

Froggy Swamp

Adapted from "Dragonfly Pond," in *Project WILD Aquatic Education Activity Guide* (Bethesda, Md.: Council for Environmental Education, ©1987, 1992). Adapted with permission from Project WILD.



• **GRADE LEVELS:**

7 – 12

• **SUBJECT AREAS:**

Art, Economics, Environmental Studies, Government, Reading, Science, Social Studies

• **DURATION:**

2 – 4 sessions

• **SETTING:**

Classroom

• **SKILLS:**

Analyzing, applying, brainstorming, communicating, cooperating, creating and interpreting maps, describing, drawing, evaluating, explaining, making judgments, planning, public speaking, reading, researching, role playing, solving problems, thinking creatively, valuing, visualizing

• **VOCABULARY:**

Biodiversity, habitat, wetland

• **CHARTING THE COURSE:**

"Herp" Habitat Huddle; Before the Well Runs Dry; Carry On!; What Every "Herp" Needs; Decisions, Decisions; Picture This; March Migration Madness; See Spots Run; What Do You Know About "Herps?"; Bog Turtle Hurdles

• **"HERP" HAPPENINGS:**

A Tiny Turtle in Danger of Disappearing; Sandstone and Salamanders

Summary

Students role-play various interest groups within a community and design a plan for the development of a swamp area that minimizes impact on the environment.

Objectives

Students will

- design and evaluate plans for the development of a wetland adjacent to a town.
- discuss and evaluate ways to minimize the damaging effects on the wetland ecosystem.

Materials

Copies of Riverdale Map (page 339), one per student; copies of Student Information Sheet (page 341), one per student; 18" x 24" paper; additional paper; tape; scissors.

Background

Swamp, bog, marsh, glade, playa, muskeg, quagmire, pocosin, moor, prairie pothole, vernal pool, wet meadow — all are types of **wetlands**. What exactly is a wetland? By definition, a wetland is a landform that is covered all or part of the year with fresh, brackish, or salt water, but is not a stream, a river, a lake, or an ocean. This water covers *hydric soils* that are saturated and therefore are low in oxygen. Hydric soils are gray or very dark in color, have decomposing plant material on the surface, and emit a sulfurous odor. Some hydric soils are very sandy and often have dark streaks of rotting plant matter running through the sand. In addition, wetlands are distinguished by their *hydrophytic* vegetation, or plants that grow in water. Peat moss, cattails, bulrushes, mangroves, cypress, willows, sedges, and

skunk cabbage are all examples of wetland plants.

In the past, humans have greatly underestimated the ecological importance of wetlands, leading to the destruction of these essential **habitats**. In fact, since the first European settlers arrived in America, over half the wetlands in the lower 48 states have been lost. Only recently has it been recognized that a wetland can act as a filter, removing pollutants from the water. The plants growing in the wetland are vital to this filtering process because they absorb contaminants from the water. Other contaminants simply settle out as the water is held in the wetland area. Another important function of wetlands is the prevention of floods and erosion. A wetland can actually act like a sponge, holding back water and slowing it down as it makes its way to a river or sea.

Arguably the most significant role of wetlands is that they are highly productive harbors of **biodiversity**. The huge number of plants results in a wealth of nutrients available for fish, waterfowl, and many species of amphibians and reptiles.

In Pennsylvania, one can find bogs, swamps, and freshwater marshes. Many Pennsylvania amphibians and reptiles live in these wetlands, including frogs, toads, snakes, and turtles. Some of our native "herps" are dependent on wetlands; these include the eastern massasauga, ribbon snake, spotted turtle, bog turtle, northern leopard frog, and four-toed salamander. In addition, vernal ponds (small pools of water found in woodlands only in the spring) are important breeding grounds for wood frogs, pickerel frogs, spotted salamanders, and Jefferson salamanders.

Although today we have a better understanding of the ecological role of

wetlands, the growing human population and the need for more land for agriculture and development still lead to their destruction. Wetlands are protected by the Clean Water Act, which requires a permit for land clearing, construction, or development that will alter a wetland. Even with this protection, 290,000 acres of wetlands continue to be lost each year in the United States. Ecological and economic factors must be weighed when making a decision concerning a wetland.

