

SAGE-GROUSE HABITAT IN UTAH



A GUIDE FOR LANDOWNERS AND MANAGERS

SAGE-GROUSE HABITAT IN UTAH

A GUIDE FOR LANDOWNERS AND MANAGERS

Acknowledgments

This guidebook was first inspired when we received a copy of Idaho 'Sage-grouse Habitat in Idaho A practical guide for landowners'. We soon realized the need for a similar publication for Utah. We relied heavily on Idaho's layout, leg work, and overall concept to assist us with this effort. As such we extend a big thanks to the Jeffery K. Gillan, Eva K. Strand, and Gretchen Hyde for their previous hard work to develop this concept.

A huge personal thank you goes out to Kait Arndt who worked for long hours to put the guide together. We appreciate her artistic creativity, computer skills, and input; we could not have done it without her expertise. Additionally we thank Todd Black for his maps, editing efforts, and many photos found throughout the guide; Jason Robinson for his drawings, and we thank others who provided photos, assisted in the proofing process, and our partners in the Utah Community Based Conservation Program Efforts at Utah State University and the Local Sage-grouse Adaptive Management Working Groups.

—Utah Sage-grouse Community Based Conservation Program
www.utahcbcp.org June 2011

This guidebook was compiled by:

Kait Arndt, Graphic Designer

Todd A. Black, Utah State University Ext CBC

Special thanks go to the following:

Terry Messmer, Utah State University Ext CBCP

Jason Robinson, Utah Division of Wildlife Resources

This guide was made possible from grants from the following sources:

Utah State University Extension Service

Utah Division of Wildlife Resources

Utah Bureau of Land Management

USFWS Partners Program

Utah Natural Resource Conservation Service

Foundation for Quality Resource Management

Utah's CWMU Association

S.J. and Jessie Quinney Foundation Service

Jack H. Berryman Institute

Contents

Identification	2
Reasons for Concern	10
Decline	
Grazing Impacts	
Habitat	
Life Cycle	20
Breeding and Nesting	
Leks	
Nesting and Early Brood-Rearing	
Nesting Habitat	
Late Brood Rearing	
Autumn and Winter	
Sagebrush Steppe Plants	40
Sagebrush	
Grasses	
Forbs	
Steppe Succession	
Conservation Planning	54



Foreward

The loss and fragmentation of sagebrush (*Artemisia* spp.) landscapes in the West has caused the decline of sage-grouse (*Centrocercus* spp.) range-wide. The grouse depend on sagebrush dominated landscapes for food and cover. Sagebrush is critically important for the ultimate survival of the grouse. As a landscape species, its conservation will require the effort of many people.

In Utah, the Division of Wildlife Resources, federal land agencies, university researchers, private landowners, and concerned citizens are leading efforts to reduce threats facing the grouse.

This guide book is largely an illustrated synthesis of Utah's Greater Sage-grouse Management Plan (2009). Although the information in this guide is based on the best scientific information available, it was written to extend what is known about sage-grouse and their habitat to landowners

and managers and is not to be cited as a scientific document.

The intent of this guide is to assist landowners in recognizing characteristics of productive and favorable **sage-grouse habitat** and to assist in providing informed conservation practices. The focus of this book is on ranching, as opposed to other land use activities. This is in part because of the importance of ranching in Utah and because grazing is a major land use that occurs throughout sage-grouse habitat.

We recognize that those who work on the landscape can play a significant role in conserving sage-grouse and the habitat. As such, as you work to implement changes through conservation, we hope you will find this guide useful. For specifics in treatment design, grazing management, fencing, and sage-grouse management, please talk with your local expert as this book is designed to provide a starting point to assist you in your overall operation.

Identification

The greater sage-grouse (*Centrocercus urophasianus*), often called a 'sage chicken' in Utah, is the largest grouse species in North America. Adult males can reach weights exceeding 7 pounds and wing spans of 2.5 feet and can be twice the weight of the females. Both the male and female sage-grouse are brownish-gray with marks of drab gray and white and have a very distinguishable black belly patch. The male can be distinguished from the female by its white breast and neck feathers, while the female is



more plainly colored from head to toe. Both sexes have long pointed tails and are noticeable in flight and in display by the males.

Sage-grouse are a relatively long-lived upland game bird species and, once they reach adulthood, can often live 5 or more years.

2



3



A male greater sage-grouse in full strut and breeding plumage. Note the white breast, long pointed tail feathers and olive eye-cone. Deseret Ranch Rich County, Utah. 1

A female greater sage-grouse. Note the mottled color and the black breast feathers. Deseret Ranch Rich County, Utah. 2

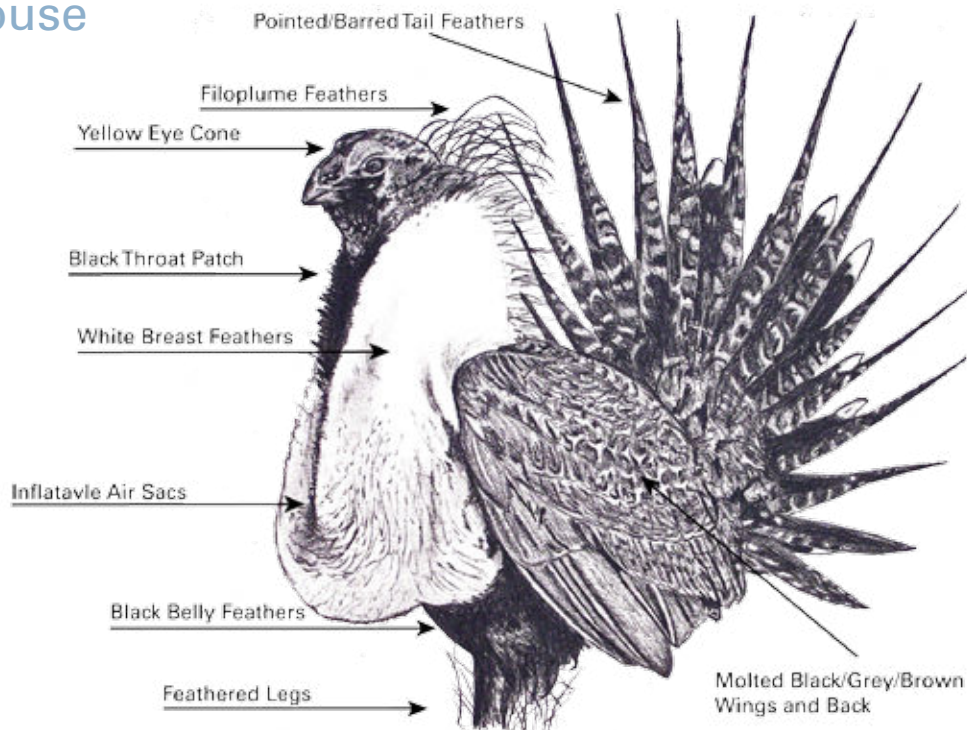
A 1-2 week old greater sage-grouse chick. Like most upland game species, the chick blends into its surroundings. Deseret Ranch Rich County, Utah. 3



