

Sharp-tailed Grouse

(Tympanuchus phasianellus)

February 2007

Fish and Wildlife Habitat Management Leaflet

Number 40

Introduction

The sharp-tailed grouse is one of four species of North American prairie grouse in which males gather at traditional locations to engage in elaborate, highly ritualized courtship displays commonly described as “dancing.” Among the four species of prairie grouse, this bird is the widest ranging and occupies the greatest variety of habitats, including riparian to parkland woodlands and other early successional, interspersed mixes of grasslands-shrublands-woodlands. Historically, sharp-tailed grouse were an important food source for Native Americans and early European settlers in the Great Plains and western North America. The species continues to be a popular and valuable game bird throughout a large portion of its northern range.

Many subspecies of sharptails have declined or become extirpated in much of their historic range. These declines are due to habitat loss resulting from the conversion of native grassland and brushland habitats to intensive agriculture, excessive livestock grazing, tree planting in open landscapes, and an alteration of the natural fire regime where grasslands and brushlands are allowed to succeed into forests. Due to these population declines, the sharp-tailed grouse is protected in portions of its present range. The Bureau of Land Management and the U.S. Forest Service consider one subspecies, the Columbian sharp-tailed grouse, to be a sensitive species worthy of Federal listing.

The purpose of this leaflet is to provide information that will enable landowners and land managers to recognize opportunities to improve habitat for sharp-tailed grouse and assist with the development and implementation of effective management plans for the species. The success of any wildlife management action requires a clear statement of management goals, an awareness of the habitat requirements of the target species or wildlife group, accurate means to assess habitat conditions, effective tools and adequate resources to address habitat limitations, and follow-up monitoring of wildlife responses. The leaflet also iden-



Royal Alberta Museum

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tifies resources and additional sources of information available to carry out management plans.

Range

Historically, sharp-tailed grouse ranged from Alaska south through western Canada, east to the Hudson Bay, and west to northeastern California and Nevada. Sharptails originally occupied 21 states and 8 Canadian provinces and territories. Populations probably reached their peak during the settlement era of the early 1900s and have declined since then. They have been extirpated from Kansas, Illinois, California, Oklahoma, Iowa, Nevada, New Mexico, and Oregon. Most southern populations now occupy smaller portions of their historic range, and many populations may still be declining due to habitat loss and degradation. On the other hand, far northern populations seem to be secure because they inhabit remote, relatively inaccessible areas.

Of the seven known subspecies of sharp-tailed grouse, one is extinct. The other six subspecies are currently found throughout much of central and western North America. Variations in range and habitat of the subspecies can be found in table 1.

Sharp-tailed Grouse (Tympnanuchus phasianellus)

Table 1 Subspecies of sharp-tailed grouse (*Tympnanuchus phasianellus*)

Subspecies	Range	Habitat
Alaska sharp-tailed grouse (<i>T. p. caurus</i>)	North-central Alaska east to Yukon Territory, northeastern British Columbia, northern Alberta, and northern Saskatchewan	Brushy areas, openings, and bogs in boreal forest. In winter, sharp-tailed grouse rely on riparian areas, deciduous hardwood shrub gullies, and deciduous and open coniferous woods. Deciduous trees and shrubs are important for feeding, roosting, and escape
Northwestern sharp-tailed grouse (<i>T. p. kennicotti</i>)	Primarily found in the Northwest Territories	Brushy areas, openings, and bogs in boreal forest. In winter, sharp-tailed grouse rely on riparian areas, deciduous hardwood shrub gullies, and deciduous and open coniferous woods. Deciduous trees and shrubs are important for feeding, roosting and escape cover, including aspen (<i>Populus tremuloides</i>), snowberry (<i>Symphoricarpos occidentalis</i>), sagebrush (<i>Artemisia</i>), willow (<i>Salix</i> spp.), and birch (<i>Betula</i> spp.)
Northern sharp-tailed grouse (<i>T. p. phasianellus</i>)	Northern Manitoba, northern Ontario, and west-central Quebec	Brushy areas, openings, and bogs in boreal forest. In winter, sharp-tailed grouse rely on riparian areas, deciduous hardwood shrub gullies, and deciduous and open coniferous woods. See the northwestern sharp-tailed grouse for a list of deciduous trees and shrubs used for feeding, roosting, and cover
Prairie sharp-tailed grouse (<i>T. p. campestris</i>)	East-central Saskatchewan, southern Manitoba, and western Ontario south across Upper Peninsula of Michigan, Minnesota, and Wisconsin	Central lowlands and prairies, occupying brushy successional stages of deciduous and mixed deciduous-coniferous habitats. Favorable winter habitat consists of wooded areas where tree buds are available and grassy areas that supply seeds. Forest areas and free rows are avoided. Best habitat is a mix of grass-brush and agricultural lands
Columbian sharp-tailed grouse (<i>T. p. columbianus</i>)	Chiefly found in the Columbia Plateau and Great Basin; also found from interior central and southern British Columbia south to Utah and southwestern Colorado	Occupies sagebrush-grassland and mountain shrub habitats during summer. They use areas dominated by perennial bunchgrasses like luebunch wheatgrass or Idaho fescue and the shrub layer, if present is dominated by big sagebrush and/or antelope bitterbrush. Tall, broad-leaved mountain shrub and riparian cover types are critical components of winter habitat for sharp-tailed grouse. They often move to higher elevations to get into moister sites that support greater amounts of these types of shrubs. However, in mild winters, they often stay in the open grasslands and shrubland communities that they used for nesting and brood-rearing
Plains sharp-tailed grouse (<i>T. p. jamesi</i>)	Great Plains east of Rockies, from central and southern Alberta, southern Saskatchewan, and southwestern Manitoba south to northeastern Colorado and Nebraska	Prefers subclimax brush-grasslands. The plains sharp-tailed grouse use rolling hills with scrub oak thickets and grassy glades. As an equivalent to sagebrush, they use scrub oaks, serviceberries and willows. These brushy sites provide critical winter shelter and food sources. Typically, the plains grouse occupies medium to tall grasslands for courtship and nesting

