

Water Canaries

Study Units

[Aquatic Life; The World in a Pond; People, Land, and Water](#)



Supplemental Information

In Iowa, factors discussed in the guide are important in determining water quality, but turbidity (a measure of the clarity of the water) is of even greater significance. The major pollutant in Iowa's aquatic resources is soil from surrounding land (watersheds). Nutrients from watersheds in the form of agricultural fertilizers and wastes are also a major contributing factor to decline in water quality. These pollutants create a harsher environment where certain animals cannot live, thus decreasing the diversity of the ecosystem.

Studies have shown that silt (fine soil) kills aquatic insects (e.g., caddisflies, stoneflies, mayflies, dragonflies, damselflies) by clogging the gills of immature stages. Fish that eat these insects (e.g., darters, some minnows, logperch, smallmouth bass) also are affected because their food supply is removed.

Fish that scatter their eggs on the bottom substrate have declined in numbers in many waters because eggs often are suffocated by silt. Predators that feed by sight can't do so in very turbid waters. Again, this affects fish such as darters, some minnows, and black bass. Some suckers and the northern rock bass also are affected. They are replaced by fish (e.g., common carp, white sucker, river carpsucker) that are better able to survive in "dirty" waters.

Excess nutrients degrade water quality by causing "blooms." Algae and aquatic plants grow and reproduce very rapidly when nutrients are added, but the algae and plants then die and rot. Decomposing bacteria use up oxygen in the water and produce gases such as methane and hydrogen sulfide. More sensitive animals cannot live under these conditions. See the narrative of [People, Land, & Water](#) for more information about human impacts on Iowa waters.

Teaching Suggestions

Stress the importance of silt as a pollutant in Iowa's waters. If you are doing this activity at a water site, note the clarity / color and odor of the water. Do they indicate siltation or the presence of excess nutrients? The tests mentioned in the guide also may be done using water from a classroom aquarium. (Do not try to collect water samples and bring them into the classroom because temperature, dissolved oxygen, and pH may change drastically in a container.)



Students may use the modified **Information Sheet** to record observations. It emphasizes collecting “detailed” information, which is very important in science. pH paper and Hach kits can be obtained from a scientific supplier or high school biology teacher. Hach kits come with directions designed for **student use**. Use the links to macroinvertebrate keys listed in **Student Materials** for general identification. At least **some** field guides should be available to students for reference.

Evaluation

See the **Water Canaries: Information Sheet** and the *Aquatic WILD* guide.

Student Materials

- [Benthic Macroinvertebrate Key from IOWATER](#)
- [Identification Guide to Freshwater Macroinvertebrates](#) – Stroud Water Research Center
- [Fish ID](#): This is from Wisconsin, but has a great glossary and search feature! (Double check that the species of fish you are wanting to ID lives in Iowa from this [Iowa DNR Fisheries page!](#))
- **Water Canaries: Information Sheet**

Teacher Aids

None

Additional Information

- Iowa Department of Natural Resources: [IOWATER Volunteer Water Monitoring Program](#)
- Murdoch, T. and M. Cheo. 2010. *The Streamkeeper’s Field Guide: Watershed Inventory and Stream Monitoring Methods*. Everett, WA: Adopt a Stream Foundation (206/316-8592).
- Reid, G.K., S.D. Kaicher, and T. Dolan. 2001. *Pond Life (A Golden Guide from St. Martin’s Press)*
- [Save Our Streams](#), Izaak Walton League of America
- [Iowa Rivers Revival](#) is a non-profit statewide leader in river education and advocacy and is committed to protecting some of our most precious natural resources – our rivers and streams



Water Canaries: Information Sheet

(Modified from worksheets from the Aquatic WILD guide)

Name(s) of collector(s): _____

Date: _____

Location: _____

Air temperature: _____ °F

Water Temperature: _____ °F

pH (acidic or basic): _____

Dissolved oxygen: _____

Color/odor of water: _____

Weather: _____

animal #	where animal was found	description	number found	animal name

