UTAH Master Naturalist

Desert Wildlife Field Book

Mark Larese-Casanova

UtahStateUniversity
COOPERATIVE EXTENSION

UTAH Master Naturalist

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How to Use this Field Book:

The Utah Master Naturalist Desert Wildlife Field Book is meant to provide you with an annotated look at some of the common, rare, and invasive wildlife of Utah's desert ecosystems. This book provides photographic examples of each species along with useful information on the species' life history and ecology. When used along side a detailed field guide, this book will help you learn about wildlife during your desert explorations. Have fun!

Contents:

All photos are courtesy of Mark Larese-Casanova (Utah State University) and various public open sources, unless otherwise noted. Cover photo © Joe Ford.

All wildlife maps are courtesy of Utah Conservation Data Center at the Utah Department of Natural Resources. Color-coded maps indicate habitat value for each species. Red=Critical, Yellow=High, Green=Substantial, and Blue=Limited

Antlion
Family Myrmeleontidae

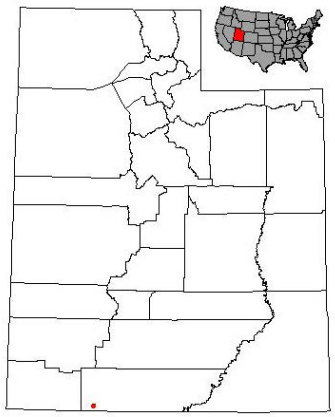
- Often called doodlebugs
- Larva builds a pit/trap in the sand
- Feed upon ants that fall into the pit

Approximately 89 species of antlions are found throughout the United States. Antlions are in the order Neuroptera, along with lacewings, and the adult form resembles these flying insects. It has a long slender body and two sets of long pointed wings. They are not strong flyers, and do not often take flight. The eggs are laid in sand.

Antlion larvae are often known as doodlebugs, and are more squat and ferocious looking than the adults. They have a broad oval abdomen, thin thorax, and head with long shearing mandibles. The larvae dig several cone-shaped pit traps in the sand, and lie in wait at the bottom. When an ant or other small insect falls into the pit, the antlion's large jaws are waiting to catch it. If the prey escapes the antlion will attempt to throw sand to knock it back into the hole.

Coral Pink Sand Dunes tiger beetle
Cincidela limbata albissima

- Endemic to the Coral Pink Sand Dunes
- Federal Candidate for listing
- Adults live on dune tops, larvae in swales
- Adults eat other insects
- Threatened by catastrophic events and ATVs



The Coral Pink Sand Dunes tiger beetle is currently recognized as a subspecies of the tiger beetle. It is a small population only found in a 9 mile long area of the Coral Pink Sand Dunes just north of the Arizona border in southwestern Utah.

The Coral Pink Sand Dunes tiger beetle is 1-1.5 cm (0.4-0.6") long, with a pale pink or green abdomen bisected by a dark stripe, an iridescent green head and thorax, pale hair on its legs, long antennae, and large powerful mandibles.

Adults are predators of other insects, which are captured in the beetle's mandibles. They are found roaming over the tops and in the swales between dunes. Larvae live in individual burrows down in the swales, which are more protected, less dry, and have more small invertebrates on which the larvae can feed.

The small population size, estimated to be 1270 in 2000, makes the Coral Pink Sand Dunes tiger beetle more susceptible to catastrophic events, such as natural disasters, weather events, or disease. Small populations are also in greater danger of deleterious mutations spreading through the populations and reducing the species' ability to survive. Other dangers include ATV use, which is popular in the sand dunes, as well as collecting. A Conservation Agreement was passed in 1998, banning ORVs from the beetle's habitat. Since then, the Coral Pink Sand Dunes tiger beetle has been a Candidate for federal protection. Genetic analysis has suggested that it should be considered a separate species, which would greatly increase its case to be federally protected.

Tarantula

Aphonopelma iodius

- Live in burrows
- Release urticating hairs as a defense
- Prey subdued by crushing, then digested externally, and consumed
- Eats insects, other spiders

Tarantulas are the largest spiders found in the southwestern United States. They are typically brown or reddish brown, sometimes with geometric patterns on the thorax. Tarantulas have four pairs of segmented legs, and powerful jaws flanked by two pedipalps (used in feeding and mating), which look like reduced legs. Tarantulas, like all arachnids, have an exoskeleton and breathe through 'book lungs,' a series of abdominal vents that allow for gas exchange between the atmosphere and the spiders circulatory system.

The genus *Aphonopelma* contains the species that are found in the United States. They occur in the western part of the country in desert ecosystems. They live in burrows and are rarely seen. Males are more often seen outside the burrow, especially in the late summer and fall while they are looking for females. They eat insects and other spiders that are captured and crushed with the pedipalps before being injected with venom, which begins the digestive process. The tarantula has a very efficient digestive system, and a single meal will last the spider for weeks. In turn, bats, birds, foxes, and other large desert animals will eat tarantulas. They are also used as a food source by the larvae of parasitic wasps.

For defense, tarantulas will bite or fling urticating hairs from its belly with its back legs. These hairs have tiny barbs and sting the attacker. Like any animal if it is harassed it will defend itself, and a tarantula bite is very painful. However there are no recorded deaths resulting from a tarantula bite. Chemicals in tarantula venom have many possible applications in pharmaceuticals – treating Parkinson's, Alzheimer's, or heart arrhythmia – and agriculture as an insecticide. Many cultures have revered tarantulas as guardians of portals to the underworld (their burrows).

Tarantula hawk

Hemipepsis spp.

- Also called the pepsis wasp
- One of the largest wasps
- Aposematic coloration
- Usually nectarivorous
- Paralyzes and lays an egg on a tarantula, on which the larva feeds

Tarantula hawks are parasites that specialize on tarantulas. The wasp is very large, up to 50 mm (2″) in length. Its body is metallic blue-black, and the wings are orange-red. The aposematic coloration of the wings is a warning to predators of the wasp's painful sting, the most painful of any insect in the U.S. or Mexico. The wasp is not aggressive, and will only sting if it is threatened. Pepsis wasps are found throughout the southwestern United States and into northern Mexico. Adults primarily feed on nectar, particularly from milkweed flowers.

The tarantula hawk gets its name from its method of reproduction. After mating, the female digs a burrow and begins seeking out a tarantula. To lure the tarantula from its burrow she will vibrate the web at the mouth of the tarantula's home, simulating prey caught in the web. When the tarantula emerges, expecting a meal, it instead receives an incapacitating sting from the wasp. The venom paralyzes the tarantula, and the wasp drags it into the prepared burrow. Once inside burrow, the wasp lays an egg on the back of the spider. When the larva hatches, it will eat the tarantula alive before metamorphosing into an adult wasp.

There are many different species in the parasitic wasp family. Many reproduce similarly to the pepsis wasp, others parasitize other parasitic wasps. These wasps lay eggs on prey already paralyzed by another wasp species, and their larvae hatch first and eat the original eggs. Others will even wait for the other wasp's larvae to hatch before first eating the original larvae, then eating the prey. Since most of this activity results in the death of the 'host,' it is not considered true parasitism.

Mormon cricket

Anabrus simplex

- Also called the Mormon cricket
- Flightless, but migrate in large groups
- Damage rangeland and crops during migration
- Feeds on a wide variety of forbs

The Mormon cricket, a shield-backed katydid, is blue-black with long antennae and a plate on the back right behind the head. It has wings, which are reduced and incapable of flight. It has a fat body; adult males weigh about 3.5 g, and females slightly more than 4 g.

The Mormon cricket occurs throughout Utah, where populations fluctuate between years. The exact ecological reasons for this are unknown, but climate variation and predation certainly play roles. Natural predators include California gulls, hawks, crows, rodents, and digger wasps. People have also utilized these outbreaks as food sources for thousands of years (roasted Mormon crickets have been found in fire pits dated to 200 BC). In high population years, when the population exceeds the food resources available, Mormon crickets will move en masse in search of food. Despite their inability to fly, the migrating bands can still cover a mile a day, and up to 50 miles a year. Mormon crickets will eat any succulent forb; milkvetches, penstemon, balsamroot, dandelion, mustards, as well as saltbrush, sagebrush, and agricultural crops. These migrations can be an economic catastrophe for rangeland or agricultural areas.

Males call for female attention soon after reaching its adult morph, as it only lives about 3 weeks after reaching the adult phase. The eggs are laid in the summer, develop throughout the fall, and become dormant in winter. The nymphs hatch in the cool early spring, find shelter during the night, and emerge to bask in the morning sun for several hours before feeding. The nymphs are mobile, and may form migrating bands. Nymphs go through many instars during the 2 to 3 months it takes to reach the adult stage. Adults also migrate, but is more directed.

Darkling beetle

Eleodes obscurus

- Common beetle worldwide
- Larval stage is mealworm
- When threatened, raises abdomen and emits a foul odor
- Preyed upon by grasshopper mice

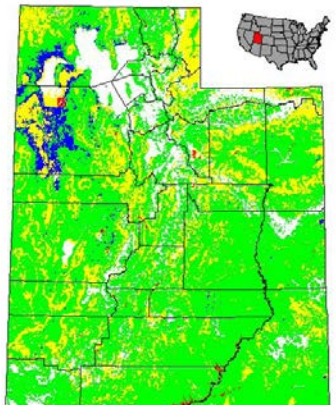
The darkling beetle belongs to the family Tenebrionidae, which is a family of beetles found all over the world. There are an estimated 1400 species of darkling beetle in the United States alone. The species common in Utah is jet black, with ridges along the wing covers and serrated antennae. It will eat primarily plants and decaying organic material, or sometimes small animals. It is a particular pest towards stored grain. Its larvae are mealworms, which are sold as bird, fish, or reptile food in pet stores.

