WASHINGTON STATE STATUS REPORT FOR THE MARCH 1998

Sharp-Tailed Grouse

by David Hays, Michelle Tirhi
and Derek Stinson

Washington Department of
FISH AND WILDLIFE
Wildlife Management Program

The Washington Department of Fish and Wildlife maintains a list of endangered, threatened and sensitive species (Washington Administrative Codes 232-12-014 and 232-12-011, Appendix C). In 1990, the Washington Fish and Wildlife Commission adopted listing procedures developed by a group of citizens, interest groups, and state and federal agencies (Washington Administrative Code 232-12-297, Appendix C). The procedures include how species listing will be initiated, criteria for listing and delisting, public review, and recovery and management of listed species.

The first step in the process is to develop a preliminary species status report. The report includes a review of information relevant to the species' status in Washington and addresses factors affecting its status including, but not limited to: historic, current, and future species population trends, natural history including ecological relationships, historic and current habitat trends, population demographics and their relationship to long term sustainability, and historic and current species management activities.

The procedures then provide for a 90-day public review opportunity for interested parties to submit new scientific data relevant to the status report, classification recommendation, and any State Environmental Policy Act findings. During the 90-day review period, the Department holds statewide public meetings to answer questions and take comments. At the close of the comment period, the Department completes the Final Status Report and Listing Recommendation for presentation to the Washington Fish and Wildlife Commission. The Final Report and Recommendation are then released 30 days prior to the Commission presentation for public review.

This is the Final Status Report for the Sharp-tailed Grouse. **Submit written comments on this report by 31 March 1998 to: Endangered Species Program Manager, Washington Department of Fish and Wildlife, 600 Capitol Way N, Olympia WA 98501-1091.** The Department will present the results of this status review to the Fish and Wildlife Commission for action at its April 3-4, 1998 meeting in Wenatchee.

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Washington State Status Report

for the

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Dave Ware, Michael Schroeder, Fred Dobler, Jerry Hickman, Jerry King, and Ron Friesz served as members of the Washington Department of Fish and Wildlife Sharp-tailed Grouse Steering Committee.

This status report contains information from the *Washington State Management Plan for the Sharp-tailed Grouse*, Washington Department of Fish and Wildlife, 1995.

EXECUTIVE SUMMARY

Sharp-tailed grouse have declined throughout North America. Of the six recognized subspecies, the Columbian sharp-tailed grouse is the rarest. The Columbian subspecies historically ranged from southern British Columbia, south along the eastern slope of the Cascade and Sierra Nevada mountain ranges to northeastern California, and east to Colorado and Utah.

Columbian sharp-tailed grouse numbers have drastically declined in Washington over the past 100 years. Sharptails were plentiful in eastern Washington when early explorers arrived and became important game birds that were harvested in abundance. Increased agriculture from 1850 to 1880 initially provided more food for sharptails, but continued conversion of grassland and sagebrush habitats to agriculture, along with increased settlement after 1900, contributed to sharptail population declines. By the 1920's, sharptails were extirpated from much of their historic range. Harvest levels were reduced after 1920 and the hunting season for sharp-tailed grouse was closed from 1933 to 1953. The population continued to decline after 1950, due to intensive livestock grazing on remnant patches of shrub/meadow steppe. By the 1950's, sharp-tailed grouse had disappeared from at least six counties where they were once abundant. Sharp-tailed grouse persist in eight scattered subpopulations in Douglas, Lincoln, and Okanogan counties. Areas supporting the most sharptails include Dyer Hill in Douglas County, Swanson Lakes in Lincoln County, and Tunk Valley and Nespelem in Okanogan County.

In 1970, the Department began standardized annual surveys (lek counts) in areas known to contain significant grouse subpopulations. A rough estimate of statewide population size in 1970 was 7,430 birds. The estimated sharp-tailed grouse breeding population in 1997 was 716 birds. Accurate population estimates are difficult to obtain, because all males may not be on leks during counts, lek counts often include some females, not all leks are known, and exact sex ratios are uncertain. The total population may be closer to 1,000 individuals.

A total of 130 different sharp-tailed grouse leks were documented in Washington between 1954 and 1997; only 51 were active in 1997. Birds per lek declined from 16.4 in 1970 to 8.1 in 1997, though this trend may be exaggerated by the increase in the number of smaller leks added to the counts. From 1954 to 1994, 66% of active leks disappeared in Douglas County, 72% disappeared in Okanogan County, and 63% disappeared in Lincoln County. The loss of these active leks is part of a pattern of population decline, range reduction, and isolation of remaining populations. All remaining subpopulations are small and isolated from one another. Four are under immediate threat of extirpation, with less than 25 birds each. Two of the three largest subpopulations left outside of the Colville Indian Reservation are of concern, in part due to their small size (estimated less than 100 individuals each). The Lincoln County population is likely the most stable population outside the Colville Indian Reservation, with substantial ownership by the Washington Department of Fish and Wildlife and the Bureau of Land Management.

The sharp-tailed grouse decline in Washington is primarily attributed to loss and degradation of habitat. Excessive livestock grazing, agriculture, and brush control using herbicides and fire are

primarily responsible for loss of habitat. The meadow steppe (fescue/wheatgrass) of the Palouse and the shrub-steppe (sagebrush/bunchgrass) of the Columbia Basin were replaced with cultivated fields. Remaining sharptail habitat is severely fragmented and in poor condition, especially in Okanogan County where winter habitat has been removed. Loss of nesting, brood rearing, and wintering habitat are important factors limiting population growth.

Cooperation is needed among private landowners, public agencies, and Native American tribes on managing habitat to ensure the survival of sharp-tailed grouse. Most of the sharp-tailed grouse remaining in Washington are on either private lands or the Colville Indian Reservation. Listing sharp-tailed grouse may be of concern for private landowners due to fears of government regulation. Some landowners will benefit because lands important to sharp-tailed grouse are given higher priority for enrollment in the USDA Conservation Reserve Program (CRP).

The CRP program is currently the main financial incentive for private landowners to provide sharp-tailed grouse habitat. Lands enrolled in the CRP appear to support the remaining sharp-tailed grouse subpopulations. Washington farmers have a total of about 871,000 ac enrolled, including 483,000 that were re-enrolled in 1997. This included some important sharp-tailed grouse habitat. If CRP lands were placed back into grain production, further declines in the number of sharp-tailed grouse would result.

Sharp-tailed grouse in Washington are at risk because they have been reduced to small isolated populations, some of which are on degraded habitat. Most of the remaining sharptail habitat is on private lands and is threatened by further alteration and fragmentation. Other than the Conservation Reserve Program, there are no cooperative agreements or mechanisms in place to ensure the long-term preservation or restoration of sharptail habitat.

For these reasons, the Department recommends that the sharp-tailed grouse be designated a State Threatened species.

TAXONOMY

Sharp-tailed grouse belong to the order Galliformes, family Phasianidae, genus *Tympanuchus* and species *phasianellus* (Johnsgard 1973). There are six subspecies of sharp-tailed grouse; *T. p. phasianellus* (northern sharptail), *T. p. kennicotti* (northwestern sharptail), *T. p. caurus* (Alaskan sharptail), *T. p. campestris* (prairie sharptail), *T. p. jamesi* (plains sharptail), and *T. p. columbianus* (Columbian sharptail) (Johnsgard 1973).

