

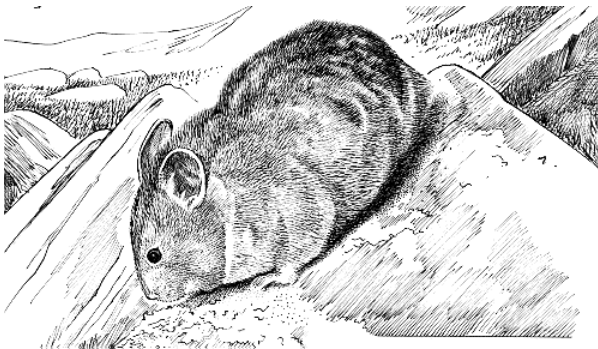
# Utah Biomes

Utah has a variety of **biomes** or areas wherein plants and animals have adaptations to deal with similar climatic, environmental and topographical conditions.

## ALPINE

The **Alpine biomes** are found at the highest elevations in Utah, usually over 10,000 feet. They are generally treeless with high winds, low temperatures and may have snow or frozen ground throughout the year.

Plants in the alpine must be adapted to these environmental conditions. Many flowering plants are annuals, meaning they produce seeds annually. Because of the short-lived summer season in the alpine or the presence of year-round snow, annuals must be able to



flower and produce seeds more quickly than their lower-elevation counterparts. The seeds of alpine plants must be viable for more many seasons in case conditions are not favorable for seed germination the year of production. Alpine animals such as the pika may store seeds for long periods of time and need to be viable once the animal decides

to consume it. It then will pass through the pikas digestive system and be deposited and germinate. Reproduction by other means such as shallow spreading root systems or budding can also help high-elevation plants survive. Roots must be able to survive in the coldest of conditions and often may not be able to penetrate deeply due to the rocky, frozen nature of the soil.



Even in summer months conditions in the alpine are considerably colder than at lower elevations. Many plants have adapted to this situation by developing woolly or barbed leaves with reduced surface area. These adaptations allow the plant protection from frost, cold and hungry animals while still retaining the ability to photosynthesize.

The strong winds of higher elevations create a hostile environment for tall plants such as trees and therefore alpine plants must be short enough to withstand breakage by high winds. Some alpine plants have developed adaptations to high wind over time. Short or non-stemmed plants that cling or grow close to the surface tend to survive best. Whereas trees or long stemmed plants would be easily destroyed by the forces of wind. Animals such as the mountain goat with a thick layer of fur and rosy finch with plentiful body fat are well adapted to the high wind and low temperature conditions of Utah's alpine biomes.

## FOREST

The **Forest biomes** of Utah are found wherever a high number of trees and other plants grow together. Utah's mountains provide a variety of forested areas to study and enjoy from lower elevation deciduous and mixed forests to sub-alpine conifer forests. The **deciduous and mixed forests** are biomes characterized by relatively mild temperatures and plenty of rainfall. Deciduous trees have large, flat leaves in order to

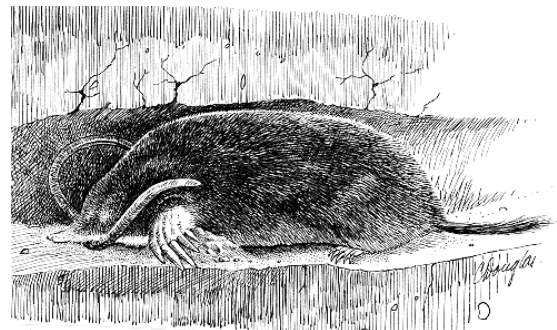


photosynthesize as much as possible before harsh winter conditions force them into dormancy. Seeds produced by deciduous plants attract animals like squirrels that store or eat them and thus help to distribute seeds to other parts of the biome. This is an adaptation that has proved beneficial to animals as well as plants. Other plants have adapted bad tasting fruits to discourage animal consumption in order that the seeds may mature properly. Deciduous trees also provide shelter for a variety of animals and give growing conifers protection.

The filtered sunlight of the deciduous forest allows a host of ground loving plants such as ferns, grasses and shrubs to thrive and these support still more animal life. Deer fawns are well adapted to the deciduous forest. Its spotted coat camouflages it in the dappled light of the forest undergrowth.

Mixed forest plants and animals compete for the same resources and usually have special adaptations that allow for the survival of all. Butterflies and moths utilize the same food sources but butterflies do their work during the day while moths do theirs at night eliminating direct competition and allowing both to thrive.

