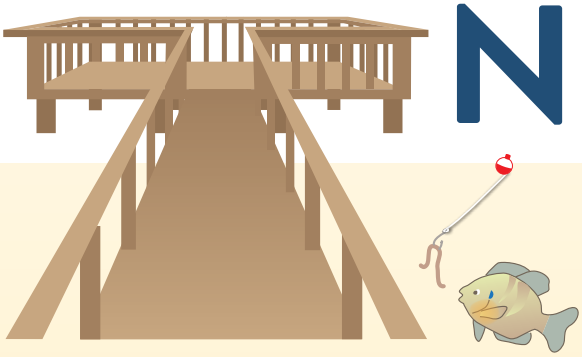
PIER NOTES



A take-along guide for fishing with kids

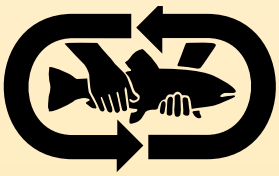
Ethics, Watersheds, Plants, and Invertebrates

The Laws of the Lake

Waiting for the fish to bite can be a good opportunity to observe the lake environment and think about how it all fits together: water, fish, insects, plants, and people.

Responsible anglers make sure we can all enjoy our lakes for years to come, by following the "laws of the lake." Some of these guidelines really are laws, while some are just good ideas.

To ensure good fishing for all in the future:



- Know and obey the regulations and limits listed in the MN Fishing Regulations booklet. Find it at mndnr.gov
- Practice catch-and-release whenever possible.
- Respect other anglers by not crowding them or disturbing their fishing spot.
- Use gentle reminders to help others obey the rules. Report serious violations to the Turn In Poachers (TIP) Hotline at 1-800-652-9093.

To control the spread of invasive species:

- Throw unwanted bait into the trash, not on the ground or in the water.
- Clean and dry your boat, waders or hip boots thoroughly after exiting the water.

To prevent damage to wildlife and the landscape:

- Consider using non-lead sinkers and tackle. Lead is poisonous and can harm or kill wildlife.
- Consider using circle hooks to minimize swallowed hooks.
- Wet your hands before handling fish, and release fish gently back into the water.
- Throw old fishing line in the trash or recycle it at your local bait shop.
- Throw your garbage in the trash and leave the lakeshore cleaner than you found it.
- Leave all plants, rocks and other natural parts of the shoreline where you find them.

Did You Know?

A bird has a gizzard filled with pebbles for grinding their food. Loons and other waterbirds regularly swallow pebbles for this purpose. To a bird, a lead sinker looks just like a pebble, and many birds die every year from accidentally swallowing lead fishing tackle.

MPCA

Pebbles and sinkers found in the gizzard of a lead-poisoned loon.

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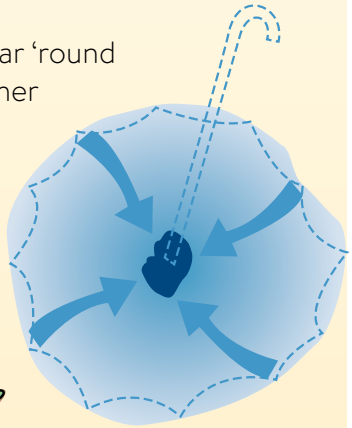
MinnAqua Program