The Columbian subspecies was first described by Lewis and Clark in 1805 (Bent 1963). In 1815, Ord classified the Columbian sharp-tailed grouse *Phasianus columbianus*, the Columbian pheasant, because of its resemblance to pheasants. Throughout this report, sharp-tailed grouse refers to any of the six subspecies of sharp-tailed grouse, unless otherwise stated.

DESCRIPTION

Plumage and Extremities

Sharp-tailed grouse are much smaller than sage grouse (*Centrocercus urophasianus*) and slightly smaller than blue grouse (*Dendragapus obscurus*). They are also lighter brown and vocalize more during flight than sage or blue grouse (Hjorth 1970). Sharptails have short feathers above their air sacs (apteria), whereas sage grouse and ruffed grouse (*Bonasa umbellus*) have elongated feathers (Hjorth 1970). Adult Columbian sharp-tailed grouse are smaller and grayer than other subspecies of sharptails (Johnsgard 1973).

Adult male and female sharp-tailed grouse are nearly identical in plumage. Female sharp-tailed grouse have crosswise bars on the two middle feathers of the tail whereas males have longitudinal bars (Edminister 1954, Henderson et al. 1967). Furthermore, females have alternating buff and dark-brown crosswise bars on top of the head, whereas males have dark-brown crosswise bars edged in buff (Henderson et al. 1967). Males have a pink air sac (cervical apterium) on each side of the neck and yellow superciliary combs; both are enlarged during breeding display. The tail is wedge-shaped, with the two middle tail feathers extending beyond the other tail feathers roughly 5 cm (2 in), creating the characteristic sharp tail.

Measurements

Length and Weight. Adult sharptails average 41.7 cm (16.4 in) (Johnsgard 1973) to 48 cm (19 in) long (Hamerstrom in Hjorth 1970). Sharp-tailed grouse weights change seasonally. Males have greater mass than females within each age class and season (Giesen 1992). Adult males also have greater body mass than yearling males in spring, suggesting physical maturity does not occur until the second breeding season (Giesen 1992). In Washington, males averaged 716 g (n = 4) and females averaged 616 g (n = 21) during late winter (Ziegler 1979).

GEOGRAPHICAL DISTRIBUTION

North America

Sharp-tailed grouse have occupied the western and northern United States and Canada since at least the late Pleistocene Epoch, based on fossil records (Snyder 1935, Am. Ornithol. Union 1957). Historically, sharptails ranged from Canada and Alaska, south to New Mexico, east to Hudson and James bays, and west to northeastern California and Nevada (Aldrich and Duvall 1955, Evans 1968, Johnsgard 1973) (Fig. 1). Their historic range encompassed 6 Canadian provinces, 2 territories, and 21 states (Aldrich 1963, Johnsgard 1973). Sharp-tailed grouse have declined in western North America since the early 1900's (Hart et al. 1950, Miller and Graul 1980, Kessler and Bosch 1982), and have disappeared from 8 of the 21 states they formerly occupied (Johnsgard 1973, Miller and Graul 1980).

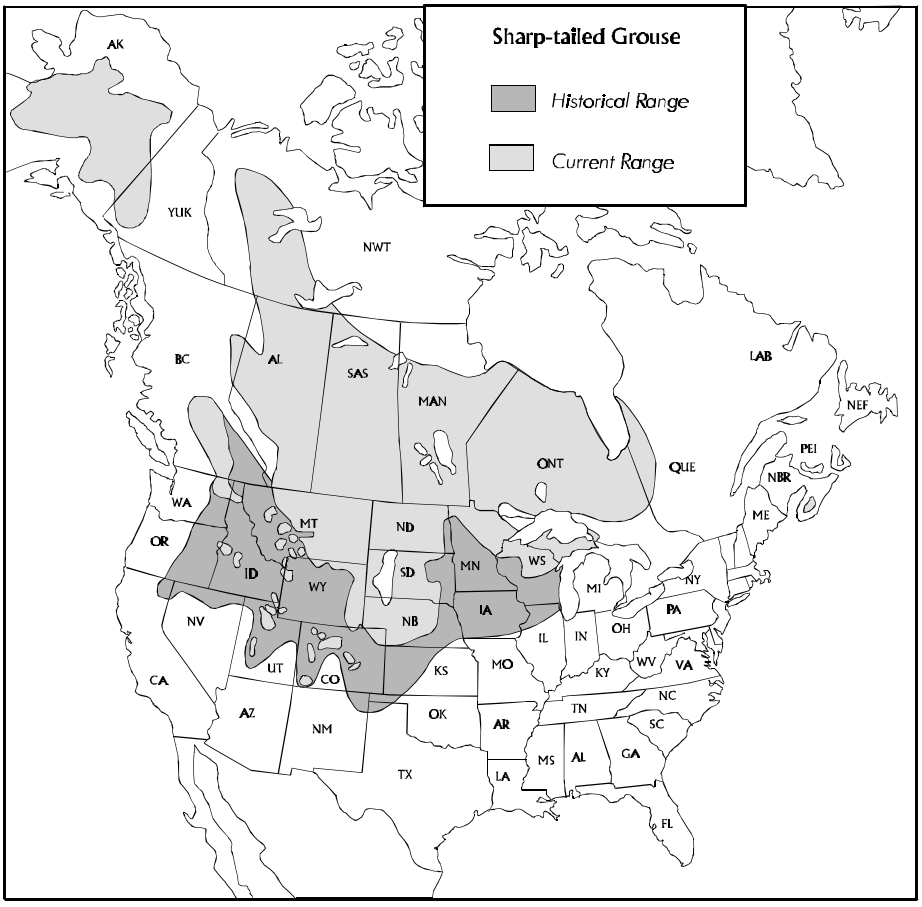

Figure 1. Historic and current range of sharp-tailed grouse in North America (Johnsgard 1973).

Historically, the Columbian subspecies ranged from central British Columbia south across eastern Washington, Oregon, Idaho, and northwestern Montana, south into northern California and Nevada, and east into Utah, western Wyoming and Colorado (Aldrich and Duvall 1955, Aldrich 1963, Miller and Graul 1980).

Currently, Columbian sharptails occupy <10% of their historic range in Idaho, Montana, Utah, Wyoming, and Washington; approximately 50% in Colorado, and 80% in British Columbia (Oedekoven 1985, Sullivan 1988, Ritcey 1995). Columbian sharp-tailed grouse are extirpated from California and possibly Oregon and Nevada (Wick 1955, Evanich 1983, Oedekoven 1985). Possible sightings in Nevada (Goose Creek south of Twin Falls, Idaho) and Oregon (Baker County) were recently reported (Braun 1991). Columbian sharptails are being reintroduced in Oregon (Starkey and Schnoes 1979, Crawford 1986).