Sharp-tailed Grouse (*Tympanuchus phasianellus*)

Of the remaining subspecies, the Columbian sharp-tailed grouse is the rarest subspecies and has experienced the most severe declines in population and distribution. Historically, the Columbian subspecies inhabited the intermountain region from central British Columbia south through eastern Washington, Oregon, Idaho, and northwestern Montana to California and Nevada, and east into Utah, western Wyoming, and Colorado. Columbian sharptails occupy less than 10 percent of their historic range in Idaho, Montana, Utah, Wyoming, and Washington; approximately 50 percent of their historic range in Colorado; and 80 percent of their historic range in British Columbia.

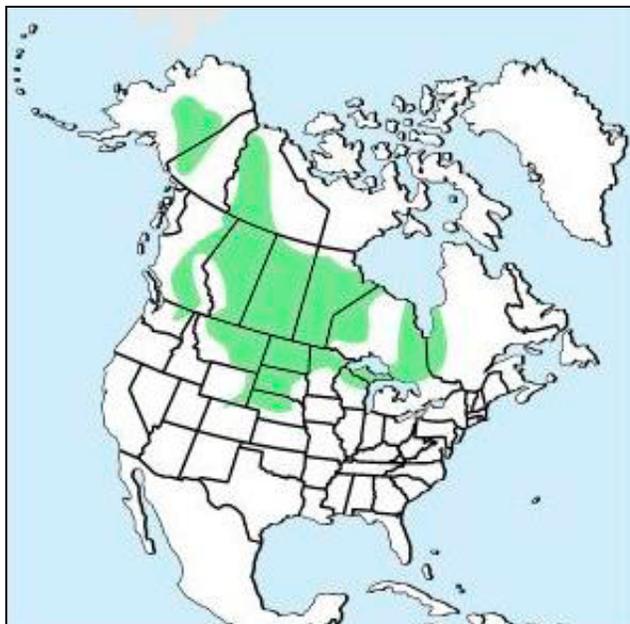
Life history

The sharp-tailed grouse is a medium-sized grouse, approximately 16 to 19 inches in length. Sharptails have a round body with short legs, a short crest, and elongated central tail feathers, and are cryptically colored. The head, neck, back, and wings are heavily barred with dark brown, black, and buff coloring. The upper wing surface has oval and round white dots. The breast and upper belly feathers are white with small dark brown v-shaped markings on the upper breast. The tail is wedge-shaped and about 6 inches long.

With a couple of exceptions, adult male and female sharptails are nearly identical. Females have cross-wise bars on the two middle tail feathers, whereas

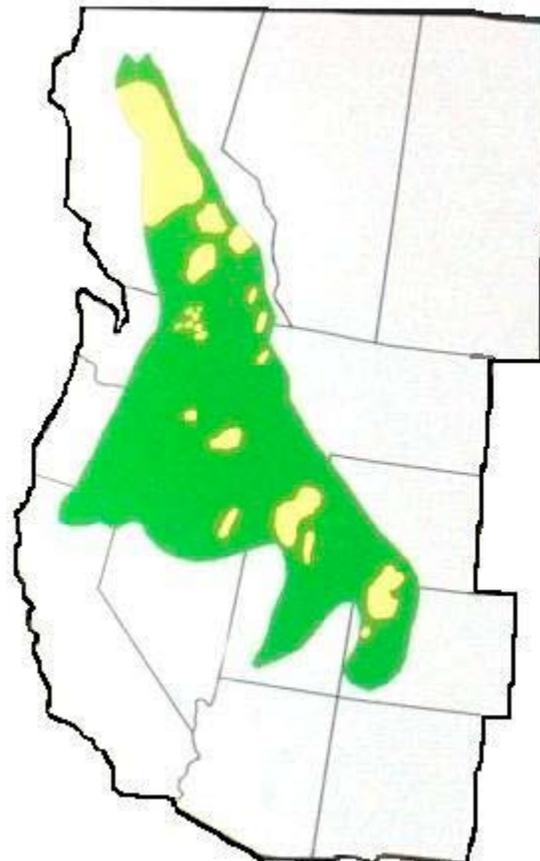
males have longitudinal bars. On top of the head, females have alternating buff and dark brown cross-wise bars, whereas males have black lengthwise bars edged in buff. Males have a pinkish-purple, half-walnut-sized air sac on each side of their necks and yellow combs above the eyes, each of which are greatly enlarged during spring.