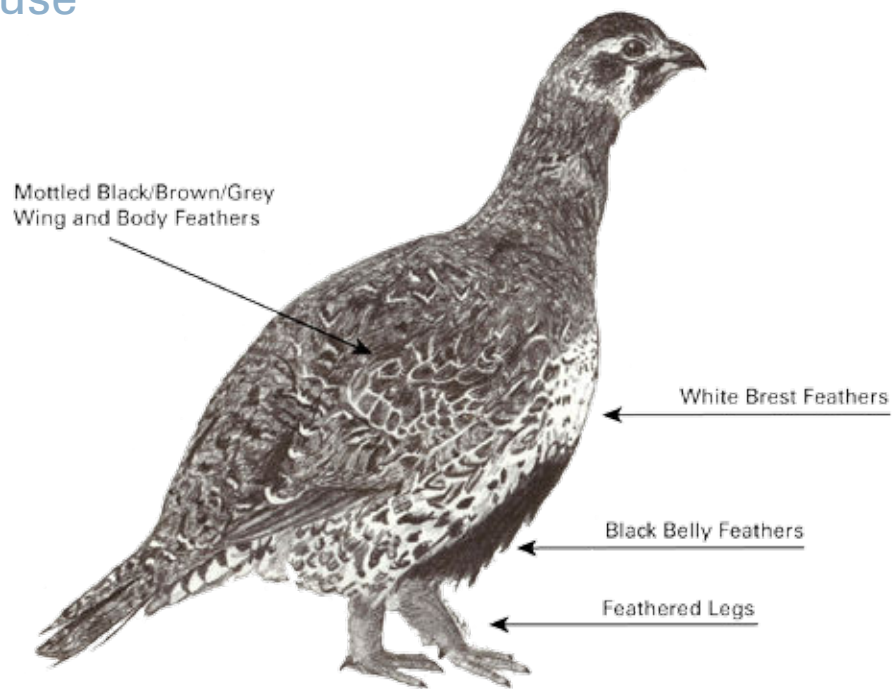
- 1 Sage-grouse eggs are similar in size to chicken eggs, and are cream/olive colored with brown spots.
- 2 Sage-grouse tracks are similar in size and shape to chicken tracks.
- 3 Feces excreted at night look similar to a small patch of tar.



Male Sage-grouse



Female Sage-grouse



LOOK-A-LIKES

Several other upland game bird species may occur in sage-grouse habitat at different times of the year. Some species may be hard to distinguish in the field, but a trained eye, binoculars, and a good bird field book are helpful. Sage-grouse are the only species with a black belly patch. The three species below are those most likely to be misidentified as sage-grouse.



Dusky Grouse (*Dendragapus obscurus*)

Similar in size to sage-grouse, the blue-grouse, or pine hen, is blue-grey in color, is less mottled than and has rounded instead of pointed tail feathers.



Columbia Sharp-tailed Grouse

(*Tympanuchus phasianellus columbianus*)

Smaller in size than the sage-grouse with a shorter pointed tail, white underparts, brown and white coloring, and a slight crest on their head.



Female Ring-necked Pheasant

(*Phasianus colchicus*)

Female ring-necked pheasants are smaller than the sage-grouse and have a long narrow tail with unfeathered legs.

Decline

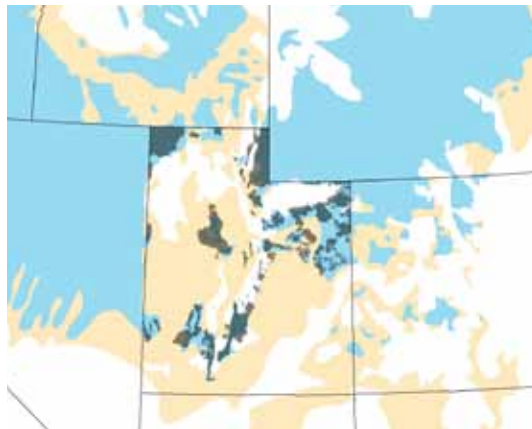
Currently, greater sage-grouse can found in sagebrush habitats located in 11 western states and 1 Canadian province, totaling about 454,000 square miles. Utah's habitat and populations account for about 11% of the range wide population. A large portion of Utah's sagebrush rangelands provide suitable habitat for sage-grouse comprising over 11,000 square miles. Biologists estimate that sage-grouse occupy a range limited to 41% of what it once

Sage-grouse Range

Occupied range Utah

Current Range

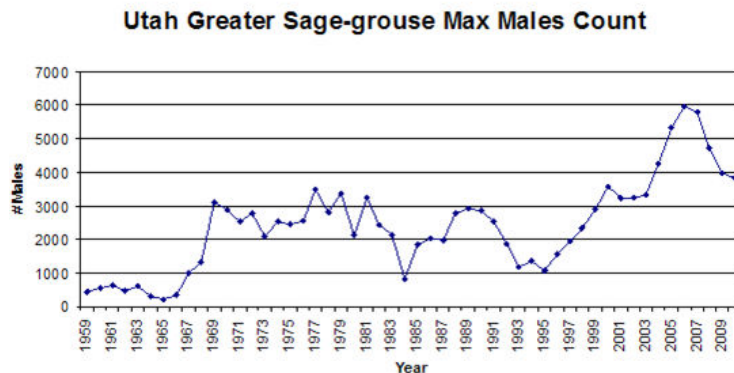
Estimated Historical Range



did prior to human expansion. Determining exact population numbers is impossible, but biologists monitor yearly population fluctuations. Monitoring of sage-grouse populations starts in the spring