Note: This activity is flexible in that you can make it as in depth as you like. It can be a brief, brainstorming and problem solving activity. Alternatively, you can assign roles and then allow a week or two for planning before holding the mock town council meeting. Students can research and plan their arguments outside of class. You may want to set aside some class time for group meetings and planning.

This activity is also ideal for a co-curricular project. It incorporates science, government, and social studies aspects. Preparing and presenting arguments employs English and communications skills. Posters and other graphics used for presentations could be considered art projects.

Preparation

1. Before doing this activity discuss wetlands and their crucial role as habitat for many of Pennsylvania's amphibians and reptiles. Ask questions such as "What is a wetland?" "What function do wetlands serve in the environment?" "What happens when we develop wetland areas?"

2. Have students do research on which Pennsylvania "herps" live in swamp and marsh habitats. You

may want to introduce this topic with an activity such as "Herp" Sweet Home or "Herp" Habitat Hagggle.

3. Contact your county conservation district, the Department of Environmental Protection, the Environmental Protection Agency, or Natural Resources Conservation Service for information on current regulations concerning wetlands. These regulations change frequently. You may want to assign students to contact these agencies and research current regulations. Most government environmental agencies have web sites where you may find information useful to this activity. You may also want to contact (or have students contact) local grassroots environmental associations, such as a watershed association, to discover local wetland issues and the conflicts that surround them.

Listed below are web sites where you will find information on wetlands protection and regulations.

- Environmental Protection Agency
www.epa.gov/OWOW/wetlands
- U.S. Fish and Wildlife Service
www.nwi.fws.gov
- Wetlands Regulation Center
www.wetlands.com
- Pa. Department of Environmental Protection
www.dep.state.pa.us

Procedure

1. Provide students with background information about the proposed plan for Riverdale and a map of the town and its surroundings. Give them time to read the information sheet and study the map. Hold a class discussion about the pros and cons of developing the

swamp. Write a list of pros and cons on the board.

2. Divide the class into groups of three or four that represent various interest groups within the town. Some possible interest groups include:

- Mall developers and owners of businesses/restaurants that plan to move into the mall
- Officers of the local soccer club
- Contractors who will develop the land
- Nature lovers – naturalists, bird watchers, hunters and fishermen
- Riverdale Chamber of Commerce
- Biologists/Ecologists
- Residents of the town of Riverdale

You can let students choose a group or you can randomly assign them to groups.

3. Give each group time to meet and discuss what role they play in this scenario. What would be the feelings and responsibilities of members of their group? What would they do with Froggy Swamp? Tell each group that they must devise a plan for Froggy Swamp.

4. It is now time to elect a town council for Riverdale. Tell the class that they are going to elect five class members to serve as the town council. Ask for volunteers and then have the class vote. Explain that the town council is going to hold a meeting to decide what to do with Froggy Swamp. Each interest group will have five minutes to present their proposal for Froggy Swamp at the meeting. They will need to draw a map of their plan, showing how Froggy Swamp will look with the

plan they propose. (For some groups, they may wish to not develop it at all, and their maps will show it as an untouched swamp. The amount of development is up to the interest group.) Provide poster board for this map.

5. At some point early in the planning stage, there should be a meeting of the town council. They will have to devise rules for the meeting concerning the exact length allowed for presentations, if they will allow questions during or after the presentations, and if they will allow a chance for rebuttals. They must also choose criteria for their decision. How will they judge the proposals? Will they place equal weight on environmental impacts and economics? They should devise a scoring system for the proposals. The rules on the length of the presentation, questions, and rebuttals should be told to the entire class early in the planning stage.

6. At this point, you can allow the groups to devise a plan immediately, or you can make it an outside assignment. You may allow a few weeks to research and devise a plan. If you choose to make it a long-term assignment, it may be good to allow some meeting time for the groups during class. Town council members, other than when they are meeting as council, should still work with the groups of which they were part originally.

