WETLAND ECOLOGY

A simple wetland food chain.

WEBS OF LIFE IN THE WETLANDS

There is an abundance of water and nutrients in wetlands. With plenty of sunshine (the ultimate source of energy), plants thrive in this environment. As plants grow, die and decompose, they become the basis of the wetland food chain. Bacteria, fungi and other tiny organisms feed on these decomposing plants (also called detritus). In turn, these microorganisms feed small invertebrates such as insect larvae, snails and worms. Animals such as frogs, small fish and birds consume these invertebrates. The small animals become food for larger animals such as raccoons, foxes, herons and hawks.

Energy travels through food chains and food webs. The sheer productivity of energy at the primary level makes wetlands unique. The constant growth of plants, which are the primary level of the food chain, leads to an abundance of energy all the way up the food chain. Wetlands are literally teeming with life.

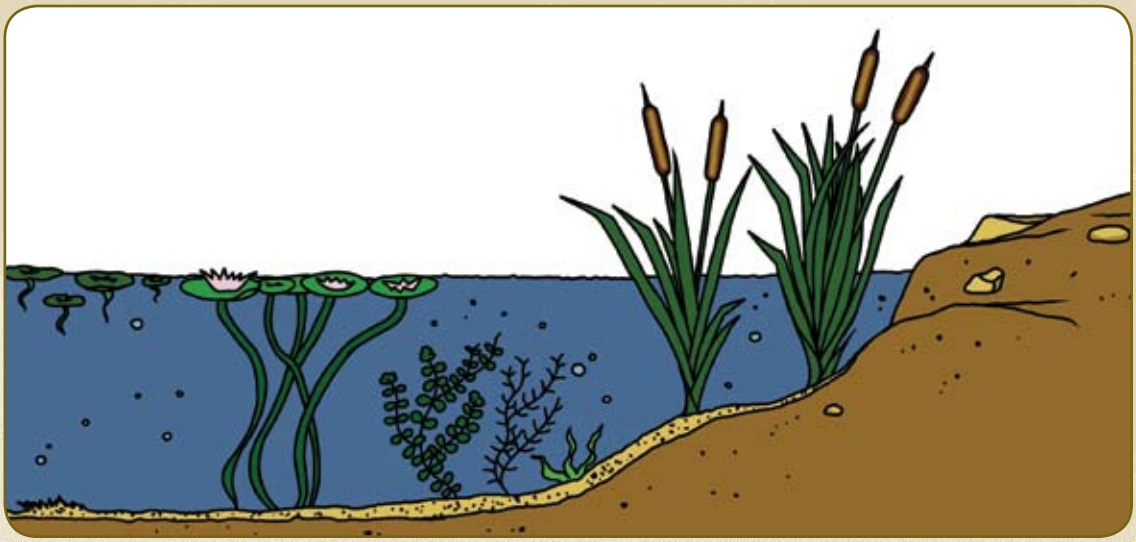
A cattail stem provides a good example of an emergent wetland plant using air spaces (called aerenchymas) for moving oxygen to its roots. In cattails, these spaces not only transport oxygen, they provide a strong yet light-weight structure, an adaptation which helps the plant support itself as it grows in the water and as it emerges above the water.

ADAPTATIONS TO LIFE IN THE WETLANDS

Even with its abundance of water and nutrients, the wetland environment is a challenging place to live. Survival in the wetlands means adapting to periods of both flooding and drought. It means dealing with reduced oxygen in both the soil and water. Organisms must often contend with accumulated salts or other pollutants. The day to day tasks of finding food and shelter as well as mating must also be accomplished to ensure a species' survival. Wetland plants and animals have developed a variety of physical and behavioral adaptations to deal with the particular set of challenges presented by life in the wetlands.

One of the biggest challenges organisms face in the wetlands is surviving in an oxygen-deprived environment. Sediment and soil in a wetland are often anaerobic – that is, there is very little available oxygen. This is a big challenge for wetland plants that need oxygen for respiration and nutrient exchange. Wetland plants have developed several strategies to deal with this condition. Many have developed air spaces throughout their structures to move oxygen from the emergent parts of the plant (the part above water) to the roots. Other plants have developed above-ground roots and other structures which enable them to literally "come up for air."

Wetland bacteria have a unique way of dealing with anaerobic conditions. Rather than using oxygen for respiration, they use sulfate. The by-product of their respiration is hydrogen sulfide, which is what causes the rotten-egg smell in the muck of many wetlands.