The wings are reduced, and the beetle cannot fly. It compensates for its inability to fly away with a chemical defense. When the beetle is disturbed it raises its backside towards the unfortunate harasser and sprays a foul-smelling, oily substance from its abdomen. This behavior gives it another common name, the stink beetle. The only Utah predator that does not avoid darkling beetles is the grasshopper mouse. The rodent has found a creative way to neutralize the beetle's defense. It grabs the beetle and sticks its abdomen into the ground before the beetle can release its noxious spray. The mouse can then eat the beetle without being sprayed.

Great Basin spadefoot toad

Spea intermontana

- Found throughout Utah
- Generalist of dry habitats
- Efficient at digging in loose soil
- Dormant most of the year, emerge during warm spring rains



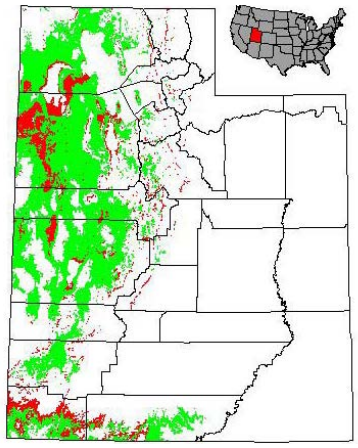
Great Basin spadefoot toads are a common throughout the intermountain west. Spadefoot toads spend most of the year, both the hot and cold seasons, in burrows underground. They may dig these burrows themselves with their spade-feet or inhabit ones made by other burrowing animals. To avoid desiccation during this dormancy, urea levels in the blood are elevated, increasing the amount of water that diffuses from the soil into the toads skin. During the first warm spring nights, typically in April, evening rains will drive the toads out of hibernation. They will migrate to breeding grounds, where the males call for female attention. Breeding ponds are in still water, sometimes in permanent bodies and sometimes in seasonal or rain-fed pools. The proportion of temporary to permanent pool use increases eastward through the toad's range, because the rain shadow from the Sierra Nevadas results in less regular precipitation in the western Great Basin.

Since the toad has historically relied on temporary breeding pools, the juvenile stage is very short. Hundreds of eggs are laid in spring or early summer, depending on availability of breeding pools. They hatch after 2 or 3 days and metamorphosis is complete after around 5 weeks. Long before this, after the front legs are developed, tadpoles will venture out of the water, perhaps to evade aquatic predators. Food availability, temperature, predation, and size of the remaining pool determine the size of larva at metamorphosis. The tadpoles will maximize larval growth if the resources are available and predation risk is low, or become smaller adults if resources are limited or the risk of growing large is too high. When threatened or injured the toad's skin secretes an irritating chemical, which can burn the eyes, cause allergic reactions, and probably taste foul to predators.

Great Basin collared lizard

Crotaphytus bicinctores

- Found throughout Central and Mojave Basin & Range
- Feeds on lizards, insects, spiders, and some plant material
- Males are aggressively territorial, display on top of rocks
- Inactive during the cold winter months



Great Basin collared lizards are found throughout arid habitats in the western United States. They are large for western lizards, up to one foot long including the tail, and have distinctive markings. The collar, for which it is named, is three bands around the neck, alternating dark-light-dark. Males become more colorful during the breeding season, with reddish bands down the back and a blue-black fold of skin (a dewlap) on the chin that it displays when threatened or when courting females. The more brightly colored eastern collared lizard (*Crotaphytus collaris*) occurs in similar habitats in southeastern Utah.

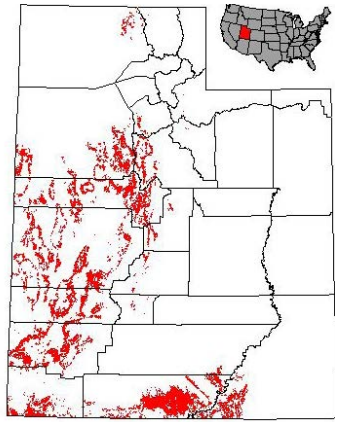
Great Basin collared lizards typically inhabit hilly, rocky desert shrublands in the Mojave and Sonoran basins, as well as in southwestern Utah and in isolated populations in the southeastern part of the state. They are very tolerant of heat, active during all but the hottest hours of the day; in the colder winter months these lizards become dormant. They do not climb well, and are usually seen sunning themselves on low rocks. If threatened they dart into a burrow or rock pile. Lizards will only run for short period of time, because they are incapable of breathing while they run.

Male collared lizards are particularly territorial during the breeding season in the spring. They will hold their ground and display when approached. These displays involve 'push-ups,' pumping their body up and down with the forelimbs, and display of the dewlap. They are aggressive, particularly during the breeding season, and will bite very hard. The lizard will rise up onto its hind legs while running. Females lay eggs in the summer. This lizard is omnivorous. It feeds on insects, spiders, other lizards, small snakes, leaves, and flowers. In captivity, collared lizards will also eat mice and small mammals.

Desert horned lizard

Phrynosoma platyrhinos

- Found throughout Utah's deserts
- Inhabits open areas
- Color variation suits surroundings
- Feeds on invertebrates, primarily ants
- Females are oviparous



Horned lizards live in dry, open habitats. Because of this, they rely heavily on camouflage as a protective mechanism. Coloration typically matches the colors in a population's habitat. Horned lizards have compact, spiny bodies, and the size and distribution of the neck-fringing spines and scale patterns are the best ways to differentiate between species. The desert horned lizard is lives throughout the Great Basin, generally at lower altitudes than the short-horned lizards, though the ranges overlap in much of Utah.

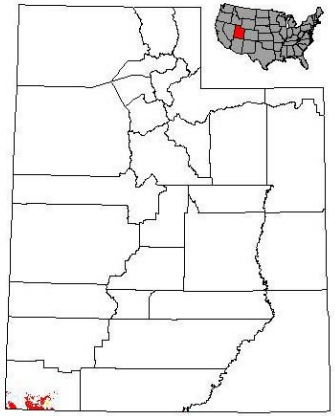
Horned lizards primarily eat ants, specializing on them to varying degrees, which has shaped the evolution of horned lizards considerably. Ants are distributed in concentrated patches, and horned lizards move between several and colonies in a day. Ants are small and not particularly nutritious, with a high proportion of indigestible chitin exoskeleton. Because of this, horned lizards must eat hundreds of ants each day. This necessitates a large stomach, resulting in a larger ratio of stomach size to body size than any other lizard species. Large stomach size reduces speed and mobility, making fleeing a less viable escape option and increasing dependency on camouflage.

Horned lizard populations have decreased considerably with increased development in their habitat, and they are listed as threatened species in many western states. They are also popular as pets, so many are taken out of the wild and sold. Sadly, horned lizards are nearly impossible to keep alive in captivity. Disturbance to the lizard's habitat promotes the growth of invasive grasses, which outcompete native bunch grasses, reducing suitable open habitat for horned lizards. Fire ants from South America are disrupting southwestern ecosystems by out-competing native ant species. Horned lizards are not adapted to eat fire ants.

Banded Gila monster

Heloderma suspectum

- Utah Sensitive Species
- Found only in the Mojave Basin & Range
- Venomous saliva
- Eats eggs, small mammals, lizards, and insects
- Threatened by habitat loss and collecting
- Very secretive (active on spring and summer, but often underground)



The Gila monster is the largest lizard in the United States and one of only two venomous lizards in the world. It can reach a length of 2 feet, including the tail. It has a broad body type, with fat reserves in the tail and body, and very muscular jaws. The venom is released down grooves in the teeth, instead of through hollow fangs as it is in some snakes, and is chewed into the flesh. They are found in sloped rocky desert habitats with scattered shrubs, grasses, and cacti, usually near water.

Gila monsters are rarely seen. They forage in the day for eggs, small mammals, lizards, and insects. They have large fat stores, slow metabolism, and can eat up to 35% of body weight in a single meal (young Gila monsters can consume 50% of their own mass). As a result the lizards leave their underground burrows very rarely, potentially less than 5 times a year. They are seen above ground most often in the late spring, during the breeding season. Males use their tongues to smell females, and initiate mating. The female lays from 1-12 eggs underground, and incubation lasts 10 months.

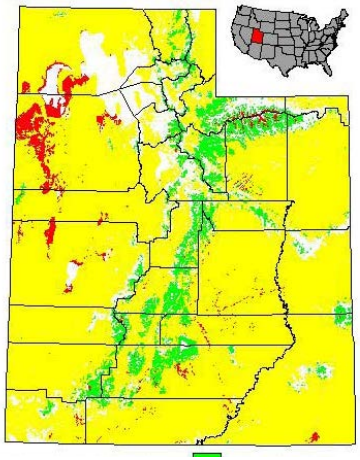
Gila monsters hunt by scent, flicking their tongues to smell like most snakes. The venom is about as toxic as the western diamondback rattlesnake, but not as much is released in a bite. Gila monster bites are still excruciatingly painful, by virtue of the lizard's massive, muscular jaws and protein degrading venom. They are usually attributed a benign attitude, and will not bite unless provoked. Compounds in the venom are being researched as promising components in medicines for type 2 diabetes.

Gila monster populations have decreased considerably in the face of development. They are protected in all the states where they occur. Dangers include the destruction of habitat, loss of food resources, and illegal collection.