Washington

Historically, Columbian sharp-tailed grouse ranged from the Canadian border at Oroville, south to the Oregon border, west to the eastern Cascade foothills, and east to the Idaho border in Whitman County (Fig. 2). Sharptails were plentiful in eastern Washington, inhabiting most of the prairies in the Columbia Plateau and the stream valleys emptying into the Columbia River (Dawson and Bowles 1909, Darwin 1918, Yocom 1952) (Appendix A). By the 1950's, Columbian sharp-tailed grouse were extirpated from six counties formerly having breeding populations (Yocom 1952, Buss and Dziedzic 1955). Yocom (1952:187) reported the following range for Columbian sharp-tailed grouse in Washington:

> ...[N]ear the international boundary of Canada and the United States at Oroville, Washington, on the Okanogan River; southwesterly along the breaks of the Columbia River to Waterville, Douglas County; east along Crab Creek, Lincoln County, to the vicinity of Harrington; thence to the breaks of the Spokane and Columbia rivers to Lincoln County. This vast area is not a continuous range for this species. Actually the population centers are quite scattered.

Isolated sightings were also reported in Adams, Asotin, Klickitat, Spokane, Stevens, and Whitman counties (Yocom 1952, Weber and Larrison 1977). The depiction of historical sharp-tailed grouse range in Jewett et al. (1953) is more inclusive than that in Yocom (1952); sharp-tails currently inhabit about 2.8% of their historic range (M. Schroeder, pers. comm., Jewett et al.1953).

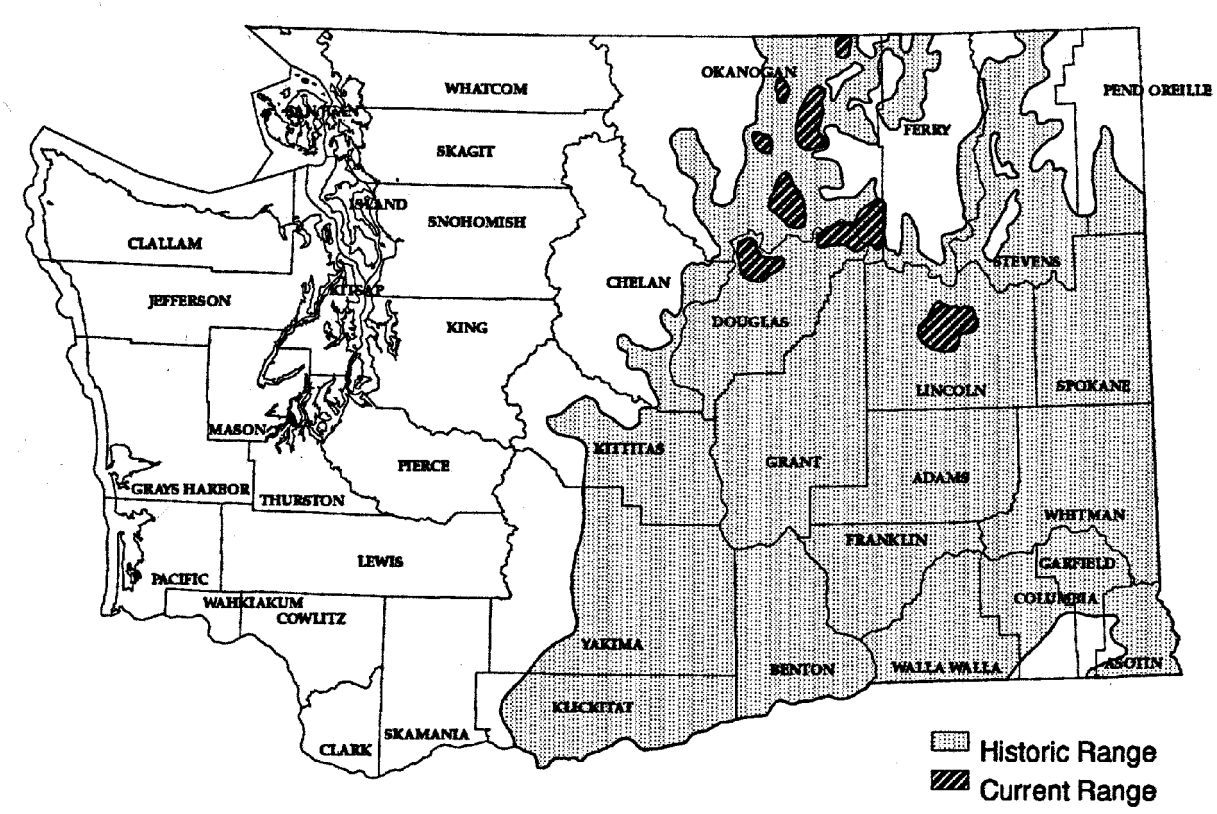

Figure 2. Historic and current range of sharp-tailed grouse in Washington (based on historic records, habitat, and current known locations).

The current range of Columbian sharp-tailed grouse in Washington consists of eight small, severely fragmented populations in Douglas, Lincoln, and Okanogan counties (Fig. 2). Sightings of sharptails were reported in Asotin County in the mid-1980's; however, the Idaho Fish and Game Department transplanted sharptails in Idaho at that time, and some probably dispersed to Asotin County. Sharp-tailed grouse found outside Douglas, Lincoln, and Okanogan Counties are likely transient birds that periodically occupy pockets of remaining shrub/meadow steppe. They contribute little to the statewide population in terms of reproduction or genetics.

NATURAL HISTORY

Behavior

Territoriality and social system. Male and female sharp-tailed grouse gather within areas called leks during the spring for displaying and mating. As many as 25 males may use a single lek (Johnsgard 1973). At the beginning of the breeding season, male sharp-tailed grouse establish small territories on the lek. Males establishing territories in the center mate more often and are killed less often by predators (Peterle 1954, Rippen 1970, Moyles and Boag 1981).

Rippin (1970) recognized a central ring of dominant males surrounded by three outer rings of sub-dominant males. Territorial position correlated to mating success; dominant males were responsible for 76% of the copulations (Rippin 1970). Aggressive behavior between males is most visible at territorial boundaries (Hjorth 1970). When males meet, they face each other, utter aggressive calls, and use their wings to strike the opponent in the body or head (Johnsgard 1973). Males confront each other face to face, with bills close to the ground and rumps high (Hjorth 1970). Both males lower the rear part of their bodies in slow motion and perfect unison. Males may lie in this position a half an hour or longer, sometimes retracting their wings and falling asleep (Hjorth 1970).

Sharp-tailed grouse are usually found singly or in small groups during the summer and in large coveys from fall until spring. Flocks are the basic social unit of sharp-tailed grouse (Gratson 1988). Sharptails may gather in flocks to share information, search for food, and guard against predators while foraging (Gratson 1988). Habitat (Weddell et al. 1991), the availability of cereal crops (Hart et al. 1950, Meints 1991), or snow depth (Gratson 1988) may influence the size of flocks. In Washington, Weddell et al. (1991) found large flocks in riparian areas during winter. In Idaho, 80% of sharptails observed in winter were within 2 km (1.2 mi) of leks (Marks and Marks 1987). In Utah, large sharp-tailed grouse flocks broke down in winter but formed again in spring, usually near leks, after snow receded (Marshall and Jensen 1937, Hart et al. 1950).