WILDLIFE & SPORT FISH RESTORATION

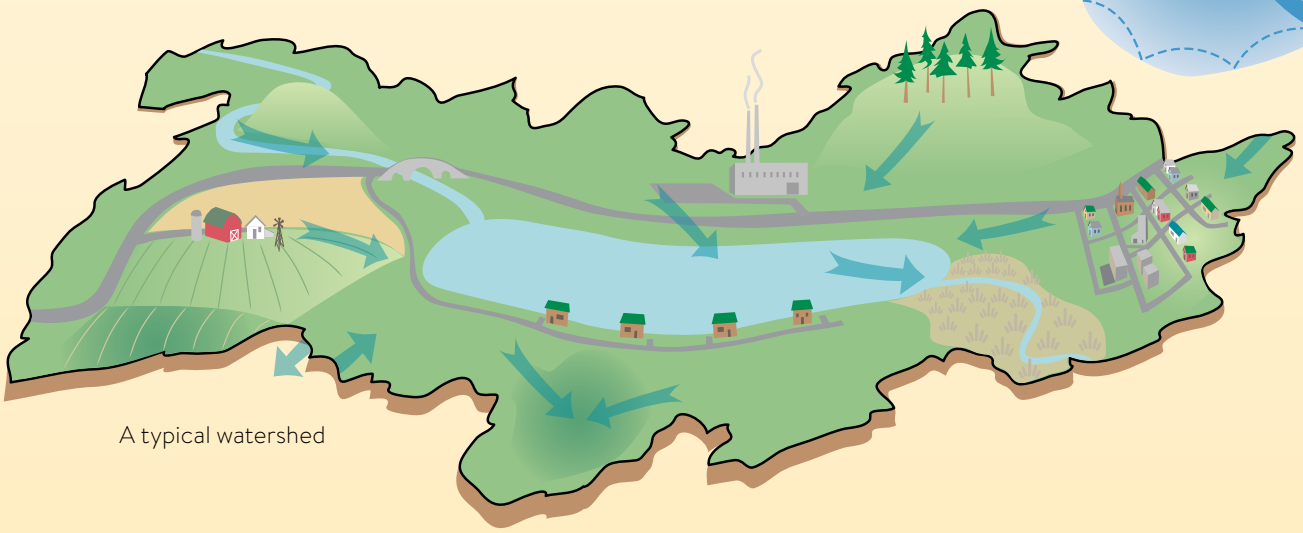
For more information about angling stewardship, see Chapter 4: Lesson 1 in the MinnAqua Leader's Guide, *Fishing: Get in the Habitat!* mndnr.gov/minnaqua/leadersguide

Watersheds and Water Quality

What color is your lake? Clear? Brown? Green? Some lakes are deep and clear year 'round while others may change from clear in the spring, to green or brown as the summer heats up. It has to do with where the lake water came from and how it got there.



Watersheds—Imagine an upside-down umbrella in the rain. The "lake" that forms in the center collects its water from the surrounding "land." Your lake does this too, and the area of land from which the lake collects its water is called the "watershed."



A typical watershed

Pollution—What people do to the land can pollute a lake. As water runs off the land (called "runoff"), it can pick up and carry pollutants. Look around you. What pollutants might the rainwater wash into your lake?

Sediment and Nutrients—There are many different pollutants, but sediment and nutrients are really big problems. When ground lacks vegetation, soil moved by water can make lakes brown and murky. Fertilizers from lawns, gardens, and farmland can make a lake turn green in the summertime.

The amazing color-changing lake—Fertilizers help plants grow by containing nutrients like nitrogen(N) and phosphorous(P). The tiny algae in your lake are plants too, and are vital to the lake food chain. But, when lots of nutrients get in your lake, and the water warms up, the algae can grow out of control ("bloom"). Some blue-green algae can produce toxins that are harmful to humans and pets. When that algae eventually dies, bacteria eat the algae and use up the oxygen in the lake, sometimes causing a fish kill.

Did you know?

The free-floating, oatmeal flake-sized, duckweed is the world's smallest vascular plant. They serve an important role in aquatic ecosystems, and can also form dense green mats on nutrient-rich, summer lakes.

