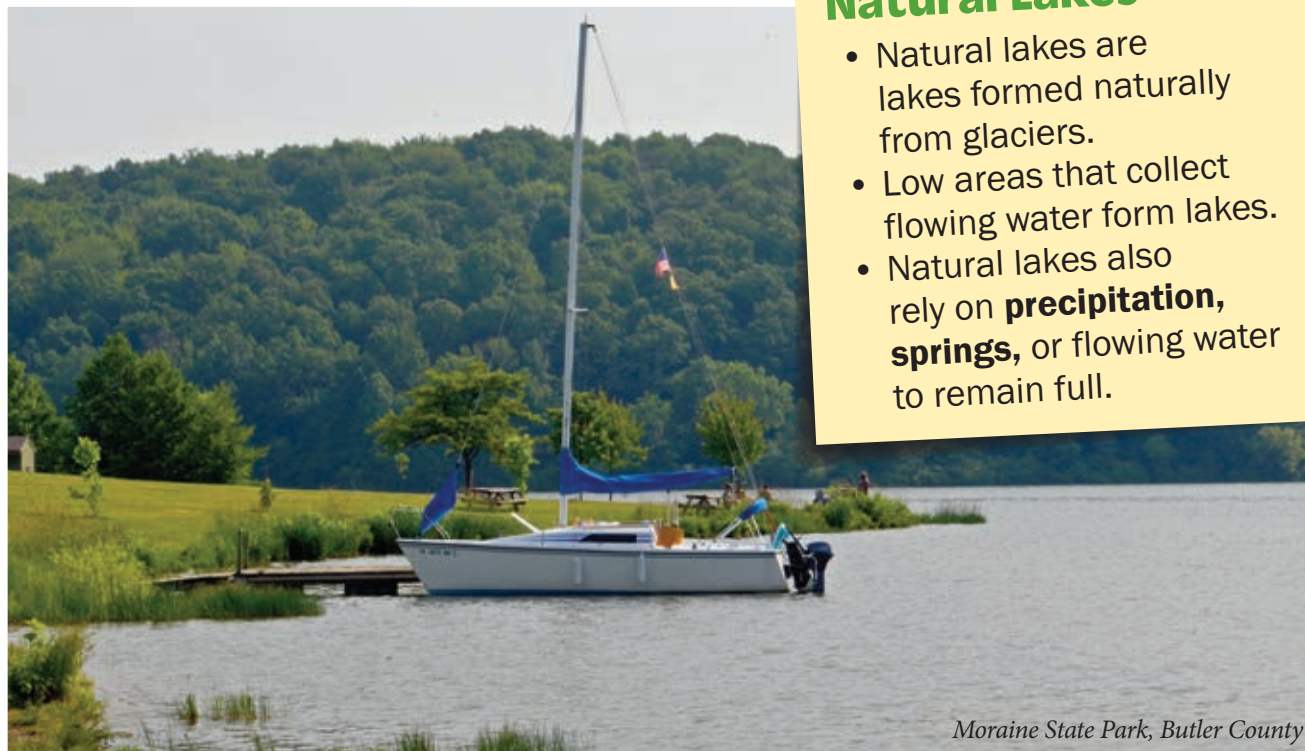
Lakes provide habitat for animals, a source of clean water, and recreation for people. Continue reading to learn more about **lake ecology**, benefits and threats, and how you can help protect lakes.

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.