In spring, males and females gather on traditional areas called leks, also known as dancing grounds, for courtship displays and mating. Spectacular courtship displays are performed by males to attract females. In the spring, and to a lesser extent, the fall, males congregate on leks in the mornings (30 to 60 minutes before sunrise), remaining there for 2 to 3 hours. The courtship display consists of animated and relaxing (or freezing) phases. During the dance, the male maintains a bent forward standing posture with head and wings oriented horizontally, tail erect, and air sacs on either side of his neck inflated. Displaying males rush forward or circle while rapidly stamping feet, clicking



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Current range of the sharp-tailed grouse



Adapted from Colorado Division of Wildlife,
http://wildlife.state.co.us/species_profiles/SharptailedGrouse/

Current (yellow) and historic (green) ranges of the Columbian sharp-tailed grouse in western North America.

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central tail feathers, and emitting hooting, clucking, cackling, and gobbling sounds. Dancing bouts last 30 to 50 seconds and are most intense when females are present on the lek. Often males will dance in synchrony, appearing to start and stop on signal.

Size of a single lek ranges from 2 to 35 displaying males. There is a hierarchy among males on the leks, with the older, dominant males displaying in the center of the lek and less experienced males on the periphery. Participation in mating is highly variable, but generally, most of the mating is performed by dominant males in the center of the lek.

Males regularly visit leks beginning in March; females visit from early April to early May. In Wyoming, for example, a study showed that most females appeared on leks when snow covered less than 10 percent of the area. Display activities and mating decrease toward the end of May. Males may also visit leks in autumn, most likely to re-establish territories and reassert dominance relationships.

All nesting, incubating, and brood-rearing is done by the female. Nest sites are usually chosen within a mile of the lek. The first egg is laid between 1 and 3 days after mating with subsequent eggs being laid every 1 to 2 days. The average clutch size is 12 eggs. Eggs are oval-shaped, approximately 1.7 by 1.3 inches in size, olive to dark brown-buff in color, and smooth. The 21- to 25-day incubation period begins after all the eggs are laid.

Eggs hatch simultaneously, and the young, capable of feeding themselves, leave the nest within 24 hours of hatching. Hens have one brood per season, but may re-nest if the original nest is lost. Females often move broods to open areas containing succulent vegetation and insects. At 12 weeks, chicks are fully grown and can fly. Brood dispersal occurs in late autumn.

Habitat requirements

General

Sharp-tailed grouse use a variety of open, relatively treeless habitats including shrub steppe, meadow steppe, mountain shrub, brushy grassland, and riparian/deciduous habitats. They often use transitional areas between habitat types, especially when the area contains a mixture of vegetative species and structure. Good sharptail habitat contains a mix of grasses, forbs, and many species of shrubs. Sharptails primarily choose habitat based on openness of landscape, height and density of vegetation, and type of vegetation. Preferred vegetation types vary greatly by geographic region. Table 2 contains some vegetative species often associated with sharptail habitat. Sharptails prefer flat to gentle topography over steep slopes.

Food

Sharp-tailed grouse feed mainly on the ground during spring, summer, and fall, occasionally foraging in the treetops. When snow is deep during winter, they may forage in shrubs and trees. During severe winters,



Washington Department of Fish and Wildlife

Male sharp-tailed grouse performing courtship display



R.J. Peck, Environmental Canada

Sharptail nests are made out of a variety of items from grasses to feathers.

Sharp-tailed Grouse (*Tympanuchus phasianellus*)