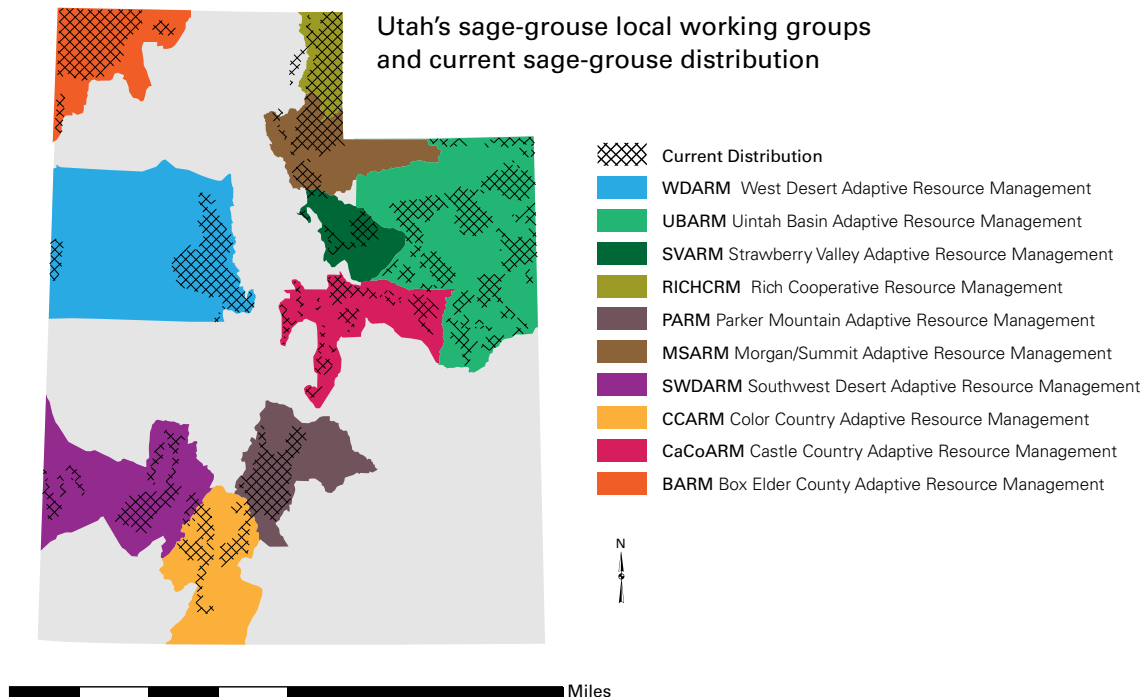
when matting occurs on **leks**. The number of males on each lek is counted and compared with previous years to establish a trend. In 2005, Utah counted over 5,700 males on leks and, in 2007, 285 leks were counted across the

state. Most variability between years is driven by weather patterns and the accessibility to leks than any other one thing. Of the 11 documented states that still support sage-grouse population, 8 have shown population declines since 1965. Range wide populations have been declining by about 2% each year since 1965. Alternatively, population trends have been estimated for areas that closely follow ecological and floristic boundaries, and they have shown an increase (see figure right). This increase could be



due to a greater effort to count, search for, and incorporate more leks into the database, but it is equally likely that populations are increasing due to management efforts. Wildlife managers have monitored production in

areas where hunting occurs by analyzing wings from harvested birds. The information is limited, however, because there is often not a large enough sample to determine accurate numbers.



Impacts to Habitat

The greater sage-grouse is a “sagebrush obligate” species, meaning that they require sagebrush for cover, nesting, and food. Loss of essential sagebrush habitat has been the main cause for their decline.

In Utah, major changes to habitat took place with the increase of human population. There are no longer sage-grouse or sage-grouse habitat found in Salt Lake or Davis counties. The conversion of sagebrush areas to urban environments, dry land farms, and seeded/irrigated pastures significantly reduced the available habitat for sage-grouse. For example,

large acreages of sagebrush grasslands that once grew on the flats north of the Great Salt Lake in Box Elder County have been converted to irrigated or dry farm croplands.

To address impacts and threats to habitat and sage-grouse, experts in sage-grouse biology, range-land management, wildland fire, grazing management, and land-

scape ecology meet regularly as part of local working groups to implement sage-grouse management plans for specific geographic regions throughout Utah. They have identified 11 separate threats that either have or may impact sage-grouse and their habitat. These threats were assessed at a local level and varied from region to region. For example, oil and gas development is identified as a major threat in Northeast Utah but not in Central and Southern Utah.

1



Wildfire and Invasive Species

Fire frequency has increased sharply in recent decades in portions of western Utah preventing sagebrush stands from recov-

2



ering as they naturally would if fires burned only occasionally. Some sites that historically burned every 50 to 100 years are now burning as often as every 4 to 8 years. Increased fire frequency is intertwined with expanding areas of invasive annual grass-

Land managers are using fire to reduce encroaching pinyon and juniper stands adjacent to sagebrush habitat.

Recently burned sage-grouse habitat is now a sea of cheatgrass and other invasive annuals.

lands. Highly flammable grasses, such as cheatgrass, are causing rangeland wildfires to ignite more easily and spread more rapidly. Cheatgrass (*Bromus tectorum*) also cures by early summer, which can cause wildfire season to begin sooner than it normally would. Moreover, these grasses frequently establish themselves more robustly after a fire and can replace native **bunchgrasses**, which are essential for productive sage-grouse habitat.

3



3 The cumulative impacts from oil and gas development is a major concern of sage-grouse managers range wide.

4 Researchers are working to define potential perch sites and find ways to reduce the threats these structures may pose to sage-grouse.

4



Energy Development

The expansion of human activities can also be detrimental to sage-grouse populations. With this expansion often comes the need for more natural resources.

Utah has an abundant supply of oil, gas, coal, and other natural resources, many of which are found in sage-grouse habitat. These types of resources and their associated infrastructure can lead to further loss and fragmentation of habitat. Tall structures, such as transmission lines, provide perches for raptors and ravens that prey on sage-grouse and their nests. Sage-grouse may avoid tall man-made structures, rendering even good habitat less available. Additional research is needed how to best mitigate the potential effects of these activities on sage-grouse.

1



2



3



Livestock supplement areas are sometimes used as lekking sites. 1

Cows and calves feed near the Prohibition Springs lek south of Dove Creek, Utah. 2

A male sage-grouse on a lek, which is also used as a salting area for cattle. 3

Fencing and Grazing

Cattle and other livestock are common throughout sage-grouse habitat in Utah. Although **total animal unit months (AUMs)** on public lands have been decreasing since the 1950s, sage-grouse and domestic livestock have coexisted on the same range for many decades. There is little information directly linking livestock management practices to sage-grouse population levels.

Ranchers are in a primary position to influence sage-grouse because ranching is the most prevalent use of land in Utah's sage-grouse habitat. The interaction among grazing, ranch management, and sage-grouse habitat is so complex that identifying grazing related impacts and suggesting corrective actions can

only come from careful assessments completed for individual ranches. A management strategy that promotes adequate height and cover of perennial grasses and **forbs** will have a positive effect on sage-grouse nesting and brood-rearing habitat. Water developments and/or wet meadows, irrigated fields, and pastures

are often a part of the managed sagebrush landscape and may benefit sage-grouse during the late brood-rearing period and during times of drought. On the other hand, livestock grazing can negatively impact sage-grouse habitat if it degrades sagebrush areas, meadows, and **riparian** habitats. Sources of information for

how land managers can improve sage-grouse habitat are best gained from talking to biologists, land managers, and researchers in your particular area.