Great Basin gophersnake

Pituophis catenifer deserticola

- Habitat generalist
- Females are oviparous
- Mimic rattlesnakes when alarmed
- Prey are subdued by constriction



Great Basin gophersnakes are a common species throughout North America. They are large- as long as 7 feet, but typically less than 5 feet long. The body is tan or cream colored, with dark blotches along the back and tail, and smaller markings along the sides. Gophersnakes are often mistaken for rattlesnakes because of their size, similar markings, and similar behavior when threatened. However, the body and head of gopher snakes are much more slender than those of a rattlesnake. Additionally, gophersnakes do not have a rattle at the end of their tail. Gophersnakes are considered harmless to people, yet are often killed because they are mistaken for venomous rattlesnakes.

Great Basin gophersnakes live in many different habitats, including grasslands, shrublands, riparian areas, woodlands, desert, and agricultural lands. The behavior of the gophersnake, including times of day most active and breeding season, varies with temperature across these different habitats and elevations. Gophersnakes hunt for small mammals, birds, eggs, and sometimes lizards and insects. They capture and kill prey with constriction, either in the snake's coils or against the side of a burrow. Eggs are laid during the summer, and hatch after 2-2.5 months. Hatchlings are over a foot long.

When threatened, the gopher snake mimics a rattlesnake. It inflates its body, hisses, and will vibrate the end of its tail against dry vegetation, producing a sound similar to the rattle of a rattlesnake. This mimicking behavior, as well as the similar markings, is a defensive adaptation; the gopher snake takes advantage of other animals' instinct to avoid rattlesnakes. Ironically the similarity results in many of these snakes being killed by humans.

Western rattlesnake

Crotalus oreganus

C. o. concolor

C. o. lutosis

- Habitat generalist
- Females are viviparous
- Feeds on small mammals, birds, lizards, and amphibians
- Prey are subdued with venom
- Great basin (*C. o. lutosis*) found throughout Central Basin & Range
- Midget faded (*C. o. concolor*) found throughout the CO Plateau

The western rattlesnake is a common viper found throughout the western U.S., from central Washington to the Grand Canyon. Its coloration varies from straw-yellow, pinkish, tan, gray, brown, cream, or olive. It has dark blotches on the back, which are darkest on the outside ring. The head is triangular, characteristic of venomous snakes. It is a pit viper, meaning it has heat-sensing organs on either side of its face, which are used to seek out prey. The fangs are long, hollow, and retractable. They are connected to the venom glands and are used to inject venom into the prey. The rattle is made of keratin, the same protein in fingernails and hair, and a new section is added each time the snake sheds its skin.

Western rattlesnakes live in a wide variety of habitats. They inhabit desert scrubland and grassland in the Mojave and Great Basin deserts, open conifer woodlands, rocky canyons, high plains, and foothills. They are found in elevations up to 8000'- fairly high for reptiles. To survive cold winters, the snakes hibernate together in large colonies underground, generally on south-facing slopes.

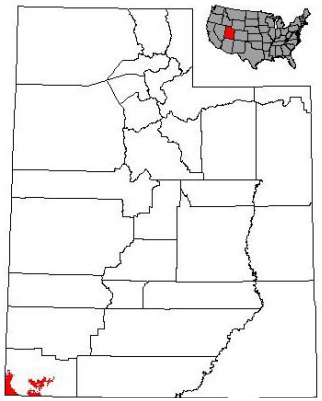
Western rattlesnakes feed predominantly on rodents, whose heat-producing metabolism is easily detected by the snake's heat-sensing glands. However, they will also eat birds and lizards. The prey is struck with the fangs, which release protein-degrading venom that immobilizes and begins digestion.

Two subspecies of the western rattlesnake are found in Utah. The Great Basin rattlesnake is found in the western part of the state. It is somewhat larger than other western rattlesnake populations, reaching up to 4 feet in length. The midget faded rattlesnake is found on the Colorado Plateau. It is slightly smaller than typical western rattlesnakes.

Desert tortoise

Gopherus agassizii

- Beaver Dam Slope population in Utah is Federally Threatened
- Construct and sometimes share burrows in sandy soil
- Herbivorous generalists
- Threatened by habitat loss



Desert tortoises are large, slow moving land turtles, with high domed shells, scaly skin, and long claws. The tortoises are sandy brown, weigh up to 50 lbs, and have shells over a foot in length. Males have a longer gular horn protruding below the head, which is used in male-male combat over mating opportunities. The plastron (bottom plating) has a concave shape near the back, which fits over the female's shell.

The Beaver Dam Slope population in southwestern Utah is part of the Mojave subpopulation, which can be found in desert valleys, semi-arid grasslands, canyon bottoms, and rocky hillsides. The tortoises dig extensive burrows under rocks and in sandy soil, using their long claws and front legs.

Mating occurs from spring to fall. Males fight with each other for receptive females by posturing, head bobbing, and ramming into one another. The female may wait until spring – after hibernation – to lay eggs, or lay them in the fall, in which case the eggs will not hatch until spring. Temperature heavily affects the speed at which eggs develop and the sex of the young turtles. Many predators, from ravens and Gila monsters to large mammalian predators, will eat the young. The only natural predator that can break the adult's shell is the mountain lion.

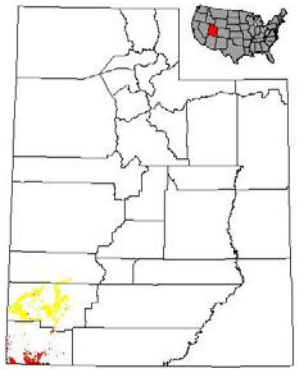
Desert tortoises eat almost anything they can reach including low growing shrubs and forbs, fallen leaves, bark, fruits, flowers, succulents, and grasses. They will also drink large amounts of liquid water when it is available.

Desert tortoise populations have been reduced drastically in the last few decadesdue to habitat loss, introduced or more prevalent predators, road collisions, poaching, wildfire, and other problems associated with development.

Costa's hummingbird

Calypte costae

- Found in the Mojave desert
- Feeds on nectar, but insects are an important protein source
- Females construct nests of feathers and plants bound with spider silk
- Males are gregarious



Costa's hummingbirds are small even by hummingbird standards. They weigh a mere 0.1 ounce on average, and measure about 3 inches in length. Costa's hummingbirds are migratory, with summer breeding ranges in the deserts of the southwest, including the very southwestern tip of Utah.

Costa's hummingbirds primarily feed on nectar from plants adapted for hummingbird pollination. These include desert honeysuckle, barestem larkspur, desert willow, and penstemons. It supplements this protein-deficient diet with small insects.

The breeding season varies depending on latitude, but always occurs in the spring. The female builds a nest out of plant matter, feathers, and spider silk in cactus, Joshua tree, or other shrubs or trees. The male's display involves broad loops in the air and high-pitched calls. The female typically lays 2 eggs, and the young hatch after an incubation period of 15-18 days. The young leave the nest after 3 weeks, and are sexually mature by the next year's breeding season.

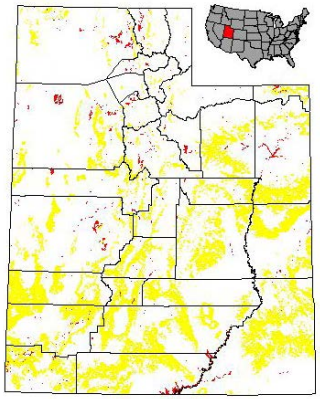
Costa's hummingbirds enter a torpid state on cold nights,during which their hearts beat about 50 times a minute, compared to 500-900 beats per minute of a fully active bird.

Habitat loss is the major threat to the Costa's hummingbird. Urban and suburban settings, with gardens and hummingbird feeders, can support hummingbirds. But the small size of the Costa's hummingbird means it is typically out-competed in these resource-intensive areas by other hummingbird species. It is more adapted to dry desert habitats, where it doesn't face such severe competition.

Cliff swallow

Petrochelidon pyrrhonota

- Nests in large colonies throughout North America
- Common in Utah's deserts
- Usually eats flying insects, but sometimes berries
- Builds gourd-shaped mud nests on cliffs, bridges, eaves
- Often parasitizes neighboring nests



Cliff swallows are migratory songbirds common during the summer throughout the United States. They have long, pointed wings, a small beak, and weak feet; these are traits typical of swallows. They feed by catching flying insects midair and have remarkable flying abilities.

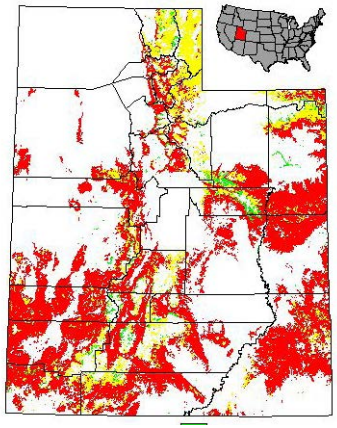
Cliff swallows are very social, nesting in colonies sometimes numbering in the thousands. The nests are constructed of mud and lined with grass in large clusters on vertical or overhanging surfaces, such as the sides of cliffs, under bridges, or on buildings. Cliff swallows gather nesting material at communal mud pits, where they also court and mate. Fighting over nest material and nest sites is common. Since constructing a nest can take 1200 trips to the mud hole to complete, it is not surprising the birds will take advantage of a closer source, their neighbors' nests. Individuals will also try to deposit eggs into others' nest, either by entering the nest and laying or by carrying an egg in their beak and dropping it in. A pair typically has only one clutch of 1-6 eggs per year. The young will leave the nests and join in a group of similar-aged birds, called a crèche. Parents can recognize their young by specific calls, as well as by the young's distinct plumage.

Human development within the nesting range of cliff swallows has on the whole helped cliff swallow populations. Cutting of forests and expanse of agriculture typically increases the number of insects. Construction of bridges and buildings in open spaces give the swallows more places to build nests. The bird is considered helpful to people because it feeds so heavily on insect pests, but is often considered a nuisance when it nests on buildings. Other names for the cliff swallow are the crescent swallow or mud swallow.