Table 2 Vegetation and associated states found within sharp-tail habitat

Arctic (or swamp) birch (<i>Betula pumila</i>): MI, MN, ND, WI	Hawthorn (<i>Crataegus</i> spp.): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY
Aspen (<i>Populus</i> spp.): AK, CO, MI, MT, NE, ND, SD, WA, WI, WY, MN	Juneberry (<i>Amelanchier alnifolia</i>): AK, CO, ID, MN, MT, NE, ND, SD, UT, WA, WY
Big bluestem (<i>Andropogon gerardii</i>): CO, MI, MN, MT, NE, ND, SD, UT, WI, WY	Juniper (<i>Juniperus</i> spp.): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY
Birch (<i>Betula</i> spp.): AK, CO, ID, MI, MT, NE, SD, UT, WA, WI, WY, MN	Lambsquarter (<i>Chenopodium album</i>): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY
Black spruce (<i>Picea mariana</i>): AK, MN, WI,	Little bluestem (<i>Schizachyrium</i> spp.): CO, ID, MI, MN, MT, NE, ND, SD, UT, WA, WI, WY
Blueberry (<i>Vaccinium</i> spp.): AK, CO, ID, MI, MN, MT, SD, UT, WA, WI, WY, MN	Maple (<i>Acer</i> spp.): AK, CO, ID, MI, MT, NE, SD, UT, WA, WI, WY
Bluegrass (<i>Poa</i> spp.): AK, CO, ID, MN, MT, NE, ND, SD, UT, WA, WY	Oak (<i>Quercus</i> spp.): CO, MI, MN, MT, NE, ND, SD, UT, WA, WI, WY
Boxelder (<i>Acer negundo</i>): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY, MN	Pigeongrass (<i>Setaria viridis</i>): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY
Brome (<i>Bromus</i> spp.): AK, CO, ID, MI, MN, MS, MT, NE, ND, NV, SD, UT, WA, WI, WY	Rose (<i>Rosa</i> spp.): AK, CO, ID, MI, MS, MT, NE, ND, SD, UT, WA, WI, WY
Buffaloberry (<i>Shepherdia</i> spp.): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY	Sagebrush (<i>Artemisia</i> spp.): CO, ID, MI, MS, MT, NE, ND, NV, SD, UT, WA, WI, WY
Bur oak (<i>Quercus macrocarpa</i>): MI, MN, MT, NE, ND, SD, WI, WY	Salsify (<i>Tragopogon</i> spp.): AK, CO, ID, MT, NE, ND, SD, UT, WA, WY
Chokecherry (<i>Prunus virginiana</i>): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY	Sedge (<i>Carex</i> spp.): AK, MI, MN, WI
Clover (<i>Trifolium repens</i>): AK, CO, ID, MI, MT, NE, ND, , SD, UT, WA, WI, WY, MN	Serviceberry (<i>Amelanchier</i> spp.): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY
Common yarrow (<i>Achillea millefolium</i>): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY	Slender wheatgrass (<i>Elymus trachycaulus</i>): AK, CO, ID, MT, NV, WA, WI, WY
Cordgrass (<i>Spartina</i> spp.): AK, CO, ID, MI, MT, NE, NV, SD, UT, WA, WI, WY	Snowberry (<i>Symphoricarpos</i> spp.): AK, CO, ID, MI, MN, MT, NE, ND, SD, UT, WA, WI, WY
Creeping barberry (<i>Mahonia repens</i>): CO, ID, MN, MT, NE, SD, UT, WA, WY	Sumac (<i>Rhus</i> spp.): AK, CO, ID, MI, MS, MT, NE, ND, NV, SD, UT, WA, WI, WY
Dandelion (<i>Taraxacum officinale</i>): AK, CO, ID, MI, MT, NE, ND, NV, SD, UT, WA, WI, WY	Sunflower (<i>Helianthus</i> spp.): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY, MN
Goatsbeard (<i>Tragopogon dubius</i>): AK, CO, ID, MI, MN, MT, NE, NV, ND, SD, UT, WA, WI, WY	Tamarack (<i>Larix laricina</i>): AK, MI, MN, WI
Goldenrod (<i>Solidago</i> spp.): AK, CO, ID, MI, MS, MT, NE, ND, SD, UT, WA, WI, WY	Thistle (<i>Cirsium</i> spp.): AK, CO, ID, MI, MN, MT, NE, NV, ND, SD, UT, WA, WI, WY
Gromwell (<i>Lithospermum</i> spp.): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY	Wild oats (<i>Avena fatua</i>): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY
Hackberry (<i>Celtis</i> spp.): CO, ID, NE, ND, SD, UT, WA, WY	Willow (<i>Salix</i> spp.): AK, CO, ID, MI, MT, NE, ND, SD, UT, WA, WI, WY, MN
Hawkweed (<i>Hieracium canadense</i>): ID, MT, MN, NE, ND, WA, WI, WY	

Sharp-tailed Grouse (*Tympanuchus phasianellus*)

sharptails may confine most of their foraging activity to hardwood draws, riparian forest, or brushlands. The habitats that provide cover for grouse must also provide food, especially during the winter when food sources may be scarcer.

Sharptails consume a variety of forbs, grasses, flowers, fruits, seeds, buds, and insects. The plant components of their diet are variable and strongly influenced by geographical and seasonal availability. Insects form the major part of chicks' diets.

In spring and summer, sharptails eat a variety of forbs, grasses, fruits, flowers, and insects. The vegetative matter consumed includes buttercup (*Ranunculus glaberrimus*), dandelion (*Taraxacum officinale*), clover (*Trifolium repens*), goldenrod (*Solidago* spp.), hawkweed (*Hieracium canadense*), rose (*Rosa* spp.), corn (*Zea mays*), gromwell (*Lithospermum* spp.), smartweed (*Polygonum* spp.), alfalfa (*Medicago* spp.), goatsbeard (*Tragopogon dubius*), wheat (*Triticum* spp.), common yarrow (*Achillea millefolium*), sagebrush (*Artemisia* spp.), salsify (*Tragopogon* spp.), dandelion (*Taraxacum officinale*), creeping barberry (*Mahonia repens*), wheat (*Triticum* spp.), bluegrass (*Poa* spp.), Juniper (*Juniperus* spp.), Oats (*Avena* spp.), and buckwheat (*Eriogonum* spp.), and brome (*Bromus* spp.) Insects consumed include ants, crickets, moths, grasshoppers, and beetles.