Rest rotation grazing systems have shown the potential to be a beneficial grazing practice for many species of wildlife including sage-grouse. While this type of management practice is not always compatible with all grazing management plans and/or individual operations, we encourage its implementation where possible. This grazing manage-

ment has shown some positive vegetative and grouse response, especially in brood-rearing habitat (summer range).

While much has been said about the potential of ‘tall structures’ on sage-grouse, most of the research currently underway is with fences and fence markers. In many states, fence markers on new and/or existing fences are becoming a common practice. Sage-grouse do strike and hit fences which can and does cause mortality. New fences and fences on ridge tops or those

near lekking areas pose higher risk of strikes. However, the full impacts of these strikes and how they may affect the population are not known. If new fences are needed, they can be marked and/or put in areas to reduce impacts to sage-grouse. If you are planning on putting in a new fence or believe you have areas where sage-grouse strikes on fences are common, we encourage you to seek assistance on how to best mitigate potential conflicts.

1



2



Marking new or existing fences with plastic fence markers can reduce sage-grouse strikes.

1

Feathers from a sage-grouse on top of a T-post of a newly erected fence in Box Elder County, Utah.

2

Life Cycle

To better understand what habitat conditions are needed to support sage-grouse populations, it is necessary to understand their natural history. Throughout the year, their habitat requirements change, and rarely can one area support populations through all stages of their lives. As such, sage-grouse typically need large, intact sagebrush landscapes to maintain sustainable populations.

The following section is designed to show sage-grouse activities during each season of the year, including their reproductive process and habitat needs during lekking and other life stages. The photos illustrate various examples of sage-grouse habitat and could be used as a guide to assist in identifying potential habitat

on or adjacent to your ranch or grazing permitted area. The photos are, however, intended only for general informational purposes. If you are looking to improve or protect habitat, more detailed field assessments and measurements would be necessary to accurately describe and identify habitat conditions.



1



2



3



- 1 A skiff of snow in April where female sage-grouse visit a lek. In this photo are seven hens and five male sage-grouse.
- 2 A male grouse on a lek in an old crested wheat seeding that is grazed each fall by livestock, reducing ground cover and allowing better visibility for the grouse.
- 3 A male grouse in full display on the Dog Hollow lek on the Utah-Wyoming border in Rich County, Utah.

Leks

Spring is the mating season for sage-grouse. The species exhibits a **polygynous mating** system where one male will mate with multiple females. Research has shown that it is typically one male that does the bulk of the breeding. The females choose which male sage-grouse to mate with while attending annual gatherings on communal breeding grounds known as 'leks'.

Males try to attract females by performing elaborate strutting displays and by making a "popping/bubbling" sound as their inflatable chest air sacs collapse and hit against their breast bone. Sage-grouse typically gather on these leks between March and early May, depending on the

location and elevation. There can be as few as two and more than 100 birds in attendance. Leks can be found at a variety of locations but generally are in open areas adjacent to sagebrush. Leks could be in meadows, openings created by fires or roads, areas of low sagebrush, or dry lake beds.

Leks can often be located in areas that are heavily used by livestock such as salting areas. Most leks are traditional and are used year after year.

Nesting & Early Brood-Rearing

During the mating season, hens search for nesting sites. They will lay eggs for several days in a row before they start nesting. Various studies in Utah found that most nests are typically found within a few miles of a lek, but this can vary from one region to another. The sage-grouse nest is a bowl-shaped depression on the bare ground and it is common to find them comprised of vegetation such as dead grass with a few of the hen's feathers.

Sage-grouse nests are typically located under a sagebrush shrub but can be under other shrubs such as bitterbrush (*Purshia tridentata*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), or other **sagebrush steppe** plants. A relatively small **clutch** size, aver-

aging six to eight eggs, coupled with a low re-nesting probability results in one of the lowest reproductive rates of any North American game bird. Eggs can be olive to pale green in color with small dots of brown. Following the hatch, the hen and chicks will

typically stay within the vicinity of the nest for up to three weeks, but some have also been known to travel several miles in only a few days, moving to more productive brood-rearing areas.

1



2



3



- 1 A sage-grouse nest under mountain sagebrush built with twigs and feathers making a 'nest bowl' on the ground.
- 2 A chick exhibiting a threat display by spreading out its wings and flattening out on the ground.
- 3 A hen moving through black sage, leads researchers away from her scattered brood.

Habitat Characteristics

Nesting and brooding success is critically important to population sustainability and growth. This section is geared to assist landowners and land managers in identifying critical components to and for sage-grouse habitat.

It's important to remember that sage-grouse require a large continuous area of sagebrush habitat as well as a substantial **understory** of grasses and forbs (flowering broad-leaved plants) during different times of the year. To help monitor habitat values, biologists have developed a

general set of habitat criteria which can be useful to help identify potential sage-grouse habitat on ranches out in the field.

Sagebrush Canopy Cover

Most research studies have shown that the most productive nesting and early brood-rearing

habitat includes 15 to 25 percent sagebrush **canopy cover**. Photos on the following pages illustrate different canopy cover amounts as they might appear in the field when looking at the area from a landscape perspective.



A sage-grouse nesting site (foreground) in Rich County, Utah. Note the patchiness of the habitat (background) with good sagebrush cover in certain areas with more open areas intermixed throughout.