Encourage students to call government organizations and civic groups to find out how they would handle a similar situation. Students may want to research how their town makes zoning decisions, or they may want to find out if there are laws restricting wetland development. (You

may want to help them by informing them that wetland development is controlled by a permit process outlined in Section 404 of the Clean Water Act.)

7. Reserve one class period for the presentations and decision-making process. The town council members should sit together in the front of the room. It works well if the council sits at an angle so that the remainder of the class can also see the speakers and their maps as each plan is presented to the council. Before the presentations begin, one of the council members should announce the rules for presenting. You may want to have a member from each group draw straws or roll dice to determine in what order the presentations should be made.

When the presentations are complete, the council members should vote. Have them announce their decision and give the reasons why they chose that plan.

Conclusions

Whenever human development occurs, ecosystems are adversely affected. Because of rapidly growing human populations and shrinking wildlife habitat, we must plan our future enterprises carefully. To do this successfully, we as a society need to be aware of our impact on natural areas.

Assessments

1. Have students make a list or write an essay on the pros and cons of developing areas such as Froggy Swamp.
2. Lead a class discussion about the problems that arise when a town must make a decision involving both economic and environmental factors.

Is it possible to please everybody? Should a legislative body like the town council try to please the majority of people or do what they think is best? How does money influence a decision of this type?

3. Have students describe what they could do personally if they lived in Riverdale.

Extensions

1. Have students describe a future society in which new technologies could help to solve the dilemma of a town like Riverdale.
2. Collect newspaper articles about related land development issues. Find out how other communities solve their problems.
3. Seek out private organizations that work to protect swamps and other wetland areas. Investigate what they do and how they do it.
4. To make the simulation more like reality, have two or three students represent the media. Have them produce a newsletter that addresses the subject. Also, you can distribute play money to each group. You can give each group the same amount of money, or give more to groups that in reality would have more (contractors, mall developers.) They can use the money to buy information, form alliances, or try to influence the council members.



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Resources

“Dragonfly Pond” in *Aquatic Project WILD*, Bethesda, Md.: Council for Environmental Education, 1992. The complete Activity Guide can be obtained by attending a KARE workshop. For more information, contact the Pennsylvania Fish and Boat Commission at (717) 657-4540.

