FRWA Curriculum Guide

Week III

Watershed Ecosystems

Watershed Ecosystems Background Information

"For many of us, water simply flows from the faucet, and we think little about it beyond this point of contact. We have lost a sense of respect for the wild river, for the complex workings of a wetland, for the intricate web of life that water supports."
– Sandra Postel, Lost Oasis; Facing Water Scarcity

An ecosystem encompasses a community of plants and animals that can exist simultaneously within a certain area. The health of an ecosystem depends upon the health of the water and the diversity of plant and animal populations is indicative of overall health. Aquatic life supports a variety of life: plants, fish, reptiles, insects, mammals, birds etc. Proper water temperature ranges, preventing erosion along the riparian bans with trees and vegetation, shading effects of trees, fast, moving cool waters with riffles and pools all support a diversity of aquatic life.

Evidence of benthic macroinvertebrates provide an indication of the health of the stream and river. *Benthic* refers to animals that live on the bottoms of streams, rivers, or ponds and spend part of their lives in a body of water. *Macroinvertebrates* do not have backbones and are large enough to be seen without a microscope. Such insects are sensitive to conditions of the water and the existence of certain insects in streams can indicate water quality.

Different organic and inorganic components comprise the ecosystem. The manner in which interaction takes place among these components all contribute to the state of the ecosystem. Organic components include producers, primary consumers, secondary consumers, tertiary consumers, and decomposers. Producers, or plants, make their own food through the process of photosynthesis while plant eaters, also called primary consumers or herbivores, eat the plants within an ecosystem. Secondary consumers, known as carnivores or meat eaters, are predators to plant eaters. Lastly, tertiary consumers are at the top and eat secondary or primary consumers. Also included are decomposers: organisms that return nutrients to the soil to be re-used by the producers. Two examples of inorganic components include rocks and water.

An ecosystem can be represented by food chains, food pyramids, and food webs. A food chain shows the flow of energy through the trophic levels. For example, the sun begins the food chain. Producers are plants that need the sun to make food, consumers eat the plants, and so on. Food chain models demonstrate how energy passes through an ecosystem.

A food pyramid demonstrates the amount of food required to sustain an organism at each trophic level. For example, plants are at the base and obtain their energy from the sun. They are eaten and 90% of the energy from the plant is lost as the consumer uses the energy to survive. As a result, less energy is available to the carnivores higher up on the food chain. Therefore, it takes many plants to sustain fewer herbivores and even fewer carnivores.

A food web, meanwhile, demonstrates the connectedness of all the organisms and illustrates the many possibilities of energy flow. The larger the diversity of organisms within an ecosystem, the better an ecosystem is able to withstand natural or man-made disruptions.

The Farmington River Watershed provides habitats where many species thrive. 400 different animals, inhabit the area between Otis, MA and Colebrook Lake in Colebrook, CT. State-endangered swollen wedge mussel, which are highly sensitive to pollution, bears, beavers, peregrine falcons inhabit this area.

The Barkhamsted Reservoir area hosts bobcat, bear, fisher, and beaver. Beaver were eliminated in the late1800's due to farming and trapping. Additionally, porcupine and muskrat, as well as eagles, turkey vultures, osprey, flycatchers, warblers, swallows, and songbirds have been spotted. Aquatic insects, state-threatened spring salamanders, waterfowl, trout, and salmon abound in the riffles and pools of the river.

In the area of New Hartford and Satan's Kingdom, trout, salmon, beavers, and muskrats can be seen. Cherry Brook provides a haven for songbirds, including cedar waxings, vireos and orchard orioles. Nighthawks, Canadian geese, common and hooded mergansers, and an occasional red-breasted merganser dot the sand bars, as do gulls, and shorebirds. Killdeer, solitary and spotted sandpipers, great blue heron, and great egrets are regulars at the reservoir.

At the Lower Collinsville Dam and in Unionville, songbirds are prevalent. Osprey, otters, mink, eastern hog-nosed snake, and trout are found and in warmer sections of the river, yellow perch, calico bass and other breeds are caught.

Throughout the sixteen mile riparian stretch from Farmington to Simsbury, rare-billed cuckoo songbird, hooded warbler, American woodcock, eastern screech owl, eastern bluebird, kingfisher, willow flycatcher, and orchard oriole are prevalent. Other species of wildlife that inhabit this section of the Farmington include bats, otters, beavers, deer, musk and wood turtles. Painted turtles bask at an oxbow lake and frogs and dragonflies all contribute to the diversity of the ecosystem.

Along the riparian banks of Tariffville, Simsbury, and Windsor, crows, red-tailed hawks, great horned owls, red-wing blackbirds, and great blue herons abound. Additionally, trout are stocked for fishing enthusiasts. Blueback herring, salmon, American shad, alewife spawn at the Rainbow Reservoir in Windsor. Double-crested camorants fly close to water and ospreys, herons, kingfishers, eastern screech owls, red-tailed hawks, muskrats, wood ducks, and leopard frogs can all be spotted.

Because of dam construction and other restrictions to waterways, salmon and other *anadromous (return from the sea or ocean to where they were originally born to spawn)* fish populations have declined. Fish use the ladder at the Rainbow Reservoir as a passageway to return to spawn. In order to promote the proliferation of salmon, CT DEP Whittemore fish hatchery, housed one-mile downstream of the Goodwim Dam, produces 150,000 to 300,000 Atlantic salmon eggs.

Connecticut DEP and its partners continue to help restore Atlantic salmon to the Connecticut River watershed. The program involves incubating Atlantic salmon eggs in a chilled aquarium tank beginning in early January. These eggs were previously harvested from salmon that returned to the Connecticut River. The eggs hatch around mid-February into alevin, a small fish of about one to one and half inches. Supported by a yolk sac (the egg residual), its sole source of food supply, the salmon alevin approaches the "fry" stage at the end of April or early May.

At this point, the sac will be gone and the fish look like streamlined small minnows. The fish are ready for stocking in the Farmington River and tributaries in late April or early May. Many schools participate in programs that involve raising salmon and releasing them into rivers as fry. The salmon restoration project for the Connecticut River Watershed and the subsequent stocking of the Farmington River and its tributaries are helping to retain the salmon and other types of fish in this area.