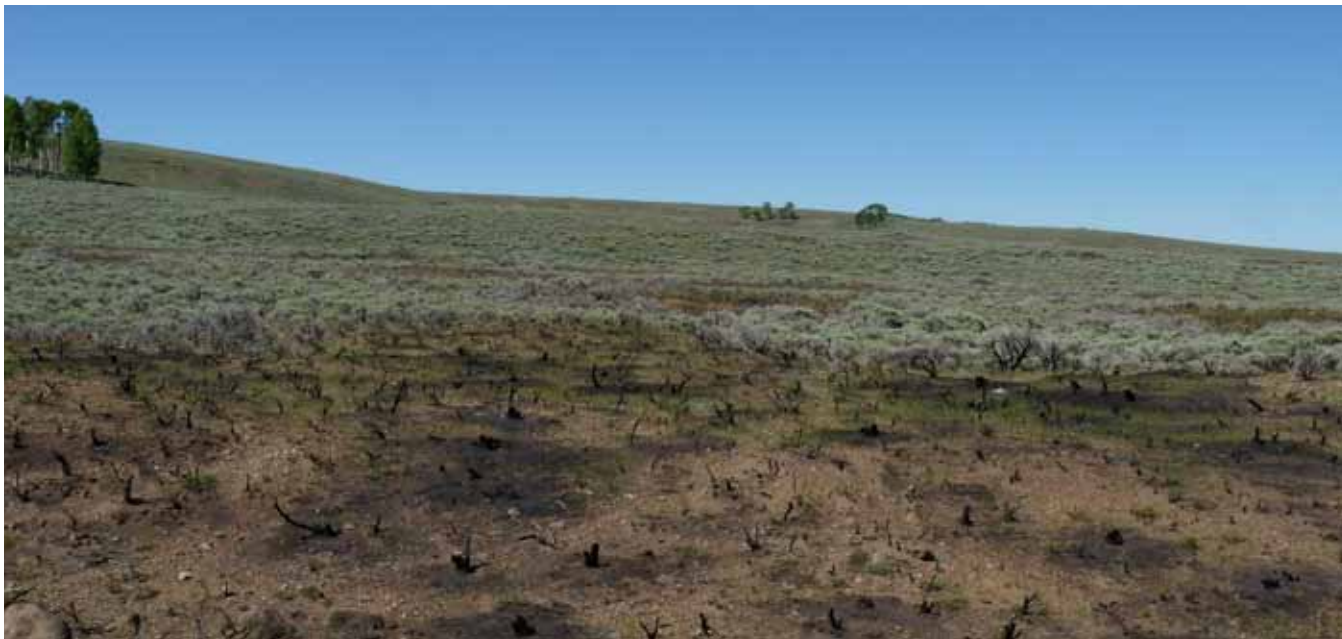
Good nesting and brood-rearing habitat on Parker Mountain, Utah. Note the variation of open and dense shrub cover areas.



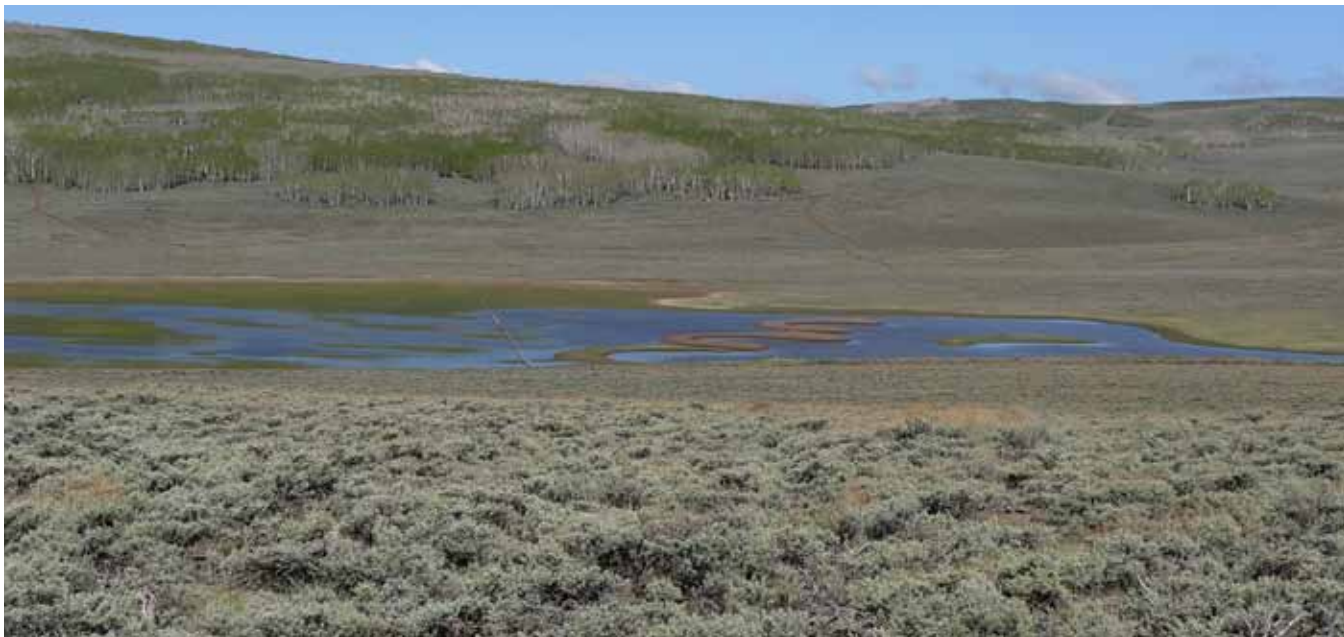
Marginal nesting habitat and poor brood-rearing habitat. Note the lack of grass and forb understory, dying sagebrush, and the lack of different successional stages of sagebrush



Poor nesting and brood-rearing habitat. Note the invasive annual grasses, the lack of other understory, and the dying sagebrush.



The use of fire in sagebrush systems is not recommended on a large scale and is usually only effective at higher elevations, typically in brood-rearing habitat. Note the patchiness of the fire, creating open areas while leaving intact stands of sagebrush.



A landscape photo showing brood-rearing habitat. Again, note the patchiness of the area, the open wet meadows, and the adjacent areas of heavier sagebrush which provide escape cover from predators, as well as roosting and loafing cover.

Shrub Structure

Wildlife biologists theorize that sagebrush plants with a spreading growth form provide more secure nesting conditions and additional screening cover from predators than those that are more columnar in their growth.



As most species of sagebrush age they become less vegetated at the bottom and more columnar at the top. This provides less cover for sage-grouse and their nesting sites.



Ideal sage-grouse nesting cover with sagebrush being more rounded and having spreading growth particularly at the lower half of the brush. A successful sage-grouse nest sits just on the other side of the rock under the sagebrush in foreground.



A hen sage-grouse (circled in red) holds tight on her nest while observers check her status. Note the sprawling shape and cover of the sagebrush.

Shrub Height

For productive nesting cover, the average height of sagebrush generally falls between 15 and 30 inches in wetter sites and between 12 and 30 inches for drier sites.



Researchers collect several different vegetative measurements at all sage-grouse nest locations including the height and width of different kinds of brush.



Some of Utah's more productive sage-grouse nest sites are actually found in mixed shrub habitat. This successful nest site is in patched snowberry and bitterbrush.



Most of Utah's sage-grouse habitat is in drier climates where the sagebrush rarely exceeds 24 inches. Researchers remove hatched eggs on Parker Mountain in south central Utah.

Understory

Along with specific sagebrush cover and height characteristics, nesting hens and their brood also prefer a substantial understory of perennial grasses and forbs.

Forbs attract insects, and insects are the primary food source during the nesting/early brood-rearing time period. In addition to providing food sources, this healthy understory provides protective cover from predators. As a practical matter, it is ideal to maintain the grass understory through the end of the early brood-rearing season. Habitats that provide an average of at



least 7 inches of grass and forbs are desirable, though it may not be possible to achieve this height at every site due to weather conditions and precipitation differences.