Canyon wren

Catherpes mexicanus

- Fairly common in Utah deserts
- Nests and forages in steep canyons
- Feeds on insects and spiders
- Highly adapted for finding food in cracks in rocky canyons



The canyon wren is a small songbird found in rocky canyons in western North America. It makes its home in crevices in canyon walls, which provide shelter and shade. This remote and secluded habitat makes the canyon wren one of the most unstudied birds in Utah. The canyon wren has a very distinctive song, usually sung by males during the mating season. It is a cascading series of liquid notes, followed by a buzz. This song can be heard in canyons throughout southern and eastern Utah. Canyon wrens are non-migratory, cold winter weather limits canyon wren distribution.

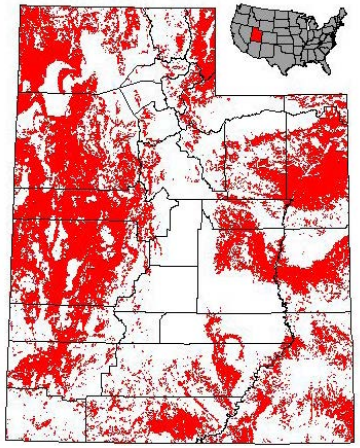
Canyon wrens forage for insects and spiders in their rocky habitat. They are usually found in canyons with running water, though they have not been observed to drink water. It is hypothesized that canyon wrens get all the water they need from their insect diet, and live near water due to higher concentrations of insects. The canyon wren has a modified skull, with the spine meeting the skull higher than in most other birds, and a slightly flattened skull. This, along with its long beak, is an adaptation that allows the bird to reach its head further into cracks to reach insects.

Canyon wrens form monogamous pairs that can last over multiple breeding seasons. Both the male and female help to build a nest out of twigs and grasses, lined with animal hair, lichens, soft plant matter, cobwebs, and feathers. The female incubates the clutch while the male forages and brings her food. Typically 5 eggs are laid, which are incubated for 12-18 days. Both parents help care for the young, which can forage and feed themselves after just ten days.

Sagebrush sparrow

Artemisiospiza nevadensis

- Found throughout Utah's arid lands
- Populations affected by declines in sagebrush habitat
- Opportunistic omnivores that forage on the ground
- Nests built of sticks and grass



The sage sparrow is a medium sized sparrow found in arid sagebrush and greasewood shrublands throughout the western United States. Although it is usually a migratory bird, resident populations occur in the southwestern tip of Utah.

Sage sparrows forage for food on the ground, where they run between shrubs seeking out seeds, insects, spiders, small fruits, and succulent vegetation. Insects make up a higher proportion of the diet during the breeding season, likely because they are more available during the summer. Little liquid water is consumed; the solid diet provides all the water needed. Pairs arrive on the breeding grounds already established. The sage sparrow has a larger territory than other sparrow species, and territories of two different sage sparrows may overlap. The exact components for prime sage sparrow habitat are not well understood, as it seems many suitable open sagebrush habitats are not occupied.

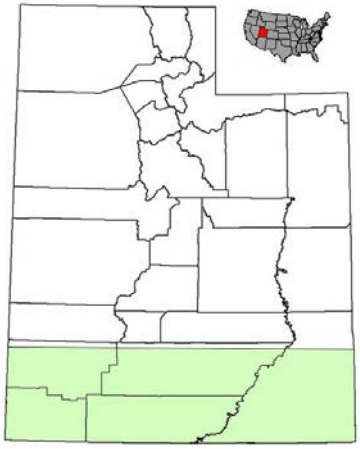
A sage sparrow nest is built from twigs and grasses lined with fur or feathers and is placed in or under a shrub. Each year, 2-6 light blue eggs are laid. While only the female incubates the eggs for approximately two weeks, both parents feed the young. Fledglings leave the nest at around ten days of age even though they cannot yet fly. During this time, parents continue to provide food for the young.

Populations of sage sparrows are for the most part stable. The clearing of sagebrush habitat for grazing or other development is detrimental to sage sparrows.

Southwestern willow flycatcher

Empidonax traillii extimus

- Federally Endangered
- Inhabits riparian habitats
- Found in small numbers along southern Utah rivers
- Feeds almost entirely on insects



The southwestern willow flycatcher is a small bird found in riparian areas in the southwestern United States. It has the largest populations in Arizona, but is also found in Utah along the San Juan and Virgin Rivers. It migrates seasonally, with a winter range stretching from northern South America to central Mexico. Flycatchers feed almost entirely on insects, which they catch mid-flight, during the breeding season, occasionally supplementing with seeds and berries.

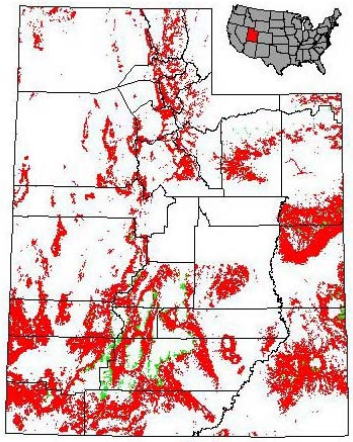
The breeding season occurs in mid-May after the spring migration. The breeding habitat is dense willow, cottonwood, or tamarisk thickets or other wooded riparian areas. The male calls from an exposed branch to attract female attention. The female lays 3, sometimes 4, eggs in a nest made of shredded bark, cattail tufts, and grasses, lined with soft vegetation and feathers. The nest is built near water typically in the crook of a willow tree. The eggs are incubated 12-13 days, and the young fledge (grow feathers for flight) two weeks after hatching. Nest parasitism by brown-headed cowbirds is common and can severely impact reproductive success. When the young cowbirds hatch, they outcompete the other chicks for the parent's attention, or even push the flycatcher young out of the nest. The mother does not notice that she is caring for an alien species even when the cowbird grows to twice her size. Trapping cowbirds has been studied as a method for conserving flycatcher populations. Fall migration occurs at the end of the breeding season in late summer.

The southwestern willow flycatcher is federally listed as endangered. Loss of healthy riparian habitat in the breeding range is the largest cause of population decline. Most conservation efforts focus on the restoration and conservation of suitable riparian habitat.

Western scrub-jay

Aphelocoma californica

- Common statewide, but rare in Cache County and the West Desert
- Found in oak shrublands and pinyon-juniper woodlands
- Opportunistic omnivores
- Cache seeds that helps propagate plants
- Female incubates, but males share in care for young
- Stay in family flocks for the first year



Western scrub-jays are common in the western United States. Previously known as simply the scrub jay, this species was split into 3 different species in 1996. Oak and juniper scrub, pine and oak woodlands, and riparian areas are all prime habitats for the western scrub-jay. It is an opportunistic feeder and will eat almost anything it can catch including insects, small vertebrates, eggs, fruits, acorns, and seeds. Subpopulations vary in beak morphology depending on the main food source. In oak dominated habitats the beak is broad and strong, while in pinyon pine habitats the beak is much more slender. These different adaptations allow the bird to more efficiently access the available food sources. The western scrub-jay is a particular pest for fruit and nut farmers, and sometimes raids the nests of other birds.

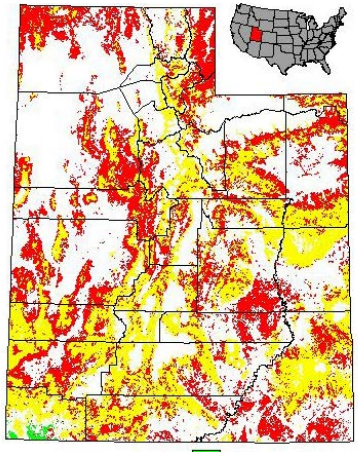
Scrub-jays have several interesting behaviors that have ecological implications. They will stand on the backs of mule deer to feed on the parasites in the hair. This helps the deer rid itself of parasites and provides the bird with an easy meal. If either member of this mutualistic pair notices a predator it will flee, warning the other. Scrub-jays also have remarkable capacity to remember the location of various seed caches, but some are inevitably forgotten and germinate, helping to establish new plant populations.

Scrub-jays are members of the Corvid family, which includes magpies, ravens, and crows. All members of this family show high levels of intelligence, as well as long-lasting bonds between mating pairs. Scrub-jay pairs work together while foraging and raising young. A pair typically has only one brood per year. Families stay together until the young are a year old and the parents begin another brood.

Loggerhead shrike

Lanius ludovicianus

- Common in Utah year round
- Sit-and-wait predator of insects, small mammals, birds, and reptiles
- Impales prey on thorns or barbed wire to aid in feeding or to store for later



Loggerhead shrikes are migratory, and found throughout North America at different times of the year. The summer range is from southern Mexico to central Canada. It can be found in Utah year-round. Loggerhead shrikes prefer to spend time near open areas with adjacent cover, like riparian areas surrounded by shrub or grassland.

The loggerhead shrike is one of the few known predatory songbirds. It perches in a tree or shrub and watches for prey out in the open. When prey is sighted it swoops in and surprises the prey. It lacks strong talons to tear its prey apart, and must skewer the food on a tree thorn, cactus spine, or barbed wire fence to give it leverage. The shrike will leave the animal skewered and come back to it, a gruesome sight to come across. It eats mostly mice and other small mammals, and will also feed on large insects, amphibians, reptiles, or even small birds. Its beak is stout with a distinctive hook at the end, which is used to sever the prey's spinal cord.