Sexual behavior. The most conspicuous sexual behavior is the courtship display performed by males on leks during spring. Males display and make vocal sounds to defend their territory and lure females for mating. To begin the display a male leans forward and extends his head, inflates his apteria, pushes his tail upwards, raises the feathers on his head, and enlarges his superciliary combs (Hjorth 1970). The wings are then extended horizontally. Next, the male stamps the ground vigorously, producing a drumming sound, and moves the tail from side to side, eliciting a rattling sound. The male then relaxes the feathers and wings for a short period before beginning the display again (Hjorth 1970). Males often do aerial displays (flutter flights) on leks. During aerial display, males jump upward 1 m and outward 3 m, while flashing the white feathers on the wings, belly, and tail (Hjorth 1970).

Flight. Sharp-tailed grouse can fly, yet prefer to walk (Hart et al. 1950). They generally fly when disturbed, when moving long distances, or when foraging in trees and shrubs (Hart et al. 1950). Sharptails fly 2 to 15 m (5-50 ft) above the ground, flapping their wings for approximately 27 to 46 m (89-151 ft) and then gliding. Generally, sharp-tailed grouse will fly 0.4 to 5 km (0.25-3 mi) at 30 to 35 mph before landing (Hart et al. 1950).

Home Range

Home range size depends on topography, vegetative cover, season, and availability of food. Sharp-tailed grouse have small home ranges in the spring and summer (Giesen and Connelly 1993). In Washington, male home range in spring was 11 to 46 ha (27-114 ac) (Hofmann and

Dobler 1988b). Average home range size for all sharptails from spring to fall was 100 ha (247 ac) in Colorado (Giesen 1987) and 190 ha (469 ac) in Idaho (Marks and Marks 1987a).

Seasonal and Daily Movements

Sharp-tailed grouse display a partial migration in which some birds move between breeding and wintering sites, and others remain near breeding sites throughout the year. Sharp-tailed grouse travel an average of 1.6 to 8 km (1-5 mi) from leks to winter sites (Janson 1950, Hamerstrom and Hamerstrom 1951, Marks and Marks 1987a, Gratson 1988, Meints 1991, Weddell et al. 1991). In Idaho, they were observed moving 20 km (12 mi) to wintering sites (Meints 1991). In Washington, sharp-tailed grouse moved up to 14 km (8.5 miles) between breeding and wintering ranges (Schroeder 1994).

Most sharp-tailed grouse visit leks in spring that are within 3 km (2 mi) of nesting sites (Bredehoft 1981, Oedekoven 1985, Giesen 1987, Klott 1987, Marks and Marks 1987a, Klott and Lindzey 1990, Meints 1991). Sharptails move shorter distances on a daily basis in spring and summer than in fall and winter because food and shelter are more abundant (Hart et al. 1950). In summer, daily movements were <0.1 to 0.4 km (0.06-0.2 mi) in Utah and <0.1 km (<0.06 mi) in Idaho (Meints et al. 1992).

Interspecific Competition

Little information is available on the impact of interspecific competition in grouse species. Potential competition for nesting and wintering sites may be the most likely form of competition. Ring-necked pheasant have been documented parasitizing nests of plains sharptails (*T.p. jamesi*) (Vance and Westeneier 1979). The range of sharp-tailed grouse overlapped the range of ring-necked pheasants (*Phasianus colchicus*), ruffed grouse (*Bonasa umbellus*), and sage grouse in Utah (Hart et al. 1950) and Idaho (J. Connelly, pers. comm.). Sharp-tails may also share range with blue grouse, gray partridges (*Perdix perdix*), and wild turkeys (*Meleagris gallopavo*) (Hart et al. 1950).

Diet

Sharp-tailed grouse prefer to eat native vegetation rather than introduced species, although cultivated grains supplement the diet (Hart et al. 1950, Jones 1966). Plants comprise most of the diet year-round. All sharptails consume insects when available, but insects compose only a small proportion of the diet of adults. Jones (1966) reported that sharptails consumed fewer insects than other species of prairie grouse. However, chicks in the first few weeks of life rely heavily on insects for food (Hart et al. 1950, Parker 1970, Johnsgard 1983). Chicks primarily consumed insects until 4 to 5 weeks of age in Utah (Hart et al. 1950).

In spring, sharptails eat forbs, grasses, and insects (Hart et al. 1950, Jones 1966). In Washington, the spring diet of sharptails included grass blades, flower parts (buttercup [*Ranunculus glaberrimus*] and dandelion [*Taraxacum officinale*]), beetles, and grasshoppers (Jones 1966).

In Idaho, fruit from shrubs and trees found in mountain and riparian habitat were consumed by sharptails during summer (Marks and Marks 1987a). The availability of forbs and perennial bunchgrasses declines during summer and when droughts occur (Sauer and Uresk 1976). However, stream drainages generally contain fruits and berries year-round; these drainages are important foraging areas for sharptails in late summer and during droughts (Hofmann and Dobler 1988b).

Sharp-tailed grouse consume more agricultural grains, insects, and weed seeds during fall than other seasons (Marshall and Jensen 1937, Hart et al. 1950, Jones 1966). The winter diet of sharp-tailed grouse consists of the fruit, seeds, and buds of deciduous trees and shrubs. In Washington, the buds and branches of waterbirch (*Betula occidentalis*) were important food items for sharptails during winter (Zeigler 1979).

Water

There have been no studies indicating the importance or use of water by sharp-tailed grouse. Sharptails were rarely found near open water in Idaho, even in summer (Parker 1970, Marks and Marks 1987a). Oedekoven (1985) believed sharptails in Wyoming obtained water from the plants they consumed.

HABITAT REQUIREMENTS

General

Sharp-tailed grouse use a variety of habitats, including steppe, (shrub-steppe and meadow steppe), mountain shrub, and riparian/deciduous habitats. Shrub/meadow steppe is a term used in Washington to describe sharp-tailed grouse habitat. Shrub/meadow steppe features both shrub-steppe and meadow-steppe characteristics. Shrub steppe is a descriptive term for plant communities consisting of one or more layers of perennial grass with a conspicuous, but discontinuous, layer of shrubs above (Daubenmire 1988). Shrub-steppe communities in Washington typically contain shrubs, such as big sagebrush (*Artemisia tridentata*), three-tipped sagebrush (*A. tripartite*), and bitterbrush (*Purshia tridentata*), and a variety of grasses and forbs. Meadow steppe is a descriptive term for plant communities that are dense at ground level, support many grasses and forbs with broad leaves, and have few shrubs. Meadow steppe is barely dry enough to exclude trees and generally have meadow characteristics (Franklin and Dyrness 1973, Daubenmire 1988). Typical meadow-steppe communities in Washington have several grasses,

including bluebunch wheatgrass (*Agropyron spicatum*) and Idaho fescue (*Festuca idahoensis*) (Daubenmire 1988).

Canopy cover is defined as the percentage of the ground surface covered by vegetation. In this report, four levels of sagebrush canopy coverage are differentiated: low (5 to 14%), medium (15 to 25%), high (26 to 40%), and very high (>40%). Big sagebrush, commonly the dominant shrub in Washington's shrub steppe, seldom grows with canopy coverage >40%, except in areas having deep soil and supplemented moisture (J. Connelly, pers. comm.; C. Perry, pers. comm.).