During the fall and winter, sharptails eat insects, and the seeds, catkins, fruits, and buds of deciduous trees and shrubs. These include sagebrush (*Artemisia* spp.), oak (*Quercus* spp.), tamarack (*Larix laricina*), birch (*Betula* spp.), aspen (*Populus* spp.), sunflower (*Helianthus* spp.), chokecherry (*Prunus virginiana*), goldenrod (*Solidago* spp.), sumac (*Rhus* spp.), snowberry (*Symphoricarpos* spp.), hawthorn (*Crataegus* spp.), serviceberry (*Amelanchier* spp.), buffalo berry (*Shepherdia* spp.), willow (*Salix* spp.), maple (*Acer* spp.), bog birch (*Betula pumila*), Juniper (*Juniperus* spp.), arctic birch (*Betula nana*), buffalo berry (*Shepherdia argentea*), bitter cherry (*Prunus emarginata*), thistle (*Cirsium* spp.), and rose (*Rosa* spp.). Insects eaten during fall and winter include grasshoppers, beetles, and midges.

There is no direct evidence that sharptails need open water, even in summer. They may eat snow during winter.

Breeding habitat

Mating takes place on leks, where male sharptails perform courtship displays to attract females. Sharptails use a variety of sites as leks including rangeland, cropland, plowing, muskegs, and even abandoned

mine basins and airport runways. Leks usually occur in open, elevated areas such as knolls, ridge tops, hilltops, benches, or flat areas providing a broad horizontal view of the surroundings.

Sharptails prefer leks sites with short, sparse vegetation such as grasses, weeds, forbs, and some shrubs. Sparse and open vegetation on leks enables aggressive displays by males and minimizes predation. Sparse shrubs providing escape cover from predators, are often found adjacent to leks. Leks are sometimes associated with recently burned or grazed sites. Changes in land use on a lek resulting in taller, denser vegetation have been shown to cause eventual abandonment of the lek.

Leks cover a relatively small area ranging from the size of a small house to a baseball diamond. Lek locations are generally traditional from year to year, providing the habitat is still suitable. Lek locations may change if a lek is covered with water, or if taller, denser vegetation develops.

Nesting and brood-rearing habitat

Females spend late spring and summer nesting and brood-rearing. Whether an area is suitable for nesting and brood rearing depends on the amount, height, and density of vegetation, especially forbs and grasses from the previous year. This may be to reduce the probability of predation of themselves and their nests.



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Sagebrush (*Artemisia* spp.) can provide food for sharp-tailed grouse year-round.

Sharp-tailed Grouse (*Tympanuchus phasianellus*)

Nests are shallow, hollowed-out depressions on the ground, commonly located beneath low shrubs. They are constructed with mosses, grasses, sedges, ferns, herbaceous plants, leaves, and the female's breast-feathers. Nests are typically built on flat land or slopes facing north or northeast because these areas contain more moisture and vegetation.

Nests are in vegetative cover that is denser than surrounding areas. Nesting habitat varies according to geographic location and vegetation type. Generally, habitat that is structurally diverse, including stands of grasses, shrubs, and forbs, provides high-quality nesting areas. In Idaho, nests were found under big sagebrush (*Artemisia tridentata*), low sagebrush (*Artemisia longiloba*), and balsamroot (*Balsamorhiza* spp.). In British Columbia, nests were found in open grassland and under sparse canopies of young lodgepole pine (*Pinus contorta*), ponderosa pine (*Pinus jeffreyi*), Douglas-fir (*Pseudotsuga menziesii*), and quaking aspen (*Populus tremuloides*). In Minnesota, nests were often beneath willow or bunchgrasses, primarily rough fescue (*Festuca campestris*) and bluebunch wheatgrass (*Pseudoroegneria*

spicata). Sweet clover (*Melilotus officinalis*) is particularly effective in creating the necessary overhead cover sharp-tails need for protection and shade while nesting. Most nests are situated in ungrazed or lightly grazed native prairie, often within or at the margins of thickets of shrubs or small trees. Nests are sometimes built in agricultural fields when native vegetation is sparse.

Once the chicks are hatched, brood habitat must supply an abundant source of insect food, as well as cover to protect chicks from predation. Females prefer to raise broods in areas with abundant and diverse vegetation including shrubs, forbs, broadleaf plants, and grasses. These areas contain abundant insects that chicks depend on for food.

Winter habitat

Sharptail winter habitats include shrubby rangelands, riparian areas, mountain shrub communities, and deciduous and open coniferous woods. Though they are not considered migratory, sharp-tailed grouse may move short distances (less than 21 miles) to winter in woody habitats when snow covers foraging areas. This movement usually occurs between late November and early January, though the timing is strongly influenced by snow.