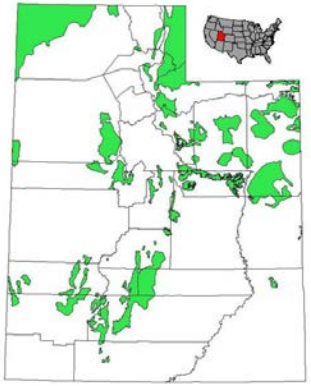
The mating season begins in April. Hunting plays an important role in social relationships. The male kills more prey than is necessary during the beginning of the breeding season to display his dominance and prowess as a provider. A pair builds a cup-shaped nest and lays 4-7 eggs.

Shrike populations have declined in the last century due to loss of habitat across their range. The overall population is still large, but it is considered endangered in several states and some subpopulations in the West are threatened with extinction. The U.S. Fish and Wildlife Service has proposed listing the loggerhead shrike as Endangered.

Greater sage-grouse

Centrocercus urophasianus

- Widely distributed throughout Utah
- Feeds on sagebrush, other plants, and insects
- Lekking species with elaborate courtship



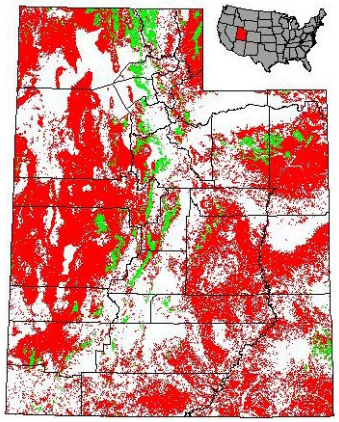
The Gunnison sage-grouse is widely distributed throughout Utah. The Greater sage-grouse is considered an indicator species for healthy shrubland habitats. This is because large populations of the grouse require access to several different types of habitat; from open sagebrush with diverse grass and forb cover to dense stands of tall sagebrush, as well as robust wet meadow or riparian areas. They feed on sage, forbs, and other plants, along with insects.

The Greater sage-grouse has a very elaborate mating display, which takes place in April and early May. It begins with the male strutting forward while raising and lowering the wings and bobbing the head back and forth. The wings brush against the white chest feathers and produce a swishing sound. The male also produces a bizarre noise with the air sacks on the breast. These displays occur in lek areas, where large numbers of males gather together to display for the females. This behavior establishes dominance, and females will ignore all but the most dominant males.

The similar Gunnison sage-grouse, a recently recognized species, has been recently proposed for listing as Endangered by the U.S. Fish and Wildlife Service. Habitat loss from increased road construction, dams, and extensive fossil fuel exploration has greatly reduced the populations of Gunnison sage-grouse. Lek counts in 2007 estimate that only about 5000 birds remain in the wild. The Audubon Society recognizes them as one of the 10 most endangered birds in North America, and the U.S. Fish and Wildlife Service has proposed its listing as Endangered.

Burrowing owl
Athene cunicularia

- Utah Sensitive Species
- Found throughout Utah's deserts
- Nests in mammal burrows
- Eats a variety of insects and small vertebrates



Burrowing owls are small owls found throughout North and South America in dry grass and shrublands and other habitats that support burrowing mammals like prairie dogs, ground squirrels, or badgers. Burrowing owls nest in abandoned burrows, which are enlarged and lined with dry vegetation. They will also collect dry horse and cow manure to line the entrance to the burrow, which is thought to help disguise the owl's scent.

For the most part, burrowing owls disappear during the fall and winter in the most northern part of their range. This implies that the birds migrate south; however, some populations do overwinter. The breeding season, when owls are certainly present in Utah, begins in late March or April.

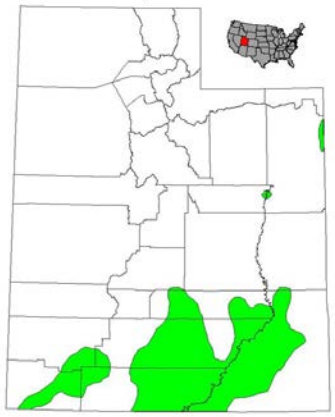
Burrowing owls are mostly monogamous, though males have been observed with multiple mates. The male tends to establish and defend the burrow while attempting to attract a female. The ensuing courtship displays include flashing the white markings, cooing, bowing, scratching, nipping, and swooping up and down or circling in the air. The female lays about 6-9 eggs in the burrow. During incubation, the male brings food to the female and guards the burrow. The young emerge fromt he burrow and begin hunting insects 6-8 weeks after hatching.

Burrowing owls are more diurnal than most owl species. They have different hunting methods, from perching or hovering above the ground to watch for prey, to chasing down insects on the ground. Food habits change with what is most available. Insects provide a large portion of the diet. They will also feed on rodents, reptiles, amphibians, young rabbits, bats, and birds.

Mexican spotted owl

Strix occidentalis lucida

- Federally Threatened
- Inhabits steep, rocky canyons
- Adults feed almost entirely on rodents such as packrats, and young feed mostly on insects, including beetles



The Mexican spotted owl is a medium-sized owl found in mountainous regions in the southern United States and northern Mexico. In Utah, it is found in canyon habitats in the southern and eastern portions of the state. The owl's preferred habitat varies across its range. In Utah, the Mexican spotted owl nests and roosts in shaded canyons, but occasionally forages in forests near canyon rims. It is theorized that it roosts in these habitats because it cannot tolerate high temperatures for long periods of time, and these habitats provide much cooler microclimates.

Composition of diet, as determined by pellet analysis, also varies across the geographic range. In Utah, rodent remains--particularly woodrats--are most common in pellets. Mexican spotted owls also feed on many other types of rodents, as well as rabbits, bats, birds, reptiles, and arthropods.

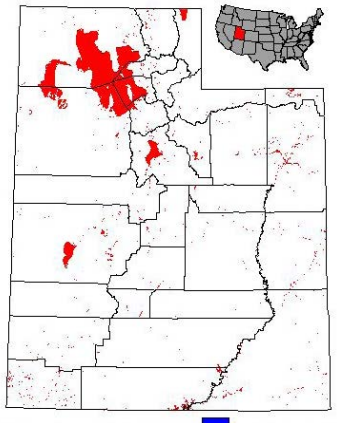
Mating occurs in March, and eggs are laid in late March or April. The female incubates the eggs for 30 days, leaving only to defecate, regurgitate pellets, and to receive prey brought by the male. The eggs hatch in early May, and the parents continue to feed the young for the extant of the summer. By mid-July, the owlets can pounce and tear at prey, usually insects. Owlets leave their parents' care in mid-September to early October. Owls do not breed every year, and reproductive success is very low.

Mexican spotted owls are federally listed as threatened. Loss of habitat is a major factor in the population decline. Major impacts to habitat in Utah include fire, grazing, oil and gas mining, loss of riparian habitat, roads, and recreation. Remaining populations are fragmented, yet seem to still have high genetic diversity.

Peregrine falcon

Falco peregrinus

- Utah Sensitive Species
- Found throughout the world, but rare in UT
- Populations declined historically due to DDT use, but have largely recovered

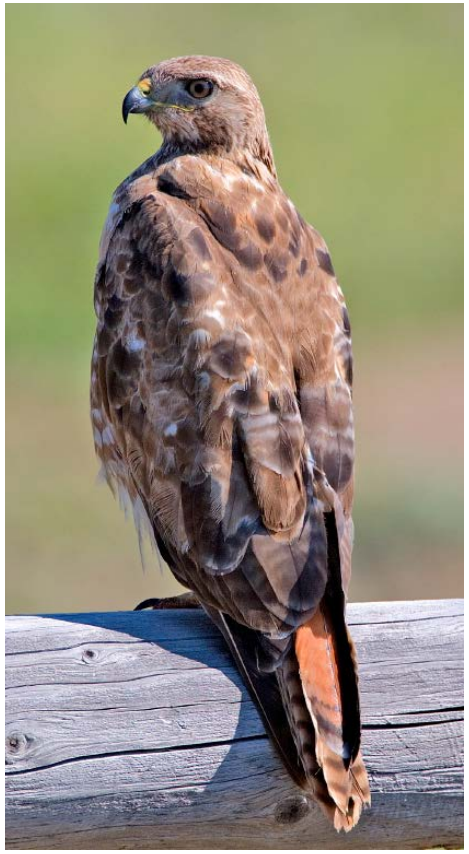


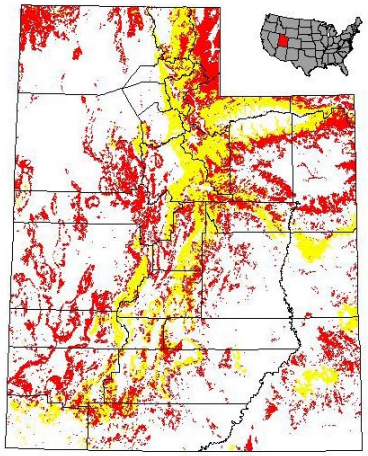
The peregrine falcon is a bird of prey found throughout the world. Peregrine falcons seek out open habitats near water like grasslands, shrublands, and tundra. They often make scrape nests on cliff ledges in rocky or mountainous areas. They are active in the daytime, feeding mostly on other birds, predominantly doves and waterfowl. When prey is sighted, a peregrine falcon folds back its wings and dives, potentially reaching speeds of 200 miles per hour. The peregrine somehow controls this freefall and makes contact with the prey talons first. If the impact doesn't kill the prey, the falcon severs the vertebrae with its beak. In Utah, they have been historically common near the wetlands of Utah Lake and the Great Salt Lake.