Sharp-tailed grouse exhibit marked preferences for habitat characteristics (Giesen 1987, Marks and Marks 1987a, Meints 1991). They primarily choose habitat based on height and density of vegetation, and secondarily on species composition (Kirsch 1969, Hofmann and Dobler 1988b, Stralser 1991). Good sharptail habitat contains perennial bunchgrasses that are well developed, forbs, and many species of shrubs (Oedekovan 1985, Marks and Marks 1987a, Meints 1991). Sharp-tailed grouse often use transitional areas between habitat types (habitat edge), especially when the area contains a mixture of vegetative species and structure (Marks and Marks 1987a, Meints et al. 1992, Stralser 1991).

Sharptails use riparian areas where budding trees can be found during winter (Klott 1987, Marks and Marks 1987a, Klott and Lindzey 1990). Sharptails preferred grass areas in Utah (Hart et al. 1950); grass, forbs, and patches of shrubs in Idaho and Wyoming (Oedekoven 1985, Marks and Marks 1987a); and mountainous areas containing shrubs in Colorado (Giesen 1987). McArdle (1977) reported the canopy cover of shrubs must be high for sharp-tailed grouse survival in shrub-steppe communities.

Elevation and Slope

Sharp-tailed grouse are found at elevations of 300 to 1,350 m (984-4,429 ft) in Washington (M. Schroeder, pers. comm.), 1,830 to 2,900 m (6,000-9,500 ft) in Colorado (Evans 1968), and 1,900 to 2,500 m (6,230-8,200 ft) in Wyoming (Oedekoven 1985). The degree of slope is important. Sharptails preferred slopes $\leq$60% in Idaho (Marks and Marks 1987a) and Utah (Evans 1968) and only selected steep slopes when adjacent to flat areas (Marks and Marks 1987a). Sharptails preferred slopes facing northeast in Idaho (Marks and Marks 1987a) and Colorado (Giesen 1987), possibly because of less wind, higher humidity, and more vegetation (Giesen 1987).

Breeding

The focal area of the breeding season is the lek. Male sharp-tailed grouse prefer sites that are open and flat for displaying (Zeigler 1979, Hart et al. 1950). Sparse vegetation on a lek enables males to see predators and be seen by females (Johnsgard 1973). Most leks are located on elevated grounds, such as knolls and ridge tops, where little vegetation grows (Rippen 1970, Zeigler 1979, Oedekoven 1985). Leks often contain thin, rocky soils or claypan (Rogers 1969). Sharp-tailed grouse use a variety of sites as leks including roads, airport runways, prairie-dog

towns, cropland, or native rangeland grazed by livestock (Hart et al. 1950, Rogers 1969, Hillman and Jackson 1973, Oedekoven 1985). Leks averaged 15 m^2 (161 ft^2) in Wyoming (Oedekoven 1985).

The breeding complex is an area where display, mating, nesting, brood rearing, foraging, and loafing occur and typically includes all land ≤2 km (1 mi) from the lek (Giesen and Connelly 1993). Grass, forbs, and shrubs within the breeding complex are important. In Wyoming, leks were situated in grass or grass/forb and mixed-shrub habitat (Oedekoven 1985). In Utah, sharp-tailed grouse abandoned a lek after fire removed surrounding vegetation (Marshall and Jensen 1937). Average shrub height surrounding leks was 36 cm (14 in), and shrub density was 10,778 shrubs/ha (4,364 shrubs/ac) in Wyoming (Bredehoft 1981).

Late Spring

Female sharp-tailed grouse devote late spring and early summer to 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 (residual vegetation) (Meints et al. 1992). Female sharp-tailed grouse prefer range in excellent condition for nesting (Blus 1965). Visual obstruction readings (VOR) are the height of a Robel Pole obstructed by vegetation (to the nearest 5 cm [2 in]) (Robel 1972). Good nesting habitat in Idaho had a VOR of 2.5 decimeters (10 in) (Meints et al. 1992).

Typically, nests are built on slopes that face northeast because there is more moisture and vegetation (Hofmann and Dobler 1988b). Residual, native grasses and forbs conceal the nest and provide shelter for the brood during spring and early summer (Marks and Marks 1988, Meints et al. 1992, Giesen and Connelly 1993). Nests may be built in agricultural fields when native vegetation is lacking; however, females are less successful at producing chicks in fields (Hart et al. 1950, Zeigler 1979). In Washington, females selected areas with relatively thick cover for nesting (Schroeder 1996). Some hens nested in idle cropland, such as land enrolled in the Conservation Reserve Program (CRP), and others in sagebrush or forbs mixed with grass (Schroeder 1996; M. McDonald, pers. comm.).

Summer and Fall

Female sharp-tailed grouse spend summer raising chicks (brood rearing). Brood-rearing habitat contained shrubs, forbs, and bunchgrasses in Idaho (Marks and Marks 1987a), Utah (Marshall and Jensen 1937, Hart et al. 1950), Washington (Schroeder 1996), and Wyoming (Klott and Lindzey 1990). Broods are often found in grasslands, agricultural and CRP fields, and in areas having many broadleaf plants, because these areas contain abundant insects that chicks depend on for food (Bernhoft 1969). Females prefer to raise broods in areas with abundant and diverse vegetation (Marks and Marks 1987a, Klott and Lindzey 1990, Meints 1991). Degree of slope or aspect is not important in brood-rearing habitat (Marks and Marks 1987a). Broods are often

observed near habitat edges. In Wyoming, Klott and Lindzey (1990) observed broods foraging on the edges of large openings and meadows and avoiding the centers.

Summer habitat used by females with broods may be different than habitat used by males or females without broods. In late spring and early summer, females with broods move to areas containing shrubs and broadleaf plants (Johnsgard 1973, Klott and Lindzey 1990). In Washington, this included wheat fields, riparian shrubs, (especially aspen, *Populus tremuloides*), sagebrush (especially three-tipped sagebrush), idle cropland (CRP), and introduced and native forbs and grasses (Schroeder 1996). Summer habitat in Colorado contained ≥70% shrub cover (Giesen 1987). In Wyoming, brood-rearing habitat had more grass and forbs and fewer shrubs (Oedekoven 1985); shrub canopy cover averaged 29% (Klott and Lindzey 1990). In Idaho, Marks and Marks (1987a) reported that both male and female sharptails used areas containing more shrubs than random sites during summer, and McArdle (1977) found most grouse (77%) were in areas with 20 to 40% shrub canopy cover.

In late summer and fall, female sharptails with broods move to riparian areas or mountainous areas containing shrubs (Giesen 1987). Habitat used in late summer and fall typically supports vegetation that is green, produces berries, and provides shade (Giesen 1987). In Washington, all sharptails flushed by Hofmann and Dobler (1988b) in April were in areas dominated by big sagebrush. In June, most sharptails (85%) were flushed from areas where bitterbrush was the predominant species (Hofmann and Dobler 1988b).

Winter

Sharp-tailed grouse use deciduous trees and shrubs located in riparian or mountainous areas during winter (Marks and Marks 1988, Meints 1991, Giesen and Connelly 1993). Movement to deciduous trees and shrubs as snow depth increased was reported in Idaho (Marks and Marks 1987a, 1988; Meints 1991), Montana (Swenson 1985), Utah (Marshall and Jensen 1937), and Washington (Weddell et al. 1991). Deciduous trees and shrubs provide protective cover, berries, seeds, buds, and catkins that sharptails depend on in winter. Shrub cover was >40% of winter habitat in Idaho (McArdle 1977).