Although plant species vary among regions, winter habitats are generally characterized by stunted trees or tall shrubs that are used for feeding, roosting, and escape cover. Winter habitat that provides cover must also provide food.

Sharptails often burrow beneath deep, powdery snow to roost after feeding. Snow burrowing helps them conserve heat and avoid detection by predators. Sharptails travel an average of 1 to 5 miles from breeding areas to winter habitats; however, they have been observed moving farther, particularly during harsh winters.

Limiting factors

The most important factors limiting sharptail populations are the loss of open landscape caused by fire suppression, succession, and tree planting. Other pressures on population include predation, hunting, and disease, though these factors are minor compared to the overall loss of habitat.



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Willow (*Salix* spp.) habitats can provide food and cover for sharp-tailed grouse during the winter.

Predation

Predation may be the greatest source of mortality among sharp-tailed grouse. Grouse are prone to predation because of their ground nesting habits, large clutch sizes, and lekking behavior. Predation periods seem to be highest during nesting periods and when birds congregate at leks. Sharp-tailed grouse predators include coyote, mink, weasel, red fox, red-tailed hawk, northern goshawk, peregrine falcon, gyrfalcon, great horned owl, long-eared owl, short-eared owl, northern harrier, golden-eagle, prairie falcon, and bald eagle. Nest predators include skunks, bull snakes, ground squirrels, magpies, crows, and ravens.

Sharp-tail monitoring

Sharp-tailed grouse populations are monitored and assessed using lek counts, brood surveys, harvest surveys, summer flush counts, and wing collections. Monitoring efforts vary greatly in different parts of the range, however. Information on sex ratio, lek attendance by males and females, and lek stability is needed so that lek surveys can be used to adequately monitor populations of sharp-tailed grouse throughout their range. For detailed information on conducting sharptail monitoring, visit the Oregon Department of Fish and Wildlife guidelines at http://www.dfw.state.or.us/wildlife/sagegrouse/pdf/appendix_1.pdf.

Habitat assessment

Landowners can assess the availability of suitable sharp-tailed grouse habitat on their property. Table 3 is an example of an inventory chart for assessing sharptail habitat. For planning purposes, rate the habitat components for the designated planning area



U.S. Fish & Wildlife Service

Sharp-tailed grouse in winter habitats

based on the descriptions given. Habitat components that are limited or absent are likely limiting sharptail habitat quality. Management plans should address the habitat components that are determined to be limiting sharptail habitat potential. Table 3 also offers management suggestions to raise the quality or availability of each habitat component, if it is determined to be limiting.

Habitat management recommendations

Recommended practices to restore sharptail habitat vary geographically. Populations generally respond to habitat management practices that increase food sources, nesting and winter habitats, and strive to maintain grouse habitat in early to mid-successional stages in as large an area as possible. In general, any reduction of large solid stands of tall brush or conifers, followed by replacement with scattered low shrubs in a grass-forb matrix maintained in an early successional stage, will improve sharptail habitat. The protection of riparian areas is particularly important for sharptail wintering habitat.

Prescribed burning

The impacts of fire on sharptails depend on vegetation type, timing, frequency, intensity, and size of burn. Fire can be a threat to sharptail populations in a few areas and a necessity in most others.

In some areas, fire is known to be an important factor in creating and maintaining sharp-tailed grouse habitat. Without fire to create and maintain large forest openings, sharptails of forested ecosystems may decline in numbers or disappear over wide areas. In sagebrush and willow habitats, prescribed fire may be useful for opening dense stands of sagebrush and creating an interspersion of grass and shrub cover. Snowberry, chokecherry, willow, aspen, and Gambel oak, favorites of sharptails, all sprout profusely after fire. Fire suppression can lead to conifers invading bunchgrass prairie habitats in some areas to the detriment of sharp-tailed grouse populations. In these situations, prescribed burning is effective in maintaining suitable habitats. For example, in Minnesota, up to 20,000 acres are burned annually to restore sharptail habitat.

Fire has become a major tool for altering large blocks of sagebrush rangelands; however, improperly managed, it can prove harmful to sharptails. The burning of agricultural fields and grasslands can result in a loss of nests. If necessary, schedule a prescribed burn to take place before nesting begins in the spring. Fall burning may destroy winter cover in some areas.