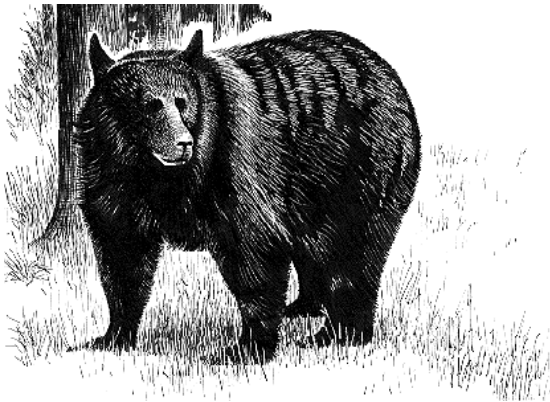
The soil in the deciduous or mixed forest is topped with a humus of nitrogen rich organic matter from plant and animal remains that are decomposed efficiently by bacteria and



earthworms. Shrews and moles are deciduous forest animals that are adapted to living underground and feeding on decomposers such as earthworms.

**Coniferous forest** biomes occur at higher elevations than deciduous forests and are therefore slightly different in climate and environmental conditions. The summer season is very brief and conifers grow quickly during this time to take advantage of the sunshine. Instead of broad, flat leaves, conifers have adapted needle-like leaves that fall off the tree slowly and one at a time (evergreen), leaving plenty of leaves to produce food year round. The small surface area of conifer needles means less water is lost through evaporation which is an adaptation that allows conifers to live in areas where water is not as available as in deciduous forests.

Needle-like leaves also discourage animals from using conifers as a food source and producing seeds in closed cones ensures that they will not all be promptly consumed. Animals such as the Red crossbill birds have adapted a very strong tweezer-like beak for removing seeds from cones. The sparse branches of evergreen trees are not attractive to most animals as shelter. These adaptations limit animal life in the coniferous forest and make for less competition among the organisms that make it their home. Some animals have adaptations that allow them to live in the forest all year long. The moose wanders over a wide range in order to find food throughout the year while rodents such as chipmunks, squirrels and mice hibernate over the winter. Carnivores are protected during cold seasons in this biome by a coat of thick fur and bears use stored fat to nourish them through winter months.

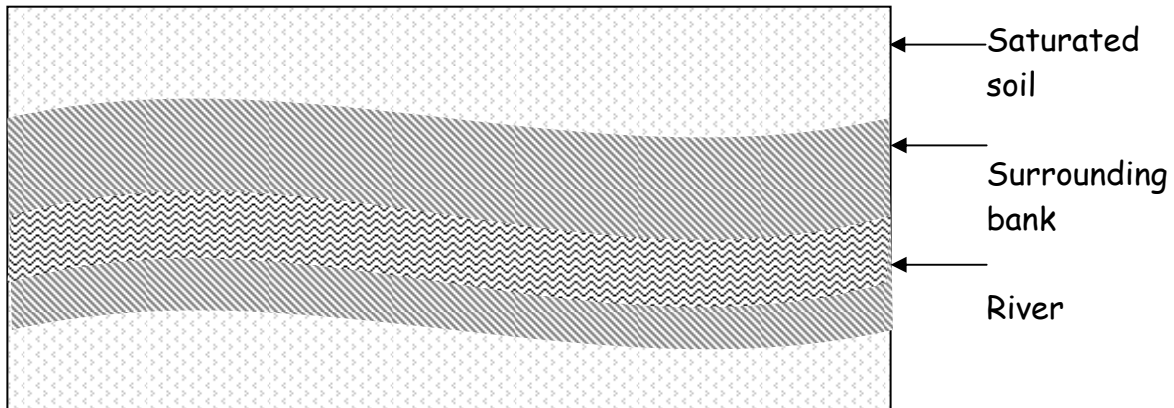


Because higher elevations have lower temperatures, most decomposers such as earthworms and bacteria cannot survive here. The result is slower decomposition of organic matter making the soil less nutrient rich.

Conifers tend to allow little sunlight to filter through to the forest floor so undergrowth is much less likely to thrive here than in deciduous forest areas. Due to the low light conditions many types of fungi are able to live under conifers and provide nutrition for parasitic plants that have adapted the ability to survive by feeding off of fungi.