A hen grouse with two of her chicks (circled in red) feed on insects in an old burn site abundant with grasses and forbs.

Late Brood-rearing

As the summer months get hotter, the grasses and forbs on rangelands start to dry out. During this time, the hen and brood may move out of their nesting habitat to seek more productive areas.

Typically, they will either move to areas higher in elevation where conditions are moister or to areas where water collects, but they often can and do stay in drier sites if there are sufficient amounts of insects. They can frequently be seen in irrigated agricultural fields, wet meadows, and riparian areas adjacent to sagebrush cover. Table 2 details the habitat characteristics during this period. In Utah, researchers have recorded sage-grouse traveling as far as 50 miles to reach summer brooding ranges.

Late Brood-Rearing Habitat Characteristics

Habitat Feature	Habitat Use	Productive Habitat
Sagebrush canopy cover	Cover	10 to 25%
Sagebrush height	Cover	15 to 30 inches
Proximity of sagebrush cover	Cover	Sagebrush cover is adjacent (< 100 yards) to brood-rearing area
Perennial grass and forb canopy cover	Cover & Food	≥15%
Riparian and wet meadow plant community	Food	Wetland plant species dominate wet meadow or riparian area
Riparian and wet meadow stability	Cover & Food	Some bare ground may be evident but vegetative cover dominates the site
Forb availability in uplands and wetland areas	Food	Succulent forbs are readily available in terms of distribution and plant structure

1



2



Sage-grouse brood rearing habitat in Rich County. Areas such as this often have diverse communities and habitat types as seen here. Note the grassy meadows.

1

Wet meadows and high elevation riparian sites are of great importance to many of Utah's sage-grouse populations. These areas provide water, insects, and green forage for the grouse to live on.

2

Fall

Fall habitat for sage-grouse varies greatly across the state. Sage-grouse will continue using wet meadows, riparian areas and irrigated fields until their food source of forbs dries up or is killed by frost. During this period, their diet will change back to predominantly sagebrush and the birds will move to areas where it is available.

Winter

Sage-grouse spend the winter in sagebrush-dominated landscapes where they rely exclusively on

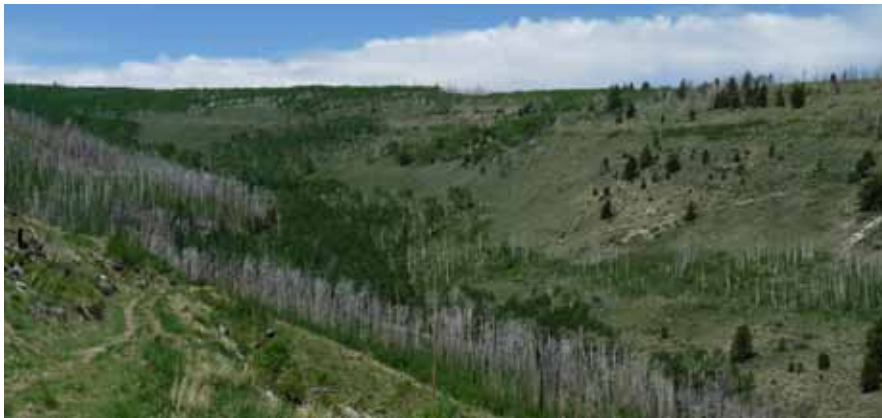
sagebrush for both forage and shelter. Winter habitat characteristics are listed in Table 3. The habitat they choose is dependent on snow depth, elevation, aspect, the amount of sagebrush above the snow level, and often the type of sagebrush. Sage-grouse tend to prefer south or southwest-

facing aspects and very gentle slopes. They can often be seen on windswept ridges, draws, or any location that has significant sagebrush available above the snow. Sagebrush above snowline is critical during all winters, even the most severe.

Winter Habitat Characteristics

Habitat Feature	Habitat Use	Productive Habitat
Sagebrush Canopy Cover	Cover & Food	10 to 30%
Sagebrush Height	Cover & Food	10 to 14 inches above snow level

1



2



1 Late season brood-rearing habitat at higher elevations as sage-grouse move up the mountain to 'greener' pastures.

2 Winter habitat in Utah is as small as a windswept ridge in black sagebrush (shown here) or in large patches of sagebrush tall enough to stick out above the snow.

Migration

Migration in sage-grouse appears to vary by individual population. Birds in some research sites in Utah have shown no migration tendencies and do not migrate at all, in others, however, birds have been recorded migrating over 100 miles in a single year. Most of Utah's sage-grouse populations are considered two stage migrants, with birds moving from their winter/breeding habitat to their summer range. Still other populations exhibit a three stage migration, moving from winter to breeding, then to summer ranges. In Utah, most sage-grouse populations tend to be migratory.



Steppe Plants

The plants that make up sagebrush communities provide cover and food for sage-grouse, so it is important to recognize the key plants to assess and manage these habitats. The following section identifies and describes the most common plants associated with sage-grouse habitat in Utah.

Tall Sage



Basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) has a tall, tree-like structure that provides poor nesting cover and is less palatable than other sagebrush species. It can reach 3 to 10 feet in height and is common on relatively moist, productive sites. In heavy winters, however, it does provide a critical winter food source.



Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) is a medium-sized shrub that grows up to 3 feet tall. It provides most of the food and cover for Utah's sage-grouse. It branches at the base and has an uneven crown. It grows on drier sites that receive between 7 and 12 inches of precipitation annually, and it is found between 2,500 and 6,500 feet in elevation.



Mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) generally grows above 6,100 feet in elevation and prefers moist deep soils that receive between 14 and 22 inches of precipitation annually. It branches at the base and can grow up to 3 feet tall with an even, flat-topped crown. It can be a major source of food during winter, but it is also used for nesting and brood-rearing habitat.

Short Sage



Silver sagebrush (*Artemisia cana*) Two sub-species occur in Utah; mountain (*Artemisia cana* ssp. *viscidula*) and bolander (*Artemisia cana* ssp. *bolanderi*). Mountain silver sagebrush is found on seasonal wet, productive sites at elevations between 6,000 and 8,000 feet.



Black sagebrush (*Artemisia nova*) is a short shrub that grows between 4 and 12 inches in height. It can be found on thin and rocky soil from 4,900 to 7,000 feet elevation where precipitation averages 7 to 18 inches. Sage-grouse can use it for winter and brood-rearing habitat. In addition to being used throughout the year, it has been shown to be, in some places, a critical winter food source for sage-grouse.



Low sagebrush (*Artemisia arbuscula*) grows up to 16 inches in height on rocky or thin soil, or very dry sites. It is a very palatable species and can provide habitat throughout the year. Sage-grouse will use it for nesting though they typically will seek taller sagebrush species if available.