Table 3 Assessment of habitat components and management suggestions

Habitat component	Habitat requirements	Present	Absent	Condition	Management suggestions to improve limited or absent habitat component
General	Perennial bunchgrasses, forbs, and many species of shrubs in shrub steppe, meadow steppe, mountain shrub, brushy grassland, or riparian/deciduous habitats; gentle topography. <i>P.t. columbiana</i> is commonly associated with sagebrush communities. In the Yukon Territory, the Alaskan subspecies is associated with fire-maintained meadow habitats and areas of gravel outwashes that support aspen parklands				In rangeland and cropland, avoid annual burning. If burning is necessary, it should take place before nesting begins in the spring. In forested areas or dense shrub habitats, use prescribed burning or dozing to open stands of trees and shrubs and create an interspersed system of grass and shrub cover. Implement a rotational grazing system, leaving at least 15% of the area ungrazed in each grazing season. In areas where shrubs comprise less than 10% of the vegetation, avoid any activities that will result in a loss of deciduous tree and shrub height or canopy cover. Restrict management practices to rejuvenate or increase shrub communities to less than 25% of this cover type annually
Food	Adults primarily feed on native vegetation and insects. Chicks depend on insects as a food source during the first 5 weeks after hatching. In spring and summer, the bulk of the diet should consist of greens, buds, fruits, herbs, and shrubs. Winter food includes buds, seeds, herbs, and fruits				Reduce herbicide and insecticide use wherever possible
Breeding habitat	Open, elevated areas with short, sparse vegetation, often surrounded by shrubs. The Columbian subspecies inhabits climax grasslands and leks are typically located on sites that are higher than the surrounding area				Maintain low and open grass on lek sites, and mow or burn over mature vegetation within a half-mile radius of leks
Nesting habitat	Structurally diverse habitat, including stands of grasses, shrubs, and forbs; vegetative cover denser than surrounding areas. Nests under pine (<i>Pinus</i> spp.) and Douglas-fir (<i>Pseudotsuga menziesii</i>) branches have been reported, as well. The Columbian subspecies prefers gentle slopes under residual clumps of bluebunch wheatgrass (<i>Elymus spicatus</i>) for nesting. The Plains subspecies has been found to prefer native grasses and shrubs, as well as hay fields				Manage grazing such that some residual herbaceous vegetation is left standing each fall. Limit burns, haying, and cultivation during breeding season
Brood-rearing habitat	Abundant and diverse vegetation including shrubs, forbs, broadleaf plants, and grasses that contain abundant insects that chicks depend on for food				Manage grazing such that new herbaceous vegetation is allowed to remain each fall. Reduce herbicide and insecticide use wherever possible
Winter habitat	Riparian areas, mountain shrub communities, or forested areas containing large, open-brush landscapes or tall shrubs				Manage habitats so that mature stands of deciduous and coniferous trees are removed or minimized

Sharp-tailed Grouse (*Tympanuchus phasianellus*)

Landowners wishing to use prescribed burning to improve sharptail habitat should consult with local natural resource professionals to determine whether fire would be beneficial to sharptails habitat. In any case, landowners should consult with professionals before performing any prescribed burn. These experts can advise landowners on the process, timing, and legal matters involved.

Vegetation management

As with prescribed burning, the effects of manipulating vegetation in sharptail habitats vary with the type of vegetation present. In grassland habitats, vegetative manipulation should be minimal, as it reduces nesting and brood-rearing habitat. In habitats that are dominated by deciduous shrubs and/or trees, some vegetative manipulation may be beneficial to create a more open grass-brush landscape.



Bill Berg, Minnesota Sharp-tailed Grouse Society

Sagebrush (*Artemisia* spp.) can provide food for sharp-tailed grouse year-round.



Bill Berg, Minnesota Sharp-tailed Grouse Society

Aerial photo showing the beginning stages of a prescribed burn

In grassland habitats, mowing, haying, and other activities that result in a decrease in vegetative cover can be detrimental to sharptail nesting and brood-rearing habitat. Vegetative manipulations causing physical, mechanical, and/or audible disturbances within the breeding complex (all land within 1 1/4-mile radius of leks) can disturb courtship displays, breeding, nesting, and brood-rearing. However, mowing of leks in summer can enhance mating displays the following spring. If vegetative manipulations within the breeding complex are necessary, landowners should ensure that these disturbances do not take place during the breeding season (March through June).

In habitats where small shrubs or trees comprise less than 10 percent of the vegetation, landowners should avoid any activities that result in a loss of deciduous tree and over-mature shrub height or canopy cover. This cover is important to sharp-tailed grouse year-round. In riparian areas, deciduous shrubs and trees should be protected and maintained. In breeding complexes or winter ranges, management practices to rejuvenate or increase shrub communities should be restricted to less than 25 percent of this cover type annually.

In habitats dominated by coniferous and deciduous trees and shrubs, sharptails will respond favorably to the mechanical removal of tall vegetation, which serves to open up breeding, nesting, and brood-rearing habitat.

A major problem in maintaining sharptail habitat is advancing vegetation succession. Over time, brush and tree canopy cover increase and begin to close in on the open grass-brush landscape that sharptails require.



Bill Berg, Minnesota Sharp-tailed Grouse Society

Cat fitted with a special shearing blade, working in stunted black spruce and tamarack lowlands to improve sharptail habitat

Sharp-tailed Grouse (Tympanuchus phasianellus)

When this occurs, public and private landowners can use bulldozers to clear the brush and trees, and large rotary mowers to cut and chip it. In winter, bulldozers, equipped with elongated blades, can “shear” the vegetation at ground level. Technical and cost-share assistance is available from the U.S. Department of Agriculture Natural Resources Conservation Service to assist landowners with this treatment.