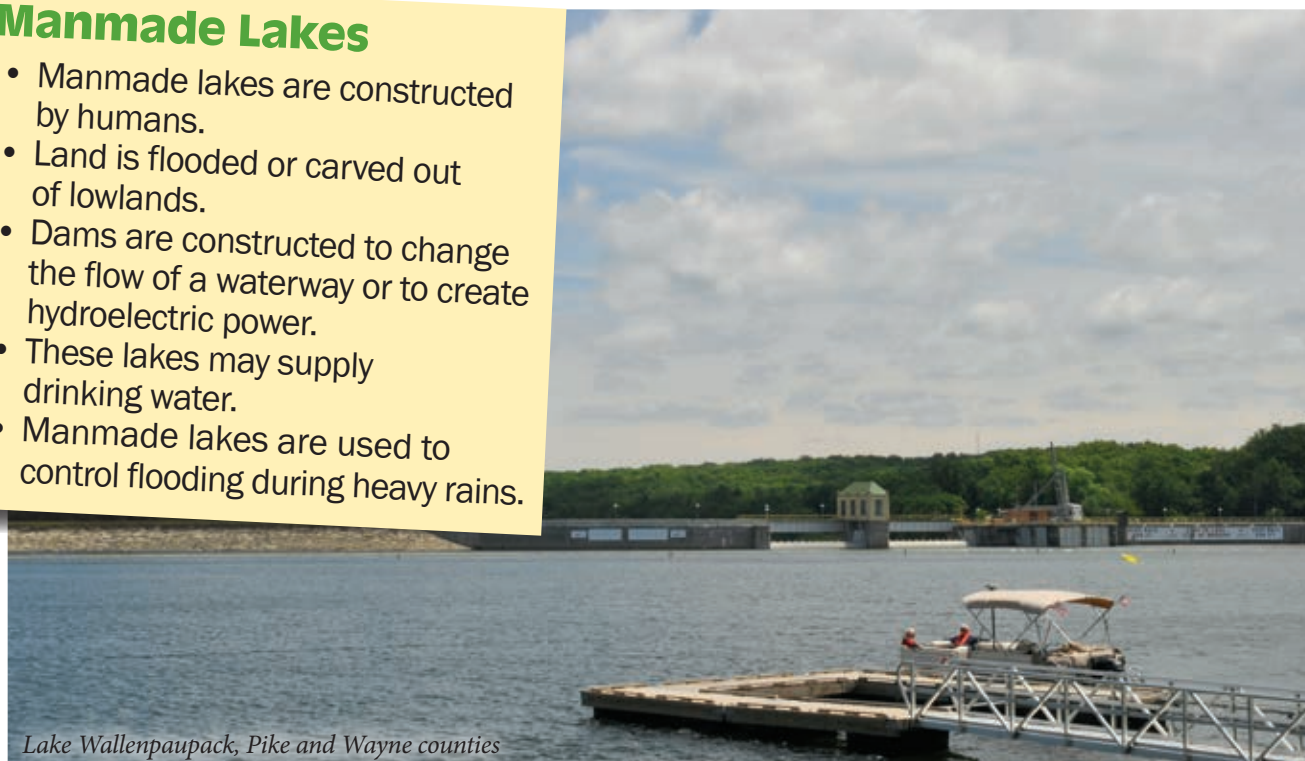
Moraine State Park, Butler County

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.

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

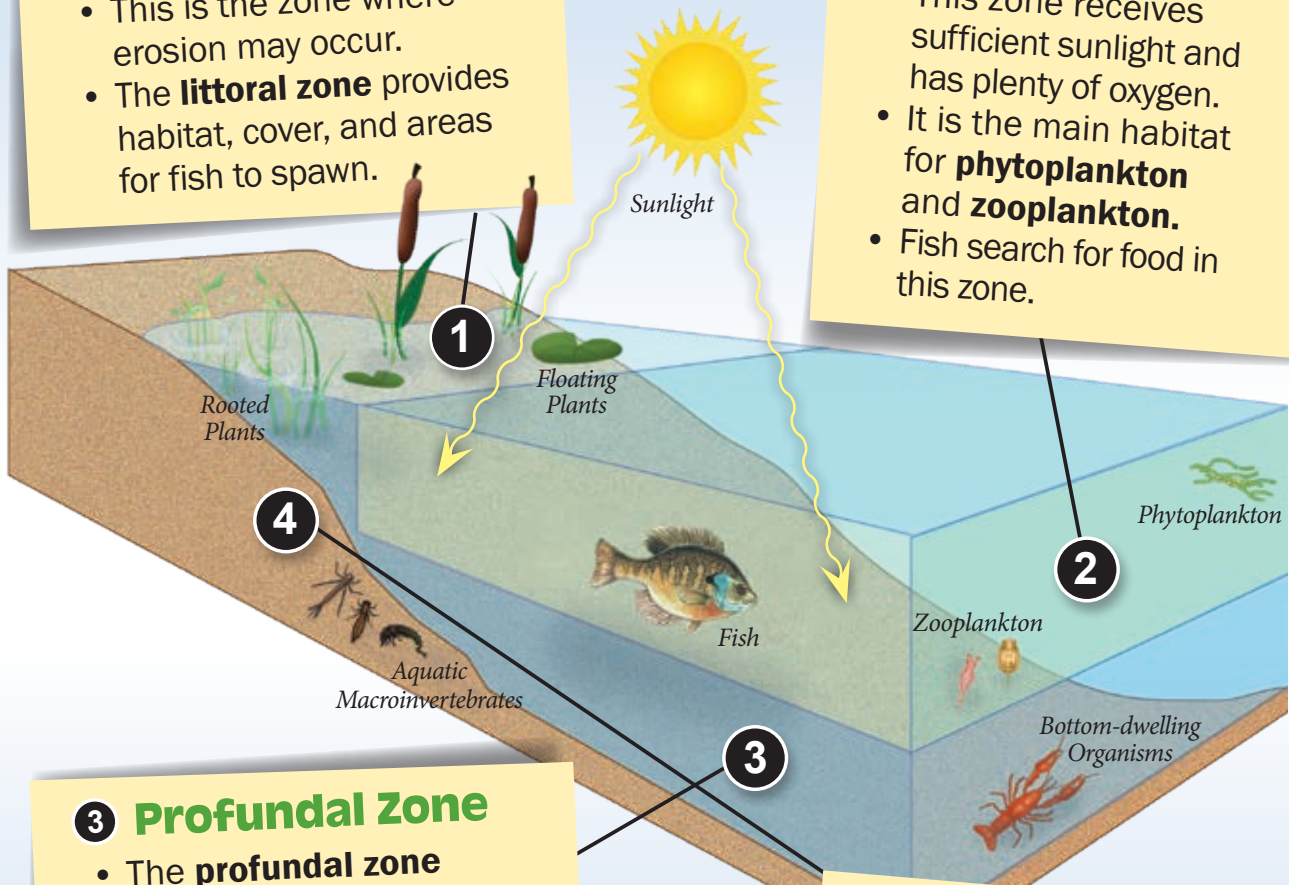
Lakes come in different shapes and sizes. Let's look at the zones found in a lake.