There was a significant decline in peregrine numbers in the last hundred years. Research showed that DDE, a derivative of DDT, caused weaker eggs that could not support the weight of an incubating adult, leading to increased clutch failure. Another primary main cause of peregrine decline is loss of habitat. As settlers moved into the West, peregrines were targeted as pests, and people stole eggs from nests to use in falconry. Development of wetlands reduces the number of prey species available. Some populations have adapted to urban landscapes, nesting on ledges of skyscrapers and feeding on pigeons. This, along with large-scale conservation, captive breeding, and reintroduction efforts has bolstered the number of peregrines. They are no longer on the endangered species list, though are still considered a sensitive species in the state of Utah.

Red-tailed hawk

Buteo jamaicensis





- Most commonly seen raptor in UT
- Hunts from a high perch in open areas
- Feeds on rabbits, small mammals, birds, and reptiles
- Monogamous for life, often returning to the same nest

Red-tailed hawks are the most common bird of prey in Utah. They are well adapted to many different habitat types including scrub desert, mountainous shrub and grasslands, patchy woodlands, as well as urban parks and agricultural fields and pastures. Red-tailed hawks prefer to live in open habitat with sporadic elevated vantage points to perch and watch for prey or to build nests. Some populations are migratory, although many occur year-round in Utah.

Red-tailed hawks form strong bonds between mating pairs, typically only broken when one of the pair dies. They court by soaring together in circles and trying to touch the other with the talons. The nests are made of twigs and lined with soft vegetative material, and built in tall trees, on telephone poles or other structures, or on the sides of cliffs. Each pair produces a brood of 1-5 eggs every year. Both parents take turns incubating the nest while the other brings food. The chicks hatch in 4-5 weeks, after which the female spends more time in the nest. The young stay with the parents after fledging learning to fly and hunt. The female is aggressive in defending the area around the nest, and the male in defending the territory borders.

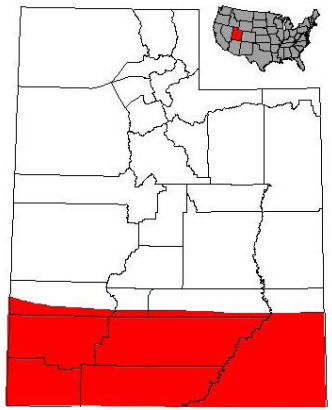
Red-tailed hawks hunt during the day, using their keen eyesight to see prey moving far away. They either wait on a perch or soar high above on thermal updrafts until prey is sighted, then swoop down to strike with the talons. They eat mostly small mammals, as well as reptiles and other birds.

In many instances human encroachment into red-tailed hawk habitat has actually helped populations. Clearing of forests increases the amount of suitable hunting habitat, and telephone poles and other structures make good nesting and perching spots.

California condor

Gymnogyps californianus

- Federally Endangered
- Populations declined due to DDT use
- Scavengers of carrion
- Nest in cliff cavities, laying one egg every other year
- Colonial roosters
- Observed in Utah, but only one recorded nest



California condors are the largest flying bird in North America. They live in arid regions with rocky slopes and cliffs, and eat carrion, which they find by sighting other scavengers that initially locate a carcass. Condors nest on protected cliff ledges. They are susceptible to disturbance, and will not roost or nest near busy roads or development. Condors are very large birds, with wingspans of nearly 10 feet and total weight of 20-25 lbs. They are also somewhat social. They mate for life, and will roost in colonies. The head is featherless to avoid collecting bacteria from the carrion on which it feeds.

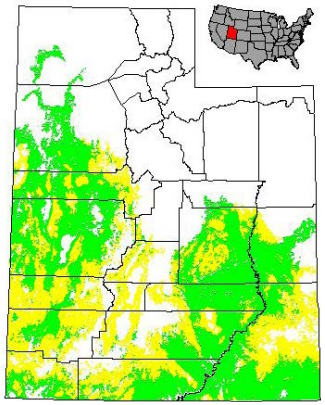
California condors were once found along the entire Pacific coast. Population declines were caused by many factors. The loss of wilderness habitat was very detrimental. Agriculture, urban development, and natural resource harvesting drove the condors away from historic habitat. Poisoning of condors is also a major problem, since they may eat poisoned meat left by ranchers for coyotes. California condors are also susceptible to bioaccumulation of DDT, which contributed to weaker egg shells and clutch failure. The greatest current threat to condors is lead poisoning from firearms.

California condors are one of the most threatened of all bird species. In 1987, the last wild condors were captured after the total wild population fell below ten individuals. Since then, captive breeding and reintroduction has led to two wild populations, though these populations are not particularly stable. A nesting pair produces only one egg every two years, and young condors are not sexually mature until their 6th year. While California condors are frequently observed in southern Utah, the first successful nest since reintroduction was recorded in the state, at Zion National Park, in 2014.

Western pipstrelle

Pipistrellus hesperus

- Inhabits western deserts
- Smallest bat in UT
- Feeds longer each day than any other bat in UT
- Hibernates, but sometimes active in winter



The western pipistrelle is a bat species found throughout Utah. It is the smallest bat species in the United States, and the most abundant species living in desert habitats. They are typically found in rocky canyons, cliffs, or outcroppings where it can find refuge in cracks high above the ground. It is also found in dry brushlands, grasslands, and forests at higher elevation, and will live beneath rocks, in mines, buildings, or other human-made structures, and possibly in burrows abandoned by kangaroo rats or other rodents. Pipistrelle habitats must have good maternity roost sites, where mothers can raise their young undisturbed, as well as a reliable water source.

Western pipistrelles are one of the most diurnal bat species. They leave their roost in the late evening, often before sundown, to begin the night's hunt. They are sometimes seen even earlier in the day seeking out water. Pipistrelles are insectivores; they feed on many different types, but prefer soft-bodied insects. They hunt by echolocation, which is typical of carnivorous bats. Western pipistrelles have a high metabolism, and must consume a relatively large amount of insects, about 20% of the bat's weight, every night.

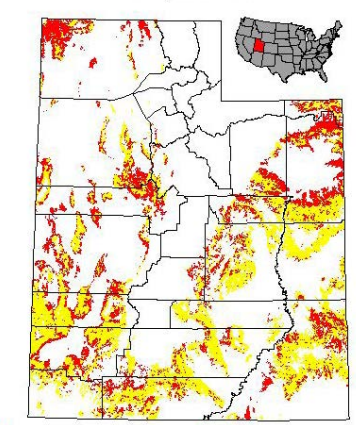
In the winter, the bats will hibernate- particularly females and populations in higher and colder habitats. Males are seen more often in the winter than females, because they often migrate to lower elevations.

Pipistrelles affect insect populations, which can impact pollination, herbivory, and disease transmission in the ecosystem. Pipistrille populations are healthy in the west, but loss of habitat and disturbance, particularly during hibernation, are the biggest threats to this species.

Canyon mouse

Peromyscus crinitus

- One of many Peromyscus species in Utah
- Found throughout Utah's deserts
- Nest among or under rocks
- Eats seeds, plants, and insects



The canyon mouse is one of many species in the genus *Peromyscus* found in Utah. Commonly called deer mice, this genus is one of the most prevalent in North America. Canyon mice are found in dry rocky habitats; in Utah this includes everywhere except mountains.

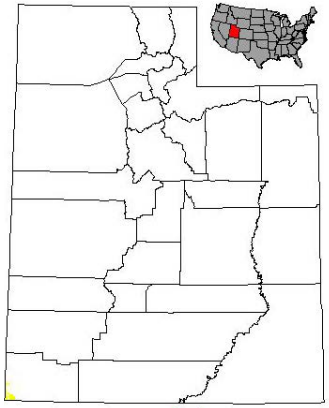
Canyon mice are very well adapted to life on bare rock, and can move along vertical or even overhanging rock walls. They can survive in desert ecosystems eating green vegetation and insects when available, as well as fruits and seeds. They obtain all the water they need from this diet as well. Their small size helps with agility and minimal food requirements.

Canyon mice make their nests either among or underneath rocks. The breeding season stretches through spring and summer. Females have 2-5 young per litter, and can produce multiple litters in a year. The canyon mouse is nocturnal; by spending the daytime under rocks it can avoid the desert heat and reduce the amount of water required. The high degree of adaptability and fast reproduction rate combine to make *Peromyscus* one of the most successful in North America.

Desert kangaroo rat

Dipodomys deserti

- Found only in low deserts with sandy soils
- Nocturnal, lives in burrows
- Active year-round
- Large hind feet for hopping
- Can store food for weeks in cheek pouches



Desert kangaroo rats are the smallest of all kangaroo rats, and are also the most adapted to live in arid habitats. They are found in the very southwestern corner of Utah. The more common Ord's kangaroo rat (*D. ordii*) is found throughout Utah. Desert kangaroo rats dig burrows in sand, and require deep sand that is relatively stable. They mostly eat dry plant matter, mainly sage leaves, creosote, mesquite, and other seeds. They can subsist on this diet without liquid water for long periods.

Like most desert animals, the desert kangaroo rat's fur is light colored, which deflects some of the sun's energy and keeps the rat cooler. Desert kangaroo rat hair is denser than that of other kangaroo rats; this protects them from intense sun. The feet and tail are covered in guard hairs, which also act as protection from the sun. The hind feet have 4 toes and are very large, which helps the kangaroo rat jump in deep sand.

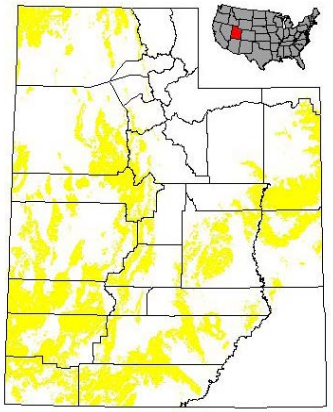
Desert kangaroo rats are solitary animals, and will act aggressively towards other individuals. These aggressive displays include foot thumping and vocal displays. Sometimes temporary colonies will form, with several burrows in the same area, but these disperse if food becomes scarce. The burrows include grass-lined nests and areas to store food. They also have fur-lined cheek pouches, like other kangaroo rats, in which they also store food. Caching seeds also helps increase plant distribution, an unintended result, but an important ecosystem function. Kangaroo rats mostly forage at night.