Grasses

Sage-grouse depend on grass to provide cover from predators primarily during the nesting and brood-rearing periods. Some grasses based on their structure, provide increased visual obstruction and therefore provide more effective habitat for sage-grouse hens and nests.

While many different species of both native and non-native grasses are found within sage-grouse habitat, the following species are known to be of importance and used regularly by the grouse primarily for nesting and brooding cover.

N – Native I – Introduced

N - Bluebunch wheatgrass *Pseudoroegneria spicata*

I - Crested wheatgrass *Agropyron cristatum*

I - Intermediate wheatgrass *Agropyron intermedium*

N - Western wheatgrass *Agropyron smithii*

N/I - Wildrye *Elymus* spp.

N - Sandberg bluegrass *Poa sandbergii*

N - Mutton bluegrass *Poa fendleriana*

N - Blue fescue *Festuca ovina*

N - Blue gramma *Bouteloua gracillis*

N - Squirreltail *Elymus elymoides*

N - Columbia needlegrass *Stipa columbiana*

N - Needle and threadgrass *Stipa comata*

N - Mountain Brome *Bromus marginatus*



Blue bunch wheatgrass (*Pseudoroegneria spicata*) is an erect bunchgrass, growing 1 to 2 ½ feet tall. Growth begins in April and the plant stays green well into the summer. Regrowth occurs following fall rains. It has a wide spectrum of adaptations at elevations between 4,000 and 9,000 feet. It is found on all aspects on mountain slopes, benches, basins, or alluvial fans, and in valley bottoms. It is one of the more widely distributed and useful grass species for sage-grouse and other wildlife.



Sandberg bluegrass (*Poa sandbergii*) is erect, perennial bunchgrass, growing in small tufts, and typically doesn't grow much over 12 inches tall. It is one of the first plants to start growth in early spring. It is among Utah's most widely adapted bluegrasses. It occurs mainly on semi-desert sites, but is also found on some upland and mountain sites, growing at elevations from 4,500 up to 9,000 feet.



Great Basin Wild Rye (*Elymus cinereus*) is unusually large, robust bunchgrass. It typically grows in more mesic sites that will support several individual plants. It is 1 to 3 feet in diameter and 2 to 5 feet tall. It starts growth in early spring and sage-grouse have been documented nesting under it. It is native to Utah and grows on riverbanks, in ravines, on moist or dry slopes, and on plains at elevations from 4,500 on up to the steep mountain slopes at 10,000 feet elevation.



Forbs

Forb variety is important during the early and late brood-rearing periods. Not only do hens and chicks eat green, succulent forbs, but chicks especially feed on the insects associated with a healthy sagebrush understory.

There are many different forbes that sage-grouse use, both native and non-native species. We have provided a list of forbes found here in Utah that sage-grouse have been documented using.

Alfalfa (*Medicago* spp.)

Broomrape (*Orobanche* spp.)

Clover (*Trifolium* spp.)

Daisies (*Erigeron* and *Aster* spp.)

Dandelion (*Taraxacum officinale*)

Dandelion, Mt. (*Agoseris* spp.)

Desert parsley (*Lomatium* and *Cymopterus*)

Everlasting (*Antennaria* spp.)

Groundsmoke (*Gayophytum* spp.)

Hawksbeard (*Crepis* spp.)

Knotweed (*Polygonum* spp.)

Milkvetch (*Astragalus* spp.)

Peppergrass (*Lepidium* spp.)

Phlox (*Phlox* spp.)

Prickly lettuce (*Lactuca serriola*)

Sweet clover (*Melilotus* spp.)

Sweet vetch (*Hedysarum* spp.)

Vetch (*Vicia* spp.)

Western salsify (*Tragopogon dubius*)

Western yarrow (*Achillea millifolium*)



Researchers in Utah have documented dandelions (*Taraxacum officinale*) as being very beneficial to sage-grouse. Grouse (chicks and adults) will eat the flowers and leaves as well as insects high in protein that can be found in and around the flowers.



Various species of Vetch (*Astragalus* spp.), a legume similar to alfalfa, are also eaten and are attractive to insects, which are critical to the survival of sage-grouse chicks.



Phlox (*Phlox* spp.) is wide spread and abundant in most places in Utah where sage-grouse live. While fairly small and patchy it greens up and flowers quickly in the spring, providing an important source of protein for lekking and nesting grouse.

Steppe Succession

Disturbance events are common in sagebrush steppe habitats and include, but are not limited to, fire, drought, flood, insects, disease, and grazing pressure. **Succession** refers to the change of vegetation communities over time as they develop after a disturbance event.

The potential for a site to return to productive sage-grouse habitat depends on the site's capacity for

re-growth of shrubs and understory vegetation to meet seasonal habitat characteristics. Recovery time for sagebrush communities after disturbance can vary greatly and is dependent on the scale and type of disturbance event, the remaining or neighboring vegetation and seed bank, the pre-existing condition of the site (e.g., plant species composition), the soil factors, weather conditions and

the amount and timing of precipitation, the topography, and the post-disturbance management.

Disturbance events have always played an important role in the sagebrush steppe ecosystem. The understory grasses and forbs can recover in a few years. During the first few years, forbs and grasses may greatly increase and commonly dominate a site. Over time, grass and forb cover will decrease as the fertilizing effects of the

burn decrease and sagebrush re-establishes and increases its canopy cover. Sagebrush, with a healthy understory of grasses and forbs, may eventually dominate the site and remain until the next disturbance event. Healthy sagebrush landscapes are composed of a mosaic of these early, mid and late successional stages and are crucial for sustainable sage-grouse populations. Historically most of these dis-

turbance events were caused by fire. However, in many areas in Utah, fire in sagebrush steppe habitat can be detrimental to sage-grouse primarily due to cheatgrass and other invasives dominating the disturbed area. Studies have shown that following fire, recovery to pre-burn sagebrush cover can take from 25 to 75 years. Wyoming big sagebrush has the slowest rate of recovery while mountain big

sagebrush usually recovers more quickly. In some areas successional processes have been altered, and some sites may not recover to productive sage-grouse habitat. Throughout Utah, private landowners and federal and state land managers are working hard to actively restore healthy sagebrush steppe habitats.

Site Potential

Even without disturbance, the distribution and abundance of sagebrush is variable across the landscape. Vegetation characteristics are generally determined by physical elements such as elevation, precipitation, soil types, and aspect.

Therefore, the variation in these physical elements across the landscape will naturally result in a variation in the types of habitats present. Some sites may never be capable of being productive sage-grouse nesting habitat. For example, a dry south-facing slope with shallow, rocky soils may not

be able to grow suitable big sagebrush cover for nesting. However, such a site may be capable of supporting other species of sagebrush or forbs that could provide foraging opportunities during other times of the year, particularly during the winter.