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.

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.



3 Profundal Zone

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

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**.

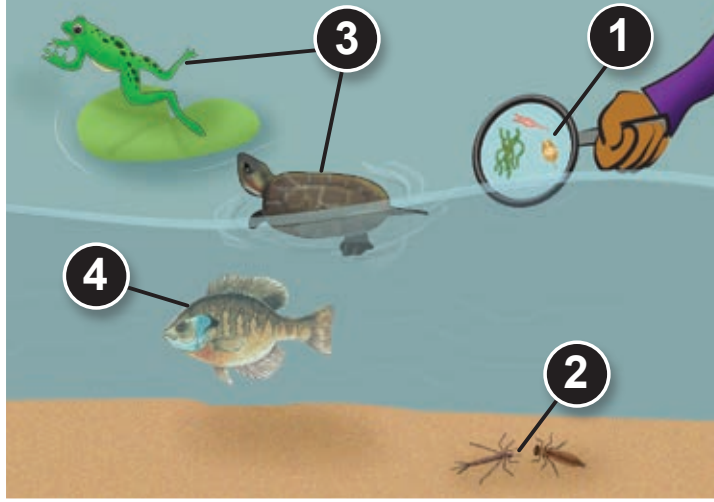
Learn more about plankton and aquatic insects at www.fishandboat.com/LearningCenter/ActivitiesAndEducationPortal/Critters/Pages/default.aspx.

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



Food Chain

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



Learn more about the feeding ecology of aquatic macroinvertebrates:

www.fishandboat.com/LearningCenter/ActivitiesAndEducationPortal/Critters/Documents/feedingfrenzy.pdf

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



Northern Map Turtles

Habitat structures on Lake Nessmuk, Tioga County.

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.

Learn more about healthy water in aquatic ecosystems at www.fishandboat.com/LearningCenter/ActivitiesAndEducationPortal/AquaticHabitat/Documents/play-2018-WaterWaterReadAllAboutIt_Allpages.pdf.

How Can YOU Help?

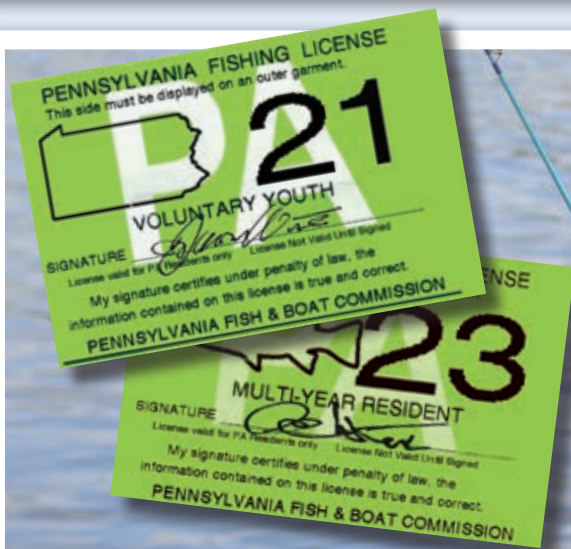
There are many ways to help keep Pennsylvania's lakes healthy.



Prince Gallitzin State Park, Cambria County

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.keeppabeautiful.org/keep-pennsylvania-beautiful-clean-it.



Sweet Arrow Lake, Schuylkill County

Learn more about Pennsylvania lakes on PFBC's interactive maps at www.fishandboat.com. Click on "Locate" and then "Lakes".

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.



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- Angler
- Largemouth Bass
- Bluegill
- Aquatic Macroinvertebrates
- Zooplankton
- Phytoplankton
- Sun

Answer Key