Mating occurs in from January to July, during which a pair will temporarily cease the typical aggressive behavior. Litters range in size from 1-6 young. They are nursed in the nest for several weeks until fur grows in.

Desert woodrat

Neotoma lepida

- Inhabits arid lands throughout Utah
- Build dens among rocks or vegetation
- Important to paleoecology
- Similar to Arizona woodrat



Desert woodrats, also called desert packrats, are found in arid and semi-arid scublands throughout the western US. In Utah, they are primarily found in juniper-sagebrush, Joshua tree woodlands, and pinion-juniper woodlands. They make their homes from twigs, sticks, other plant material, and rocks in vegetative or rocky cover. They are relatively large for desert rodents, and their size enables them to out-compete other rodents for food resources.

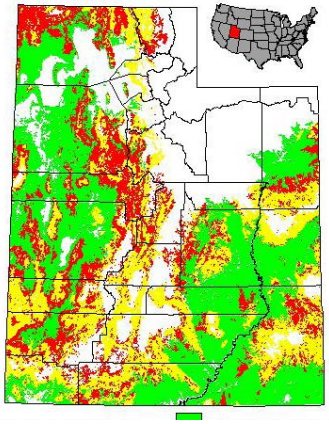
Desert woodrats require a large amount of succulent vegetation in their diet, because they have limited adaptations to reduce the required amount of water. They eat buds, fruits, bark, leaves, and young shoots of many different plant species. In Utah, these primarily include mormon-tea, sagebrush, buckwheat, and mustard plant. Desert woodrats mainly forage during the night, stay under cover of rocks or vegetation, and return to the safety of the den to eat. They collect large caches of food, for which they received the name 'packrat.' These caches are urinated and defecated upon, which can harden and preserve the caches for long stretches of time. Because of this, paleoecologists can gain insight into ancient ecosystems by studying the remains of packrat dens from these times.

Females initiate mating with chemical signals and other behaviors. Males respond with intense sniffing, vocalization, hop and dart behavior, ear wiggling, grooming, and foot thumping. The breeding season lasts from October to May. A litter of average size 2-3 is born after a gestation period of 30 to 36 days. The rats are typically aggressive, and this is particularly true of lactating females. They will, however, adopt orphan young. The young are weaned after 3-6 weeks, and are sexually mature after 2 or 3 months.

Black-tailed jackrabbit

Lepus californicus

- Found in open grasslands or shrublands if Utah's arid lands
- Likely the most abundant rabbit species in Utah
- Feeds on grasses, forbs, twigs, and bark
- Important prey species



The black-tailed jackrabbit inhabits desert shrublands, dunes, prairie, and farmlands throughout Utah, and will eat a variety of vegetation, primarily grasses and herbaceous material, also sagebrush, mesquite, creosote bush, and juniper. Most of the time is spent grazing, and they eat a high proportion of their body mass daily. Most of the water consumed comes from plant sources.

Jackrabbits are true hares, and can be distinguished from rabbits by their long limbs and ears. Jackrabbits get their name from the long ears; they were originally called jackass rabbits. These ears also help the rabbits to regulate body temperature, by releasing excess heat into the air.

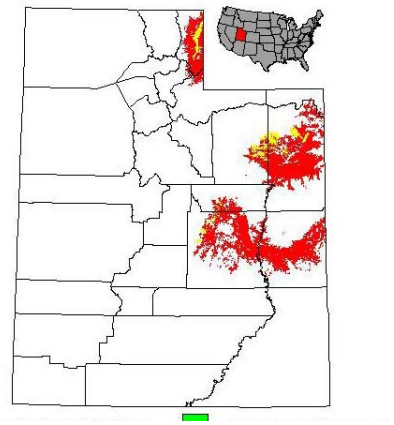
The breeding season for black-tailed jackrabbits is throughout the spring. Gestation lasts between 41 and 47 days. The young (leverets) are born well developed (precocial), and only nurse for a few days before leaving the mother. Since the breeding cycle is so short, females will have 3 or 4 litters in a year. This, combined with the short time before sexual maturity, means that jackrabbit populations can grow very quickly. Rapid growth can result in disease, famine, and mass die-offs. Tularemia can kill 90% of a jackrabbit population in a single year.

Jackrabbits have many means of avoiding predation. They rely on camouflage and speed, covering up to 20 feet in a single bound and reaching 35 mph. When fleeing a predator a jackrabbit follows a random zig-zag course, which makes it hard for the predator to predict the hare's movements and cut it off. Important natural predators include kit foxes and coyotes.

White-tailed prairie dog

Cynomys leucurus

- Live in colonial burrows
- Eats grasses, seeds, and bulbs
- Main food source of the black-footed ferret



The white-tailed prairie dog is one of two common prairie dog species in North America. White-tailed prairie dogs are slightly smaller than black-tailed prairie dogs and are mostly found in dry desert grasslands and shrublands.

Prairie dogs are social creatures, living in colonies over 50 acres in size, with several family clans in each colony. Prairie dog clans do not typically interact much, although they have several different ways to communicate- primarily auditory and visual. When an individual gives a vocal alarm after sensing a threat, it puts itself at greater personal risk. However, this improves the survival of other members of the population.

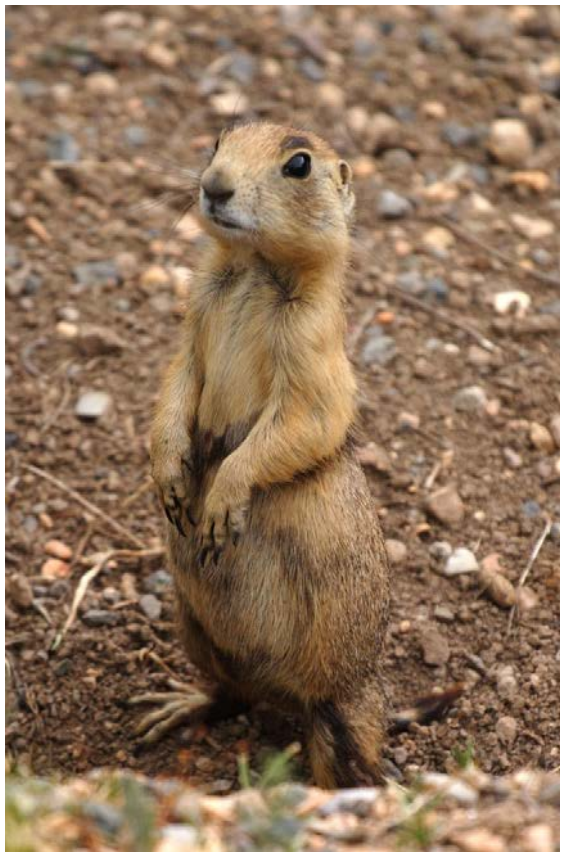
White-tailed prairie dogs hibernate through the winter, unlike other prairie dog species. The breeding season occurs in March and early April, shortly after the prairie dogs emerge from hibernation.

Starting in the early 20th century, farmers and ranchers targeted prairie dogs because they eat crops, compete with range animals for food, and the burrows can be hazardous for grazing animals. Although extermination programs, along with habitat loss to development and agriculture, have reduced the range of prairie dogs, white-tailed prairie dog populations are still healthy and are a low priority for protection.

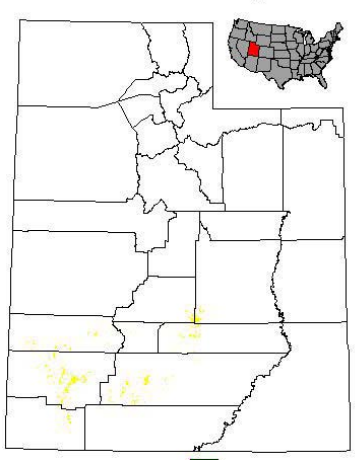
Prairie dogs are a keystone species in desert ecosystems. Many predators, particularly black-footed ferrets, feed upon prairie dogs. The tunnels they dig also aerate the soil, greatly increasing its productivity and water permeability. Once prairie dogs are exterminated from an area, a plant community can collapse due to degraded soil conditions.

Utah prairie dog

Cynomys parvidens



- Federally Threatened
- Endemic to Utah
- Similar to other prairie dog species



Utah prairie dogs are similar to other species of prairie dogs, but there are some key differences. They are the smallest of prairie dog species, and their geographic distribution is the furthest west. They are only found in Utah, with concentrations of colonies along the Sevier River, on the Apawa Plateau, and in eastern Iron County. They are found in grassland habitats where the soil is well drained, since they must be able to dig down a meter without hitting the water table, and the vegetation is not high enough to block their vision.

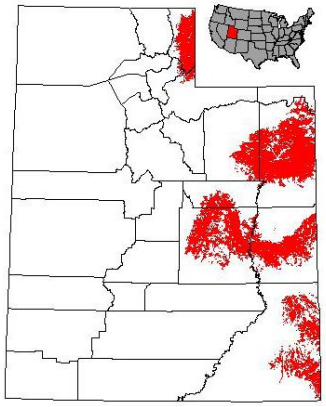
The fur is cinnamon, slightly lighter on the belly, and the tail is white. There are darker patches on the face similar to other prairie dog species. Litter size is slightly smaller in Utah prairie dogs than in other species. They are primarily herbivorous, preferring leafy plants and flowers to grasses. The young eat dead vegetation and cattle feces. They will also feed on insects, unlike other species of prairie dog. They are not seen above ground during November-February, but do not become completely dormant like white-tailed prairie dogs. They build nests within the burrow using dead vegetation.