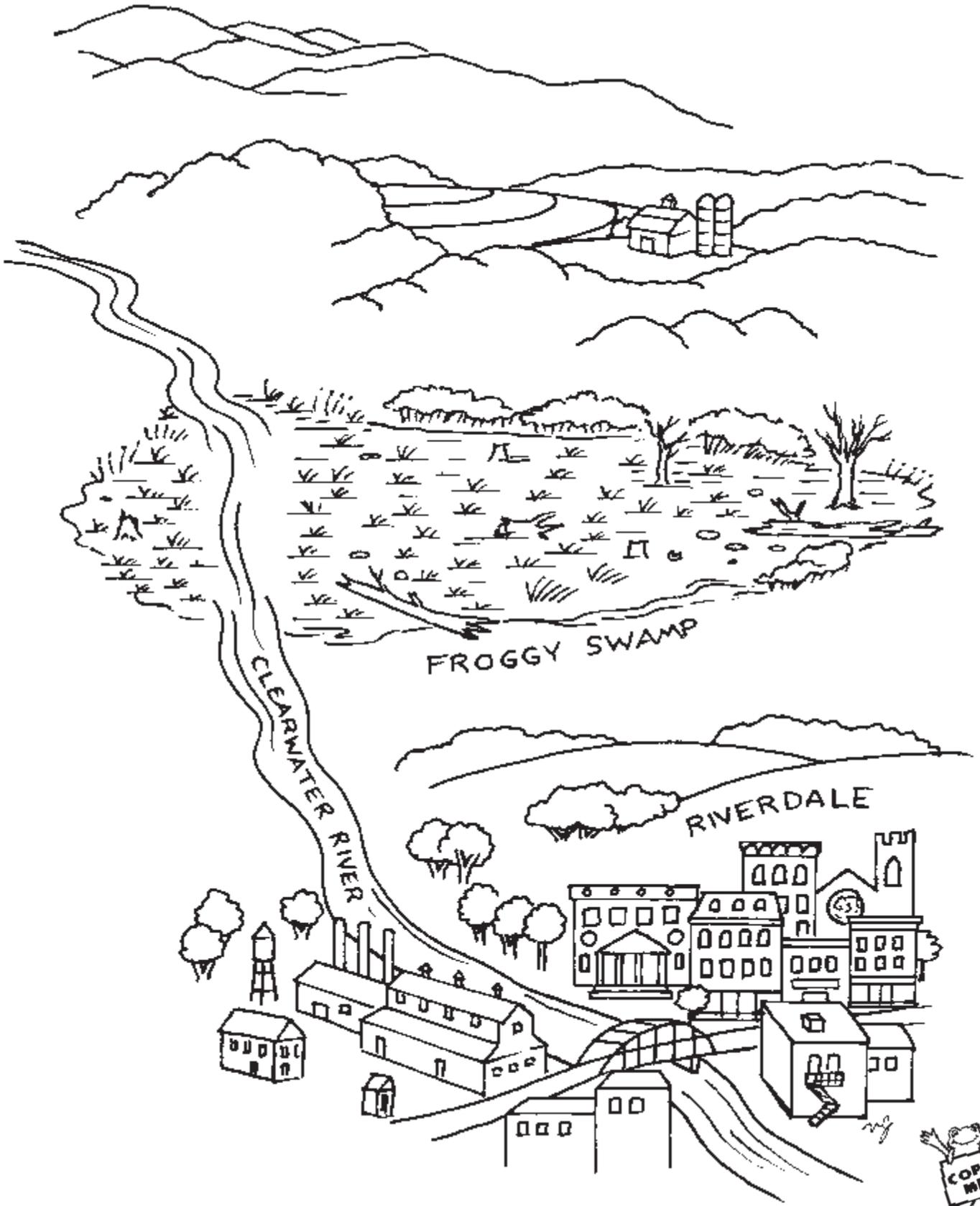
Miller, G. Tyler. *Living in the Environment*. Belmont, Calif.: Wadsworth, 1994.

Wetlands: Natural and Necessary. Harrisburg, Pa.: Pennsylvania Fish and Boat Commission, 1993.

W.O.W! The Wonders of Wetlands. St. Michaels, Md.: Environmental Concern, 1995.

▼ Notes

Map of Riverdale



Student Information Sheet: Froggy Swamp

This activity presents a hypothetical situation: Riverdale, a small but growing community of approximately 2,000 people, is located next to the Clearwater River. At the northern end of town, within the river's floodplain, lies an area of extensive swamps. These swampy regions have prevented development of this area since Riverdale was settled. However, with the town's increasing population, there is a need for more land, and the town's planning commission is considering filling in the wetlands and developing the area. The development will include a park with soccer fields, a mini-mall, and several fast-food businesses.

The park and new businesses would provide recreation facilities, employment opportunities and new services that are much needed by a growing town. Jobs will be created in the construction and maintenance of the new development. It will make Riverdale attractive to more people as a place to visit and live.

Filling in the swamps will result in the loss of important wildlife habitat. Populations that rely on this wetland for their survival include many species of birds, especially waterfowl and wading birds; a variety of small

mammals; white-tail deer; and several species of "herps." Amphibians that may be found in a Pennsylvania swamp include the Jefferson salamander, marbled salamander, red-spotted newt, Fowler's toad, northern spring peeper, western chorus frog, bullfrog, northern green frog, pickerel frog, and northern leopard frog. Pennsylvania reptiles that may inhabit a swamp are the spotted, wood, and eastern box turtles; and Kirtland's snake, the northern water snake, northern brown snake, ribbon snake, eastern garter snake, and eastern massasauga.

The people of Riverdale like the idea of having a new recreational park and new businesses, but they are concerned about the ecological impact of the project. Some people feel that the town may be growing too fast and that these changes will bring in too many new people, putting stress on the town's health, sanitation, and safety departments. Other impacts may include more pollutants entering the river, including lawn chemicals and parking lot run-off; more frequent flooding of the river due to loss of the wetlands and their "sponge" effect; and easier access to the river resulting in more pressure on wildlife.