Managed grazing

Grazing can be a useful habitat management technique if used properly. Grazing can remove the accumulated standing litter and keeps vegetative succession under control. Rest-rotation and deferred grazing are preferred over season-long grazing and can increase forage production to benefit sharptails. For rest-rotation to be effective, residual grass should be left for nesting cover and some residual herbaceous vegetation should remain each fall. This standing vegetation will then be available for nesting and brood-rearing the following spring. Grazing systems need to be designed to meet the local conditions. It is recommended that if a grazing system is to be used, assistance is sought to aid in the development of a plan that fits the resource and management goals of the area. Livestock should be fenced out of stands of deciduous shrubs and trees, particularly in riparian areas.

Overgrazing by livestock leads to a deterioration of sharptail habitat and increases in grazing pressure are a principal threat to the continued existence of some sharptail populations. Excessive grazing reduces the amounts of grasses and forbs necessary for nesting and brood-rearing cover and destroys deciduous trees and shrubs by trampling, browsing, and rubbing. The destruction of deciduous trees and shrubs is particularly harmful in riparian habitats that provide critical foraging areas and escape cover for sharptails in the winter. In the short term, excessive grazing may only remove nesting cover for a single season. However, continuous overgrazing can alter the vegetative composition of sharptail habitat, resulting in grasses, forbs, and shrubs that will not sustain sharptails.

Overgrazing can be avoided in sharptail habitat by implementing grazing management practices. Properly managed grazing can lead to a diversity of plant cover to benefit sharptails.

Using pesticides

Insecticides applied to both croplands and shrublands are detrimental to sharptails. During the summer, insects are utilized by sharptail chicks and adults. Herbicides that are applied to croplands and shrub-

lands to control nuisance vegetation are also generally detrimental. However, where tree and brush vegetation is encroaching into open landscapes, herbicides can set back this vegetation, as well as prepare an area for prescribed burning. Herbicide applications should be closely followed. If weeds, brush, insects, or other pests continue to be problematic, landowners should consider using Integrated Pest Management (IPM), which combines mechanical, biological, and chemical methods for removing pests. For more information, see Fish and Wildlife Habitat Management Leaflet Number 24: Integrated Pest Management and Wildlife.

Cultivated crops

Agricultural crops, such as oats, wheat, buckwheat, and barley, can be beneficial to sharptails because they increase the autumn and winter food supply (grain) and provide enhanced brood-rearing habitat. However, agricultural practices can also be detrimental to sharptail habitat by converting all native grasslands and shrub habitats to cultivated land. In agricultural areas, sharptail habitat is maximized when there is a mix of both cultivated and wild land. When the majority of available land is under cultivation, sharptail populations decline and may disappear.

Logging

In forested areas, clearcut logging on a landscape level can be beneficial to sharptail populations. Logging creates excellent, though temporary, nesting and escape cover for sharptails. However, logged sites are sometimes re-seeded with conifers, which are detrimental to sharptail habitat.



Livestock should be fenced out of stands of deciduous trees and shrubs in riparian areas.

NRCS

Detrimental habitat practices

Across its range, the sharptail inhabits lower successional stage habitats. Once forests overtake or fragment these landscapes, sharptail habitat is impaired or destroyed. Several land management practices are detrimental to sharptails: tree planting, primarily conifer and hybrid poplar plantations; allowing brush to grow to trees; extensive agricultural development; fire suppression; and insecticide application. Additional threats to sharptail habitat include urban sprawl and associated development.

Available assistance

Technical and financial assistance for the management of fish and wildlife habitat is available to landowners through a variety of government agencies and other organizations. Assistance programs available through various sources are listed in table 4.

Table 4 Assistance programs

Program	Type of assistance	Land eligibility	Sharp-tailed grouse habitat element added	Contact
Conservation Reserve Program	50% cost-share for establishing permanent cover, annual rental payments in return for establishing long-term, resource-conserving covers, additional financial incentives are available for some practices	Cropland (including field margins), riparian pastureland, highly erodible land	Plant native vegetation; perform prescribed burning	NRCS or FSA State or local office
Environmental Quality Incentives Program	Up to 75% cost-share and incentive payments to implement conservation practices to a maximum term of 10 years	Cropland, rangeland, grazing land, and other agricultural land in need of treatment	Develop habitat management plan; plant native vegetation; perform prescribed burning	NRCS State or local office
Partners for Fish and Wildlife Program	Up to 100% financial and technical assistance to restore wildlife habitat under minimum 10-year cooperative agreements	Most degraded fish and/or wildlife habitat	Plant native trees, shrubs, and grasses; installing livestock fencing; perform prescribed burning	U.S. Fish and Wildlife Service local office
Wildlife at Work	Technical assistance on developing habitat projects into a program that will allow companies to involve employees and the community	Corporate land	Develop habitat management plan; plant native vegetation	Wildlife Habitat Council
Wildlife Habitat Incentives Program	Up to 75% cost-share for conservation practices under 5- to 10-year contracts	High-priority fish and wildlife habitats	Develop habitat management plan; improve riparian habitats	NRCS State or local office

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Sharp-tailed Grouse (Tympanuchus phasianellus)

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