In Washington, sharp-tailed grouse winter in a variety of cover (Schroeder 1996). Waterbirch, rose, chokecherry, and big sagebrush are important species (Zeigler 1979 (Hofmann and Dobler 1988a, Weddell et al. 1991). Sharp-tailed grouse in Wyoming wintered on ridges, hilltops, and steeper slopes with little snow and mixed vegetation (Oedekovan 1985). In Idaho, Marks and Marks (1988) located most sharptails in winter ≤2 km (1 mi) from the lek used in spring. Although Meints (1991) recorded sharptails in Idaho moving ≥20 km (12 mi) from the lek during winter, Meints et al. (1992) considered the area ≤6.5 km (4 mi) around each lek as winter habitat.

Sharp-tailed grouse roost in woody vegetation (mostly shrubs) during winter or under the snow (snow burrow) when deep, soft snow exists (Oedekoven 1985; Swenson 1985; Marks and Marks

1987a, 1988). Snow burrowing may help sharptails conserve heat and avoid detection by predators (Marks and Marks 1987a).

POPULATION DYNAMICS

Reproduction

Season. Male sharp-tailed grouse may engage in breeding display throughout fall and winter, but more vigorous displays are performed in spring (Hart et al. 1950, Evans 1968, Oedekoven 1985). The mating season generally begins about the same time each year depending on snow conditions, food and habitat availability, and female attendance on leks (Oedekoven 1985, Giesen 1987). In Wyoming, most females appeared on leks when snow covered <10% of the area (Oedekoven 1985). The peak of the mating season occurred in March in Idaho (Marks and Marks 1987a), early April in Washington (Schroeder 1994), and mid-May in Wyoming (Oedekoven 1985). Display and mating decrease towards the end of May (Evans 1968, Oedekoven 1985).

Fidelity to leks. Most male sharp-tailed grouse return to the same lek or lek complex every spring (Bergerud 1988a, Giesen and Connelly 1993), and they often remain near the lek year-round (Twedt 1974). Dominant males may return to the same lek to maintain their territorial position and subordinate males may return to the same lek to establish a central territory for the future (Giesen 1987). Bergerud (1988a) believes males return to the same lek because they are familiar with the site and because they want to maintain their territories. Adult males may occasionally establish new leks, and other leks become obsolete because of habitat changes or disintegration of local populations.

Mating. Mating begins after males and females congregate on a lek. Typically, males congregate on leks 30 minutes to 1 hour before sunrise (when daylight becomes available) and remain on leks for 2 to 3 hours (Hart et al. 1950, Uhlig and Hamor 1960, Rogers 1969). Weather, predators or humans on a lek have caused sharptails to temporarily (Hart et al. 1950, Rogers 1969) or completely (Farrar 1975, Marshall and Jensen 1937) stop displaying and mating. Sharptails are polygynous, that is males may mate with many individuals. Females leave the lek soon after mating (Johnsgard 1973).

Nesting and Incubation. After mating, females devote most of their time to building nests, laying eggs, and raising chicks; males do not assist in these activities. Nest placement is very important and females search for good nesting habitat as soon as snow recedes (Brewer and Harrison 1975). Females first choose an adequate nest location and secondly, adequate brood-rearing habitat (Brewer and Harrison 1975). In Washington, females nested an average of 1.6 km (1 mi) from a lek (Schroeder 1996).

Sharptail clutches averaged 10.8 eggs in Washington, 10.5 in Idaho, and 11 eggs in Utah (Hart et al. 1950, Marks and Marks 1987a, Schroeder 1996). In Washington, average starting date of

incubation was 8 May for all nest attempts (Schroeder 1996). The incubation period for sharptails ranges from 21 - 25 days (Edminister 1954, McEwen et al. 1969). Peak of hatch occurred in early and late June in Idaho (Marks and Marks 1987a) and late May to early June in Utah (Hart et al. 1950). Hickey (1952) estimated that grouse in general lose roughly 50% of their clutches because of predation, physically weak hens, inclement weather, and food shortage. Nest success (percentage of nests that hatched $\geq$ 1 egg) averaged 32 % (n = 127) in Utah (Hart et al.1950), and 62% (n = 13) in Colorado (Giesen 1987). In Washington, nest success averaged 43% (n = 67), but renesting resulted in 65% of females hatching a clutch (Schroeder 1996)

Brood rearing. Sharp-tailed grouse raise one brood each year. The chicks are precocial, and are able to walk shortly after hatching, fly at 7 to 10 days old, and become more active at 2 to 3 weeks (Hart et al. 1950). They travel approximately 46 m (50 yd) by the end of their first month (Hart et al. 1950). Although chicks can fly short distances, they usually walk and generally freeze or hide rather than fly when disturbed (Hart et al. 1950). Hens also feign injury to protect the brood from predators, and will leave only when predators come very close to the brood (Hart et al. 1950). Hens often move the brood to open areas containing succulent vegetation and insects (Hart et al. 1950, Gratson 1988). In Washington, females remained $\leq$ 1 km (0.621 mi) from their nest site during early spring, 0.5 km (0.3 mi) during early summer, and 1 km (0.621 mi) during late summer (Schroeder 1994).

The number of surviving chicks affects population dynamics. Bergerud (1988c) analyzed 8 studies and determined a chick mortality rate of <40%; Bergerud concluded mortality is not correlated with clutch size and occurs regardless of the presence or absence of predators. Chick survival until fall was 66% in Colorado (Giesen 1987) and 50% in Idaho (Marks and Marks 1987a).

Sex and Age Ratios

Sex and age ratios are usually determined from information supplied by hunters or from wing samples taken from harvested birds. Age ratios are influenced by the way season data are collected (Table 1). Overall, sharp-tailed grouse sex ratios are approximately 1:1.

Table 1. Sex and age ratios (percent) of sharp-tailed grouse.

Location	Adult M[a]	Adult F	Juvenile M	Juvenile F	Source
Alberta	47	53	50	50	Hilton and Wishart (1981)
Colorado	45	55	47	53	Giesen (1987)
Michigan	60	40	56	44	Ammann (1957)
North Dakota[b]	53	47	na	na	Kletts (1962)
North Dakota	51	49	49	51	Kobriger (1981)
South Dakota	55	45	56	44	Jackson and Henderson (1965)
South Dakota	52	48	54	46	Robel et al. (1972)

[a] M=male, F=female.
[b] Includes all ages of sharp-tailed grouse.

Population Size and Density

Bergerud (1988c) listed five parameters that affect the number of grouse each year: percentage of hens nesting (and percent re-nesting); clutch size and nesting success; chick survival in summer; juvenile survival in winter; and the mortality rate of adults. Mortality rates in winter remain relatively constant, therefore the size of the population each year depends on breeding success (Bergerud 1988b). Virtually all hens nest. Most grouse species experience a high loss of chicks before 3 weeks of age because chicks cannot maintain their internal body temperature (Bergerud 1988c). Bergerud (1988c) listed three mortality factors often mentioned for sharp-tailed grouse chicks: 1) predation, 2) chilling from weather, and 3) starvation, but predation seems the most important.