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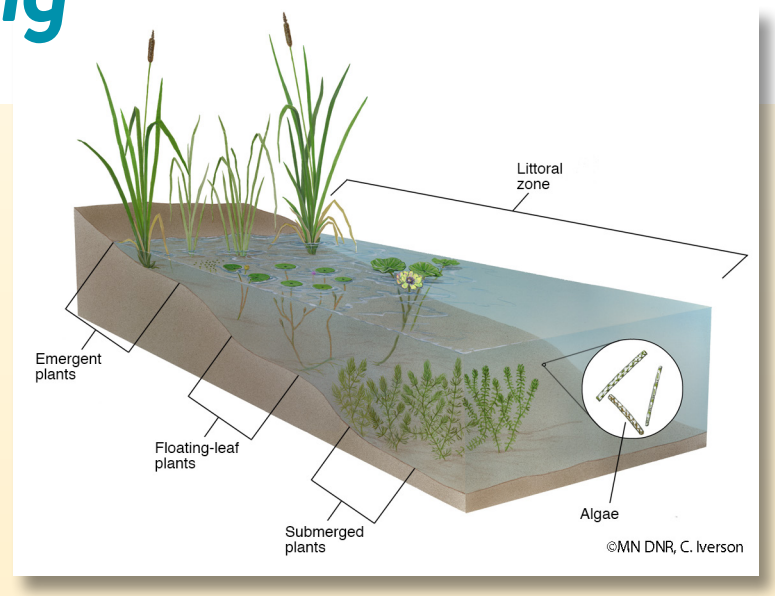
For more information about watersheds and water stewardship, see Chapter 3: Lessons 3 and 5 in the MinnAqua Leader's Guide, *Fishing: Get in the Habitat!*
mndnr.gov/minnaqua/leadersguide

Littorally Speaking

Look along the shoreline of your lake. Are there plants growing here? This near shore area around a lake where rooted plants can grow is called the *littoral* (li-TOR-ul) *zone.* These plants serve many vital functions such as providing oxygen, food, and habitat, as well as cleaning the water and holding the soil.

There are four general types of plants found in the littoral zone. Does YOUR lake have some of these plants?



Free-floating algae can be tiny, string-like, or even plant-like

Anabaena (particles)	Spirogyra (string-like or "filamentous")	Chara (plant-like)
 ©MN DNR, G. Mikel	 ©MN DNR, G. Mikel	

Submerged plants are rooted, and usually underwater

Northern Water Milfoil (*Myriophyllum sibiricum*)	Coontail (*Ceratophyllum demersum*)	Large-leaf Pondweed (*Potamogeton amplifoliu*)
		

Floating-leaf plants are rooted, with leaves and flowers that float

White Water Lily (*Nymphaea odorata*)	American Lotus (*Nelumbo lutea*)	Water Smartweed (*Polygonum amphibium*)
		

Emergent plants are rooted to the lake bottom and grow above the surface of the water

Northern Blue Flag (*Iris versicolor*)	Broad-leafed Cattail (*Typha latifolia*)	Pickerelweed (*Pontederia cordata*)
		

Plant drawings: ©MN DNR, C. Iverson

Did You Know?

A fun plant to look for on the shore is Jewelweed. It has orange or yellow flowers and is also called *touch-me-not* because it has seed capsules that explode when you touch them! Jewelweed is safe to touch, but be careful, and be respectful of any plants you investigate.

Photo: Dr. Thomas G. Barnes, USFWS Image Library

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WILDLIFE & SPORT FISH RESTORATION

For more information about the function of aquatic plants, see Chapter 1: Lesson 4 and Chapter 3: Lesson 2 in the MinnAqua Leader's Guide, *Fishing: Get in the Habitat!* mndnr.gov/minnaqua/leadersguide

