



Indiana University Clean Lakes Program

2016 Field Guide



Lake structures and communities vary greatly across the state of Indiana. At a first glance, some characteristics may seem hazardous when, in fact, they are a natural occurrence in lake ecosystems. The purpose of this Field Guide is to examine lake phenomena and distinguish between pollution and natural occurrences.



School of Public and Environmental Affairs
Director: Melissa Clark
P: (812) 855-7802
e-mail: mlaney@indiana.edu

SPEA 460
1315 E. 10th Street
Bloomington, IN 47405-1701



IDEM Office of Water Quality
P: (317) 232-8603
e-mail: info@idem.in.gov

Indiana Government Center North
100 N. Senate Ave.
Indianapolis, IN 46206

Why Are Lakes Different Colors?

For the most part, when picturing a lake, one tends to think of clear, blue waters. However, lake color ranges greatly due to particle suspension, depth, and the living materials present.

The clear **blue** color of a lake is the result of fewer particles and dissolved, colored material causing less light interception and reflection. Due to the longer wavelength of blue light, the deeper the lake, the darker the blue.

Water that is **clear** has even less dissolved and suspended materials. Seepage lakes in sand and gravel may look clear. Shallow water also appears clear since the limited depth doesn't allow for blue wavelengths to travel and be reflected back.

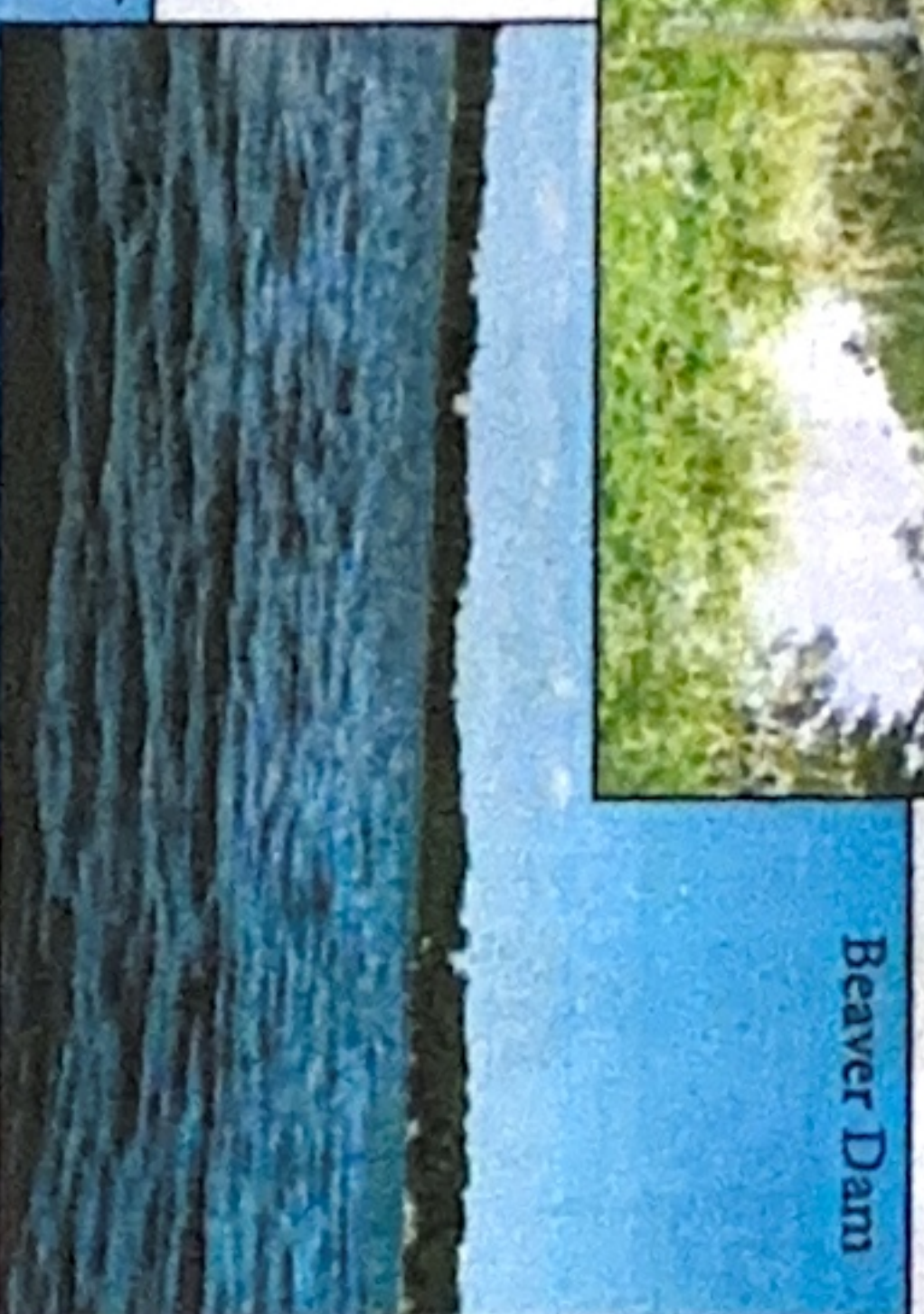
Some water is transparent, but has a **brown** tint to it. This is due to the breakdown of plants into dissolved organic material. The organic material does not only originate from aquatic plants in the lake, it also enters from forests, bogs and wetlands in the surrounding watershed.

Some water is very turbid and appears **muddy** or **cloudy**. This can be a result of soil erosion, sediment transport from strong winds and waves, and/or runoff from nearby urban areas.

Water may appear green due to living material being suspended in the water. Algae (and other microscopic organisms) have colored pigments. When in bloom, algae can color parts or entire lakes. Blooms of different algae color the water differently. *Euglena*, for example, may appear **red** while diatom blooms may appear **brown**.



Willow Lake



Beaver Dam



Brookville Reservoir



Lake Shaffer

What's Floating on Top of the Water?

An oily **rainbow** shimmer may be the result of a petroleum spill; however, it can also be a natural phenomenon. Certain bacteria obtain energy from iron and manganese. As the bacteria grow and decompose and the iron and manganese solidifies, the bacteria may appear oily, or slimy black, red or orange. In the spring and summer, a dark cloud in the water accompanied by an oily sheen could also be the outer skeletons of insects cases left behind from a hatch of aquatic insects.

A **yellow** powder or dust on the surface of water in the spring or early summer is usually pollen. After becoming water-logged, the pollen sink to the bottom or collect along the shoreline. Sometimes pollen clumps together to form small blobs.

Orange or reddish brown slime is produced by a group of bacteria that use iron as an energy source. This is the same group that create oily sheens. As this bacteria grows and reproduces, it excretes a slimy or fuzzy-looking material that becomes coated with rusty iron hydroxide. This natural phenomenon is usually associated with acidic soils; however, if present in large amounts, iron bacteria may indicate pollution.

Green floating dots in the top few feet of water may be an algae (microscopic plant) called *Gleotrichia echinulata*. Gleotrichia usually appear in mid-summer for brief periods, but can also persist longer. The presence of Gleotrichia does not necessarily indicate poor water quality. Wind and currents can concentrate them in one part of a lake.

Don't mistake floating plants like Duckweed and water meal for algae. Duckweed look like miniature lily pads, with a flat, round floating leaf and a tiny root. Water meal floats but does not have a root and is a round grain-like plant, about the size of a poppy seed.