Wetland plants generally fall into three categories. Emergent plants are those that are rooted in the soil but extend above the water's surface. Submergent plants are those that live completely underwater. Floating plants are just that – they float on the water's surface and may or may not have their roots in the soil.

WETLAND HABITATS

A habitat is a place where an organism finds the food, water, shelter and space that it needs to survive. In other words a habitat is a home for plants and animals. Wetlands are home to a diversity of plants and animals specifically adapted to wetland conditions, as well as a variety of "microhabitats" which offer very specific conditions for animals and plants. A microhabitat is an area within the habitat that presents a different set of living conditions from the area right next to it.

In wetlands, some specific microhabitats include the open water zone, the emergent zone, the zone where the soil is sometimes wet and sometimes dry and the dry uplands. There are plants and animals that are perhaps abundant in one of these areas but could not survive in an adjacent zone. For example, cattails are found in shallow water at the edge of the wetlands but cannot survive either in deeper water or on dry land. Floating plants need open water. Most ducks can be found both in open water and along the shore of wetlands but they rarely range to the dry uplands. Wetland plants and animals are uniquely adapted to life in one or more particular microhabitat.

ACTIVITY: HOME IN THE HABITATS

Directions: Note the habitat zones in the picture below. Use the Plants and Animals of Sweetwater Wetlands section of this book to find out the preferred habitats of the plants and animals listed. Draw a line from each plant or animal to the habitat zone in which it would be found. Some organisms may be found in more than one zone.

SALTBUSH

RED-EARED SLIDER

DRAGONFLY LARVA

GAMBEL'S QUAIL

RACCOON

WILLOW

COYOTE

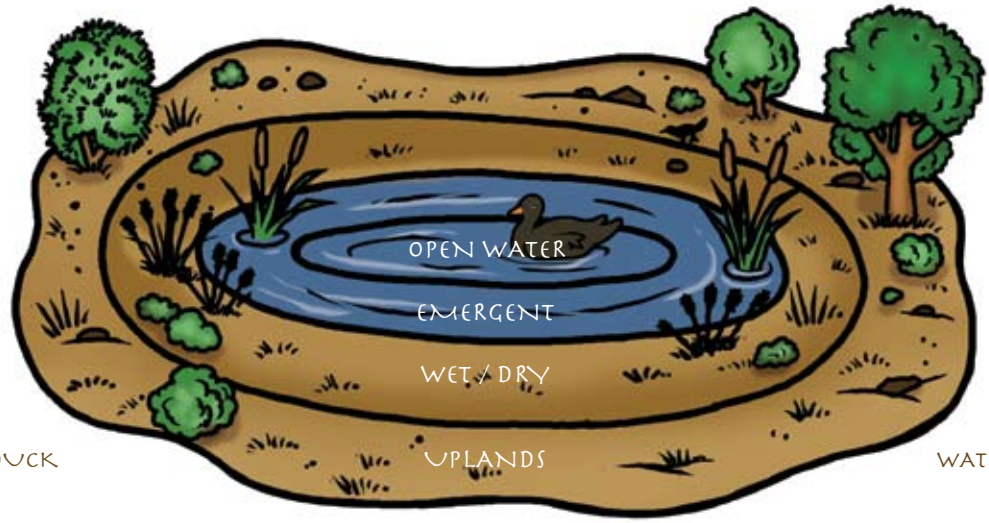
BULLFROG

CATTAIL

COTTON RAT

RUDDY DUCK

WATER SCORPION



GREAT BLUE HERON

RED-WINGED BLACKBIRD

COTTONTAIL RABBIT

ACTIVITY: WETLAND WEBS

Sweetwater Wetlands supports a thriving community of wetland plants and animals. Plants such as cottonwoods, cattails and bulrush produce energy through photosynthesis. They are the primary producers of energy in the community. Animals such as northern shovelers, coots, cotton rats and round-tailed ground squirrels eat the plant material found at Sweetwater. They are the primary consumers. The variety of carnivores that inhabit the wetlands are the secondary consumers. These include raccoons, rattlesnakes, Harris's hawks and even bobcats! Within the wetlands and the surrounding desert habitat there is an abundance of food for the variety of wildlife that occur there.

Directions: In the illustrations below, draws arrows to show who eats whom in the Sweetwater Wetlands food web. The arrows should point in the direction the energy flows. For example, energy flows from the tadpole to the dragonfly. You can find out what these animals eat in the Plants and Animals of Sweetwater Wetlands.