In Washington, Hofmann and Dobler (1988a) surveyed riparian and deciduous habitat within 5 km of leks and estimated a winter density of about one sharptail per 3 ha (7.4 ac). In Colorado, Rogers (1969) used lek counts to estimate an overall spring density of one Columbian sharptail per 26 ha (64 ac). Edminster (1954) estimated a density of one sharptail per 11 - 50 ha (27 -125 ac) for summer and fall in several states.

Mortality

Survival rates. Annual survival rates for sharp-tailed grouse range from 17% to 43% (Hart et al. 1950, Robel et al. 1972, Moyles and Boag 1981, Giesen 1987), however most rates refer to hunted populations. In Washington, M. Schroeder (pers. comm.) found an annual survival rate of approximately 60% for radio-marked birds of both sexes. Bergerud (1988c) reported a 59% survival rate for chicks (includes all steppe species of grouse), and a 40 to 25% survival rate for breeding sharp-tailed grouse (subspecies combined).

Predation. Species that gather on leks to display and breed are more conspicuous to predators (Hartzler 1974). In addition, grouse are naturally vulnerable to predators because of their large clutches and their habit of nesting on the ground (Bergerud 1988c). Bergerud (1988c) reported that 37% of sharp-tailed grouse nests (subspecies combined) fail because of predation. Raptors, which are mostly diurnal, and ground predators, which are mostly nocturnal, are the two major predators of sharp-tailed grouse. Grouse may display at dawn and dusk to avoid raptors and ground predators (Hartzler 1974). Predation may limit the growth of sharp-tailed grouse populations. Coyotes (*Canis latrans*) and raptors were primary predators in Idaho and Utah (Hart et al. 1950, Marks and Marks 1987b). Although predation is the most important proximate cause of mortality, the rate of predation is partly dependent on the quality of habitat. Grouse have long coexisted with predators. Habitat that provides good cover for nesting and riparian deciduous habitat for wintering would allow grouse to increase despite predation. However, losses to predation can be more significant for small populations. Predator control programs can be locally effective at improving nest success, but can be expensive and success is often limited.

Hunting. Leopold (1933) believed unregulated hunting could reduce any wildlife population to a level that was unstable. However, well regulated harvest likely has little affect on population stability in healthy populations. In Utah, sharptails continued to decline despite a closed season for 25 years (Hart et al. 1950). In Colorado, Braun (1975) reported that 50 to 70% of a sharp-tailed grouse population is killed annually regardless of hunting. However, in Idaho, Marks and Marks (1987a) believed sharptails could be over-harvested because they concentrate near leks during fall and in flocks during winter. Marks and Marks (1987a) supported maintaining a closed season on small, isolated populations of sharptails. In 10 studies involving 8 species of grouse, Bergerud (1988c) concluded that hunting increased annual mortality by adding to, rather than replacing natural mortality during winter. Most of the studies cited by Bergerud (1988c) reported a harvest of >30% of the population, which may have caused the additive effect.

Disease and parasitism. Boddicker (1967) reported consistent and heavy parasitic loads in sharp-tailed grouse; males and chicks had the highest number of parasites. Sharp-tailed grouse parasites include ticks (Acarina), chiggers (Trombidiidae), lice (Mallophaga), tapeworms (Cestoda), round worms (Nematoda), hippoboscid flies (*Ornithomyia anchineuria*), and mites (*Ornithonyssus sylviarum*) (Bernhoft 1969, Boddicker 1967, Dick 1981). Boddicker (1967) believed parasites seldom caused direct mortality of sharptails, but could limit populations that are stressed, such as during severe weather or when food is limited.

Accidents and cultivation. Sharp-tailed grouse may be injured or killed by flying into powerlines and fences. In Utah, Hart et al. (1950) found the bodies of 20 sharp-tailed grouse ≤91 m (100 yd) from newly erected telephone lines. Marking wires and fences with flagging or paint may help minimize accidents. Although sharptails are occasionally killed accidentally, this does not appear to be a significant source of mortality in Washington.

Agricultural fields can be a dangerous attraction to sharptails. Hens are attracted to grain stubble and insects in cultivated fields during spring, and may build nests there (Hart et al. 1950, Hillman

and Jackson 1973). During spring plowing, the nests are destroyed and often both hens and chicks are killed. Hart et al. (1950) reported that in Utah during 1937-1939, 4.7% of females and 1% of juveniles in 150 broods were killed by farm implements.

Pesticides sprayed on or near areas occupied by sharp-tailed grouse may cause mortality. No study of the effect of organophosphate insecticides on sharp-tailed grouse have been performed, but sage grouse died after feeding, roosting, and loafing in alfalfa fields sprayed with dimethoate and after feeding on alfalfa foliage that was sprayed (Blus et al. 1989). Sage grouse that occupied potato fields sprayed with methamidophos also died or suffered adverse affects (Blus et al. 1989). In all fields where sage grouse were affected, the maximum allowable rates of dimethoate and methamidophos were applied (Blus et al. 1989). In Montana, McEwen and Brown (1966) studied the effects of dieldrin and malathion, two insecticides used for grasshopper control, on sharp-tailed grouse. Lethal doses of dieldrin ranged from 5.0 to 32.2 mg/kg; malathion ranged from 200 to 240 mg/kg. The LD_{50} value (the dose that will kill 50% of the test specimens) for dieldrin was 6.9 mg/kg; no LD_{50} was calculated for malathion.

Water containing high concentrations of dissolved solids ($\geq$3,087 ppm) was toxic to sage grouse (Post 1960) and may also be toxic to sharp-tailed grouse. Although all birds are susceptible to lead poisoning (Locke and Friend 1992), it has not been diagnosed in sharp-tailed grouse.

POPULATION STATUS

Past

Historically, the Columbian sharp-tailed grouse was an important game bird in eastern Washington (Cooper 1860, Suckley 1860, Darwin 1918, Buss and Dziedzic 1955). Settlers harvested wagon loads of sharptails in a single day in the 1880's and 1890's, presumably in high-concentration areas (Larrison and Sonnenberg 1968). Sharp-tailed grouse were common in shrub/meadow steppe bordering river tributaries of eastern Washington. They were less common throughout the shrub-steppe region, although sharptails were abundant in Yakima County (Dawson and Bowles 1909, Myers 1948, Oliver 1983). Sharptails also inhabited the sagebrush-forest transition zone as summarized by Merker (1988:3):

> Within the transition zone forest of northeastern Washington, sharptail habitat had probably always been limited to the valleys and low foothills (Bendire 1892). ...Douglas (1829) reported that sharptails were a principal food item near Kettle Falls, Stevens County. Early grain fields and cut-over land may well have been beneficial (Yocom 1952, Jewett et al. 1953). In this zone in Spokane County, sharptails were "common" in the Turnbull Slough area (now a national wildlife refuge) in the 1930's (Yocom 1952). The Deer Park airport supported a lek for many years and the associated grouse often used adjacent logged-over habitat (L. Wadkins, pers. comm.). As many as 50 grouse were present on this lek in 1959 (Ziegler 1979). However, the

> last confirmed sighting in Spokane County was in 1964. ...The latest records for this area of the transition zone are the personal reports of S. Judd on the eastern Colville Indian Reservation. He recalls them as an "abundant game bird" through the 1940's. Coveys were known through the 1970's, but now the bird is believed extirpated from this portion of the reservation.