Utah prairie dogs have also been targeted for extermination in the past. This, along with habitat loss, has reduced their numbers to the point where they were federally listed as endangered. From 1972 to 1989, transplant programs attempted to move the prairie dogs from private agricultural land onto public land. These programs were very effective, and Utah prairie dogs were reclassified as threatened in 1984.

Black-footed ferret

Mustela nigripes

- "Rarest mammal in N. America"
- Federally Endangered
- Live in prairie dog burrows
- Eat prairie dogs



Black-footed ferrets are considered one of the rarest mammals in North America. During the 1980s, they became extinct in the wild, and at this point only three wild populations have been reestablished. The main reason for their population decline is the similar decline in prairie dog populations, which are the ferret's main food source. Ferrets also depend on prairie dog burrows for habitat.

Black-footed ferrets are the only ferret species native to North America. Their historic distribution was throughout the interior United States, as well as Canada and Mexico. They live in grass prairies and rolling hills, habitats suitable for large prairie dog towns. The ferrets require territories of 100-140 acres per individual, and a colony of prairie dogs large enough to provide consistent prey. They will also prey on mice, birds, and insects. Black-footed ferrets use prairie dog burrows for hunting, protection, and to raise young.

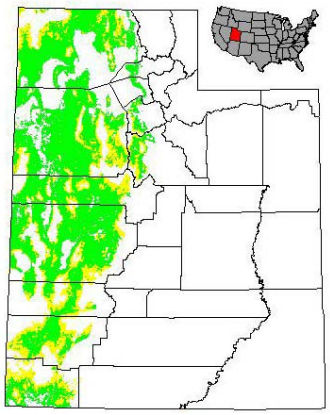
Black-footed ferrets are primarily nocturnal. Even at night, they spend most of their time underground. They do not hibernate, but do reduce the amount of energy expended during the winter. Like most territorial mammals, ferrets mark the boundaries of their territory with chemical signals in scat and urine. These olfactory signals are also used to leave a trail, which helps the ferret find its way back to the burrow after foraging.

The breeding season is in the spring, from March through April. A litter of 1-6 (typically 3 or 4) is born after a gestation period of 35-45 days. The male does not take part in parental care. After a few months the mother teaches the young to hunt and helps them find burrows of their own in the same prairie dog town. In the fall the young are nearly full-grown and begin to disperse to other prairie dog towns.

Kit fox

Vulpes macrotus

- Found in open prairie and desert habitats
- Opportunistic feeder upon small mammals, birds, inverts, and plants
- Primarily nocturnal



Kit foxes are the smallest species of wild dog in North America. The ears, the most distinctive characteristic, are very large in relation to the head. This, along with lanky limbs and light coloration, are adaptations to the desert environment they inhabit.

Kit foxes are found throughout the deserts of Utah. They use underground dens all year round, which they either dig themselves or move into those constructed by prairie dogs, other rodents, or badgers. Kit foxes spend most of the day in the den and emerge at night or during twilight to hunt. They primarily eat rodents and rabbits, though will also feed on reptiles, birds, large insects, carrion, and, if food is very scarce, tomatoes, cactus fruits, and other fruits. Kit foxes are a major contributor in stabilizing rodent populations.

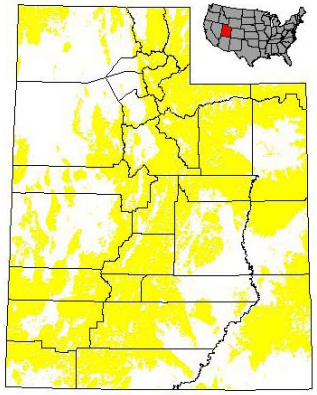
The dens are also used to birth and raise young. Kit foxes are primarily monogamous over their entire life, and both parents help in raising the young. In September, the female begins searching for a new den. The male joins her typically a month later. The foxes mate once a year, sometime in the winter, and the young emerge from the den after a month and are independent after 6 months.

Kit foxes are not particularly territorial; multiple home ranges can overlap without incident. Sometimes, when two foxes meet, there will be a vocalization characterized as a 'hacking growl.' They have excellent hearing due to their large ears, and hunt individually at night. Kit foxes are listed as a species of concern in Utah, and there are conservation efforts in existence. The primary threat to kit fox numbers is combined habitat and food loss. As human development encroaches, the rodent populations typically decline. This reduces the number of kit foxes the area can support.

Mountain lion

Felis concolor

- Once the most common mammal in N. America
- Found throughout the west
- Dependent on mule deer and other mammals



The mountain lion once had the largest range of any North American mammal. Its historical habitat stretches from Alaska to the southern tip of Chile, and from California to Florida. Today, the mountain lion has been isolated in smaller, rugged areas far removed from human disturbance, and American populations are found primarily in the western mountains, with the exception of a small population of Florida panthers.

Cougar habitat is generally determined by prey distribution and the presence of cover, which is vital for hunting. In Utah, the primary food source is mule deer; an adult cat eats approximately one deer a week. The decline in mountain lion numbers is a result of the joint pressures of habitat loss and human attempts at eradication in the name of protecting livestock.

Mountain lions are generally nocturnal, and stalk to within pouncing distance of the prey, often from higher ground on a rock or in a tree, before leaping and chasing down the animal. Their vision, particularly night vision, is advanced, as is the sense of smell, which they use to track prey. The back limbs are strong, and the collarbone is adapted to absorb the shock of landing. The jaw is both tightly hinged to provide powerful leverage and capable of opening wide.

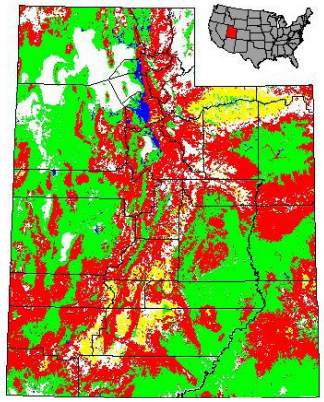
Mountain lions maintain home territories, which overlap with the territories of several females and are demarcated by scent cues in urine or scat. Cubs stay with the mother for as long as two years. For this reason females only breed every other year. However if her litter dies, she will mate again soon after.

Natural predators include other mountain lions, wolves, and bears. Most cougars that die of natural causes are taken by disease or starvation, often caused by broken or worn teeth.

Mule deer

Odocoileus hemionus

- Found throughout Utah
- Habitat generalist
- Popular game animal
- Faced with habitat loss, especially winter habitat



Mule deer are the most common large mammal in Utah, and are found throughout the western US, Canada, and Mexico. The only area in Utah where mule deer are not found is in the desert west of Great Salt Lake. Mule deer are named for their large ears, which enable them to hear predators.

The mule deer is a ruminant, enabling it to feed mostly on browse. However, to meet its nutrition requirements, it must have an adequate supply of succulent new growth on woody shrubs, small trees, and other plants. If the population grows too large, the animals will begin feeding on the older, woodier growth of trees and shrubs.

The rut begins in November after the animals have molted. Females remain in related bands, while males are more solitary, sometimes forming groups of unrelated individuals during the non-mating months. Snow will drive them to migrate to lower elevations in winter.

Mule deer are important primary consumers in any ecosystem they inhabit. They are important food for carnivores; large enough to be worth the energy expended hunted while small enough to be easily captured. Common predators of mule deer include mountain lions, coyotes, bobcats, golden eagles, feral dogs, and black bears.

Because of their popularity as a game animal, mule deer are an economic asset, particularly if healthy populations enable large harvest quotas. In areas that commercially harvest timber, particularly Douglas fir and Ponderosa pine, mule deer can be detrimental to forest regeneration. Expanded highways through deer habitat have led to many traffic collisions, which kill deer, put people in danger, and damage property.

American bison

Bison bison

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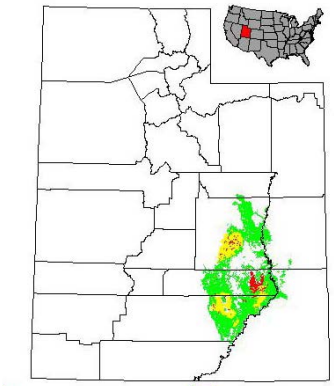
- Once common throughout N. America
- Henry and Book Cliff Mtns have the only free-roaming herds in the contiguous US
- Prefer plains, grasslands, and open woodlands



Pre-Columbian populations of bison were estimated at 60 million. They were vital components in grassland ecosystems and for many Native American tribes. By 1890, wholesale slaughter and rail lines segmenting the remaining habitat had reduced the bison population to several hundred individuals.

More recent efforts have increased bison populations. Most conservation involves semi-domestic herds of bison, like the ones on Antelope Island. These herds are allowed to roam free during the summer months when food is plentiful, and are fed and receive medical treatments (inoculations, screenings, etc) during the winter.

The Henry Mountain bison herd, found in south-central Utah, is different from most others. The bison are completely wild, and spend the entire year grazing in and around the Henry Mountains. Bison were first introduced to the area in 1941, and since then the herd has multiplied to over 400. This herd is one of few genetically pure bison herds left in the world. More recently, bison were introduced to the Book Cliff Mountains in eastern Utah.

Bison are gregarious animals, with females and calves grouping together, and males grouping in winter. Some males are solitary throughout the year. There are historical records of plains bison grouping together in herds of thousands. Both male and female groups have linear dominance structures.

Bison are grazers, and eat mostly grasses. If food is scarce, they will also eat other types of dry vegetation. They consume on average 1.6% of their body weight each day, and must have access to water every day.

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COOPERATIVE EXTENSION