Steppe Succession

Although sage-grouse depend on sagebrush, not all sagebrush is the same and sage-grouse use it differently at different times of the year. Early succession sagebrush (few and/or small sagebrush plants with a grass/forb understory) provide a rich diversity of herbaceous plants and insects critical for chick survival.

Older climax communities often have plants more than 4 feet high and > 30% canopy cover, with little or no understory. These stands still provide some nesting cover, critical winter food sources, and escape cover. When managing sagebrush steppe, manage for a diversity of succession stages. The key is having different age class patches and keeping them relatively small on a landscape level. Avoid large block management type practices. We recommend asking for assistance as you plan your sagebrush management practices. For additional contact information see page 58.



Early development



Mid-development



Late development



Conservation Planning

In July 2009, Utah's Wildlife Board approved the Division of Wildlife Resources "Utah's Greater Sage-grouse Management Plan." This document along with the local sage-grouse conservation plans are the overarching guide for sage-grouse conservation efforts in the state.

www.wildlife.utah.gov/uplandgame/sage-grouse/pdf/management_plan_2009.pdf

They provide a comprehensive description of the state of the species and a framework for how they should be managed, based upon threats to the bird and desirable habitat conditions. Management of sage-grouse within these plans will be guided by local working groups, which are comprised of local stakeholders such as land owners,

members of the public, local, state, and federal agency representatives, and various interest groups. As of 2009, there are 11 conservation areas, most of which are advised by local working groups, each developing local sage-grouse conservation plans. For more information visit www.utahcbcp.org



Final Thoughts

The challenge in the conservation and understanding of sage-grouse is that they are a landscape-level species and their habitat needs are more complex than other upland game birds. What management practices work in one area of the state where sage-grouse respond positively may in fact have a negative effect in another.

One study documented a population with a range of over 1,000 square miles. Yet, sage-grouse have fairly specific habitat requirements during different times of the year and seem to have little ability to adapt to large scale changes. Any action/treatment permanently altering the basic function of sagebrush steppe would likely be detrimental to a local population.

While ranching is likely compatible with maintaining sagebrush steppe and habitats which sage-

grouse depend, houses or subdivisions, infrastructure, or large-scale conversion to cultivated crops permanently removes vital components which sage-grouse depend are not.

This guidebook has introduced basic biology, life cycle, and habitat requirements of sage-grouse; the information herein is designed to assist you in being a better steward of our rangelands. Sage-grouse conservation effort can be simplified down to a few basic principles:

1. Know your grouse; where, when, and how.
2. Identify/protect existing important habitat.
3. Encourage sagebrush steppe regeneration and restoration where needed.
4. Prevent and eliminate exotic species such as cheat grass.

Lastly, don't be afraid to ask for assistance, we encourage you to ask for help as you prepare for sagebrush treatment/design, grazing management, fencing, and sage-grouse management.

Additional Information

For the latest information on sage-grouse issues, management techniques, and conservation assistance, please contact your local working group and consult the resources below.



Utah State University Extension

4900 Old Main Hill
Logan, Utah 84322-4900

www.extension.usu.edu

Utah State University is an affirmative action/
equal opportunity institution.



U.S. FWS Partners Program

2155 West Forest Street 340 N. 600 E.
Brigham City, UT 84302

(435) 734-6434

www.fws.gov/mountain-prairie/pfw/ut

Providing funding and technical assistance
to private landowners to implement habitat
restoration or enhancement projects in upland,
wetland, stream and riparian areas.



Utah Division of Wildlife Resources

1594 West North Temple; PO Box
146301, Salt Lake City, UT 84114
(801) 538-4700

www.wildlife.utah.gov/uplandgame/sage-grouse

Contains management plans, GIS data, and links to sage-grouse information



Utah Fish and Wildlife Service Ecological Services

2369 West Orton Circle, Suite 50
West Valley City, UT 84119
(801) 975-3330



Bureau of Land Management, Utah

440 West 200 South Salt Lake City,
UT 84145
(801) 539-4001

www.blm.gov/ut



Utah Department of Agriculture and Food Grazing Improvement Program

350 North Redwood Road
PO Box 146500, Salt Lake City, UT
84114-6500
(801) 538-4962

www.ag.utah.gov/divisions/grazing

Provides grants for projects to improve grazing management on private and public land.



Utah CWMU Association

5230 Old Main Hill

Logan, UT 84322-5230

www.cwmuutahwildlife.org



Utah Association of Conservation Districts

1860 N.100 E.

North Logan, UT 84341

(435) 753-6029

www.uacd.org

Represent private landowners and direct local conservation efforts



USDA Natural Resources Conservation Service

125 S. State St., Room 4010

Salt Lake City, UT 84138

(801) 524-4550

www.ut.nrcs.usda.gov



Foundation for Quality Resource Management

5147 South 5100 West

Hooper, UT 84315

801-725-9524

mwelch5147@gmail.com

Glossary of Terms

Bunchgrasses (page 14)

Perennial grasses that grow in clumps or tufts as opposed to mats

Canopy cover (page 26)

Overhead projection or footprint of the plant's crown onto the ground surface, usually expressed as a percentage

Clutch (page 24)

The number of eggs produced by a hen at a single time

Endangered Species Act

Federal law aimed to prevent the extinction of critically imperiled

animal and plant species and protect the ecosystems on which they depend

Forb (page 17)

A flowering broad-leaved plant that can be an annual or a perennial

Invasive annual grasslands (page 14)

Areas dominated or strongly influenced by invasive annuals such as cheatgrass, medusahead wildrye or similar species

Key sage-grouse habitat (page 3)

Areas of generally intact sagebrush that provide sage-grouse

habitat during some portion of the year

Leks (page 10)

Traditional communal mating ground where hens choose mates, occurs between March and early May on open areas adjacent to sagebrush

Local working group (page 12)

A group comprised of landowners, land managers, scientists, and other citizens that provides advice on conservation efforts in a planning area

Polygynous mating (page 23)

A mating type in which a male mates with multiple females

Riparian (page 17)

Lands adjacent to creeks, streams, rivers and standing water where vegetation is strongly influenced by the presence of water

Sage-grouse planning areas (page 51)

Geographic areas originally defined by the Idaho Department of Fish and Game that have similar landscapes, sage-grouse habitats, and population use, used to improve management efficiency

Sagebrush steppe (page 24)

A low rainfall landscape capable of supporting perennial grasses and shrubs, synonymous with sagebrush dominated rangelands

Succession (page 49)

A directional change in the species composition or structure of a plant community over time

Understory (page 26)

Vegetation community in the shrub steppe composed of grasses and forbs, essential for suitable nesting habitat

Notes



© Jamey Vasa, Photography 2005 used with permission.