Creatures From the Muck

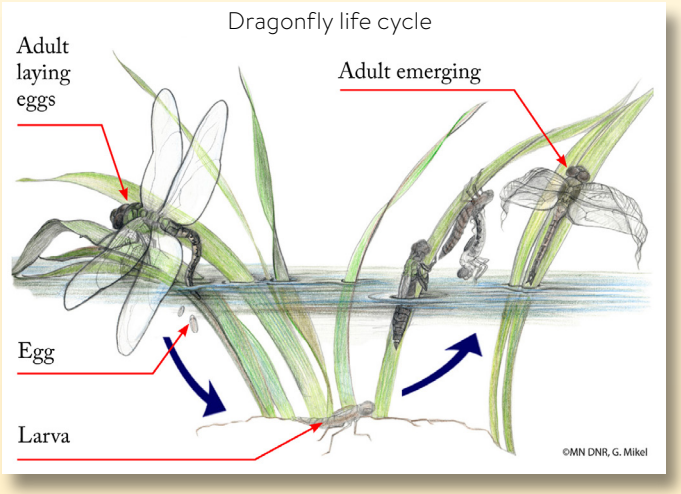
It's easy to focus on the big stuff like fish, frogs and turtles. But have you ever searched for the small critters that are a critical link in the aquatic food chain?

What are they?

Aquatic macroinvertebrates are the abundant and diverse "water critters" that, in many cases, feed on small plants, and are eaten by larger animals. *Aquatic* means "water" and an *invertebrate* is an animal without a backbone. Although most are fairly small, *macro* means "large," and refers to the fact that they are large enough to be seen without a microscope. Some are adults, but many are larva on their way to becoming adults.

Where are they?

To find an aquatic macroinvertebrate, you have to think like one. These critters are often food for larger animals, so look in places that might make a good hiding place: in the muck, under a rock, clinging to a plant stem, or hiding in a clump of algae on the shore.

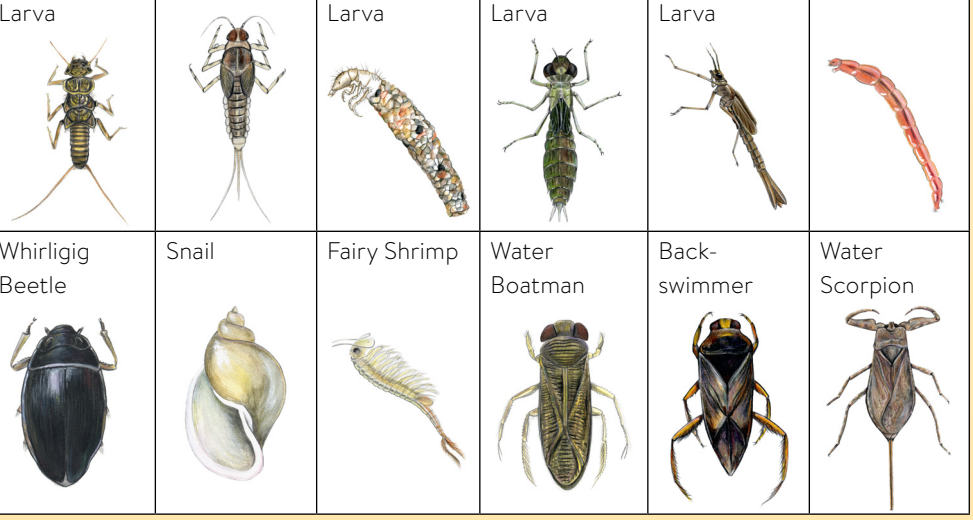


A net, a bucket, and patience

No special tools required. Just scrape a small net along the bottom or among the plants, dump your net into a bucket with some water, then wait and watch. Patience is your most important tool.

Can you find some of these common aquatic macroinvertebrates?

Stonefly Larva	Mayfly Larva	Caddisfly Larva	Dragonfly Larva	Damselfly Larva	Midge Larva
Whirligig Beetle	Snail	Fairy Shrimp	Water Boatman	Back-swimmer	Water Scorpion



©MN DNR, G. Mikel

Did you know?

A water scorpion breathes out of its rear end! It has a long, tail-like tube at the tip of its abdomen that it holds out of the water like a snorkel to obtain air. And, in case you're wondering, it's not really a scorpion.

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For more information about aquatic macroinvertebrates, see Chapter 1: Lesson 4 and Chapter 3: Lesson 6 in the MinnAqua Leader's Guide, *Fishing: Get in the Habitat!*
mndnr.gov/minnaqua/leadersguide

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