## WETLAND

**Wetland** biomes are characterized by the presence of standing water or heavily water soaked soil. Bodies of water such as ponds, rivers, marshes along with their surrounding areas are examples of wetlands. For example, a river is merely the backbone of a wetland body with the surrounding banks acting as muscle (or a place in which to grow or shrink) and the saturated soil beyond the banks acting as the protective layer (or an area that filters and buffers harmful influences). A river in high water years may need to use much more of its whole area than in low water years.



The soil in a wetland biome filters pollutants and heavy minerals carried by water from higher elevations and act as a sponge to absorb excess moisture in high water years thereby reducing flood danger. If wetland biomes are drained or plant life disturbed severe flooding of the surrounding areas will occur and the main water body will become tainted by in-flowing pollutants. Wetlands may also become tainted if bacteria and algae species grow unchecked because of the loss of organisms that feed on these life forms.

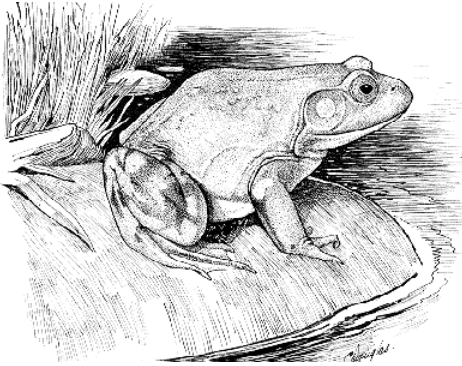
Due to the high moisture levels in the wetland animals and plants must be properly adapted in order to survive. Mink are well adapted to this biome because of their webbed hind feet and sleek fur, which help them to swim efficiently and thereby capture prey such as fish, amphibians, water birds and muskrats that would be inaccessible to them otherwise. Wetland plants have a variety of adaptations that allow them to thrive in constantly wet conditions. The cow lily has leaves or pads that are leathery to let water run off easily and are long stemmed in order to stay afloat.



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ZSA, Center for Aquatic Plants,  
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They also act as a home for small wetland invertebrates such as snails and provide food for a variety of organisms.



Frogs, toads and salamanders have adapted wet, slimy skin as a precaution against drying out in case conditions in the wetland become unfavorable for them. They also hibernate in order to survive cold temperatures provide food for other animals and keep invertebrates such as mosquitoes, mayflies and leeches in check. Frogs and toads act as environmental indicators of water quality as well.

When a wetland is polluted, amphibians will be visibly and physically effected alerting people to unfavorable conditions.

## DESERT

Dry, rocky or sandy soil and the scarcity of available surface water characterize desert biomes in Utah. Days are hot and nights tend to be very cold. Nevertheless, a variety of plant and animal species thrive in Utah's deserts.

The Mojave Desert region (the southwest corner of the state) is home to the Joshua tree, endangered desert tortoise, roadrunner and Gila monster. A member of the only family of venomous lizards, the Gila monster is able to use its venom to capture prey, an adaptation that makes up for the slow and lethargic nature of this animal.



Likewise, plants in the hot desert have adaptations that enable them to survive. The yucca has a long root for finding deep water and fibrous sharp leaves, which discourage browsers. Leaves are shaped in a way that any available moisture is funneled directly to the base of the plant. Other desert plants may have thick pads instead of leaves to store as much water as possible or spines to discourage animals from eating them. Still other plants rely on animals for their survival.

The mesquite tree acts an oasis of shade, moisture and protection for desert animals. This tree evolved during the Pleistocene when large browsers like camel, wild horse and mastodon distributed mesquite seeds throughout their western North American range. The Spanish introduced modern grazers like cattle and horses to the west in the 16<sup>th</sup> century. These animals foraged on mesquite seedpods and the tree once again had the means for seed dissemination.



Many rodent species in the cold (high) deserts of Utah have adaptations that allow them to utilize the same food sources while avoiding direct competition. The kangaroo rat is able to forage in open areas because of powerful hind legs that help it to move quickly and super-sensitive hearing to detect predators. Pocket mice forage close to clumps of vegetation for the protection they offer and deer mice are able to forage when temperatures force other rodents into hibernation. Rodents provide food for other desert animals like coyotes, snakes and owls.



Burrowing owls prefer the abandoned burrows of prairie dogs, badgers and skunks. This adaptation allows the owl to conserve its energy for finding food. Many desert animals live in burrows for the protection they offer and for the moisture that is created by simply breathing in a small space. Other desert animals forage or hunt at night in order to avoid the hot sun.