Sharp-tailed grouse hunting was less restrictive before 1900. In Whitman County, hunting seasons in the late 1800's were 6 months with a daily bag limit of 20 sharptails (Buss and Dziedzic 1955). Population declines in the early 1900's resulted in the state legislature restricting all counties to a 4-month sharptail season (August to November) with a daily bag limit of 10 (Buss and Dziedzic 1955). In 1909, Whitman County further reduced the season to 3 months with a daily bag limit of 5; the county closed the season in 1919.

In 1933, a moratorium was placed on sharp-tailed grouse hunting statewide. In 1953, a 2-day season on sharp-tailed grouse was re-opened in three counties with daily and possession limits of one and two, respectively. Harvest data for sharp-tailed grouse were never tallied separately from other grouse species, so harvest figures are unavailable. In 1954, the daily limit increased to two, the possession limit increased to four, and in Okanogan County, the season increased to 8 days. The illegal kill of sharptails by hunters seeking other species, and by orchardists may have been significant during this period (J. Patterson, pers. Comm.). All of eastern Washington was re-opened for sharptail hunting in 1965 and daily and possession limits remained at two and four until 1976. Possession limits were reduced to two in 1977. All counties except Lincoln were closed to sharptail hunting in 1985 because of population declines. Continuing declines in the sharp-tailed grouse population resulted in a statewide season closure in 1988.

An indication of long-term population trends in Washington was obtained through an analysis of counts at active leks. Between 1954 and 1997, 130 leks were documented. Lek counts performed since 1970 show fluctuations in the population (Fig. 3, Appendix B). Counting procedures were standardized in 1970 and biologists visited many more leks after 1987, and since the early 1990's, virtually all known lek sites have been visited each year. An increase in the statewide count of birds on leks from 1970 to 1996 was influenced by the increased frequency and standardization of lek counts after 1970 and the discovery of satellite leks (new locations near a primary lek). Regional trends were not always consistent, and it was common for counts to increase in one area while counts in adjacent areas declined (M. Schroeder, pers. comm.).

The average number of birds per lek is useful in monitoring local populations and may indicate the long-term population trend. The total number of leks used by sharptails can remain stable while the number of birds per active lek indicates a declining population. In 1970, statewide lek counts averaged 16.4 birds/lek (Fig. 4). Between 1954 and 1997, the number of birds/lek varied between 5 and 27, but the trend seems to be a decline. This information is difficult to interpret because: 1) new leks found over time may be smaller than previously located leks, 2) smaller leks may be less likely to be monitored, 3) the maximum number of males located may increase

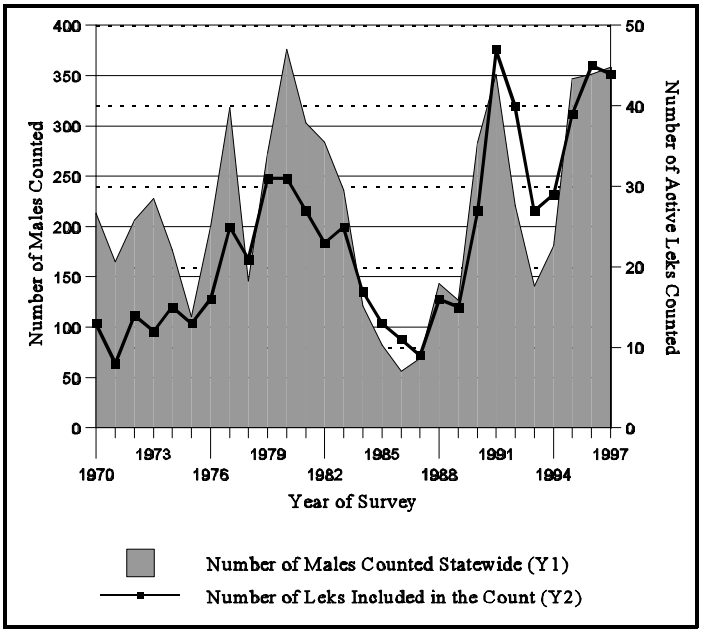

Figure 3. Male sharptails counted statewide during lek counts, 1970-1997.

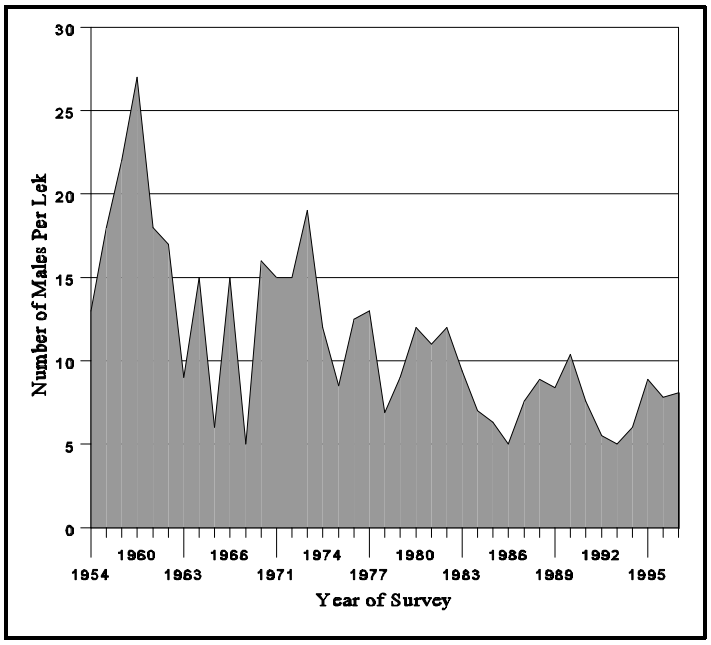

Figure 4. Mean number of sharp-tailed grouse counted per lek in Washington, 1954-1997.

with increasing survey effort, and 4) the same sample of leks are not necessarily monitored in consecutive years.

From 1977 to 1986, a 42% decrease in active leks was reported and birds per lek had declined by 82% to an average of 5 birds/lek in 1986 (Hofman and Dobler 1989). Some WDFW personnel hypothesized that the decline was part of a natural population cycle. However, the decline continued and by 1988 the average was as low as 4 birds/lek (Hofmann and Dobler 1989). The decline was experienced at both the state and county level. For example, from 1980 to 1989, the Lincoln County population estimate declined from 1,500 to 150 birds (Hickman 1989). Okanogan County had the greatest decline in lek attendance (21 birds/lek in 1971 to 5 birds/lek in 1996) and several leks declined to zero. Douglas County had the least change (9 birds/lek in 1971 to 6.3 in 1996). Overall, the number of birds per lek declined from 16.4 in 1970 to 7.6 in 1996.

To further examine the relationship between lek counts and population change, we looked at counts at active leks surveyed only in consecutive years to roughly estimate historic population size and rate of decline. Active leks were included even if they changed location, until they were determined to be inactive (declined to and remained at 0 birds). We used only consecutive year counts because frequently-monitored leks are the best indicators of trends in populations. Annual rates of decline were calculated from the proportional changes in mean number of birds per lek (Fig. 5). Surveys indicated a decline from the previous year in 31 of 42 years studied from 1954 - 1996.

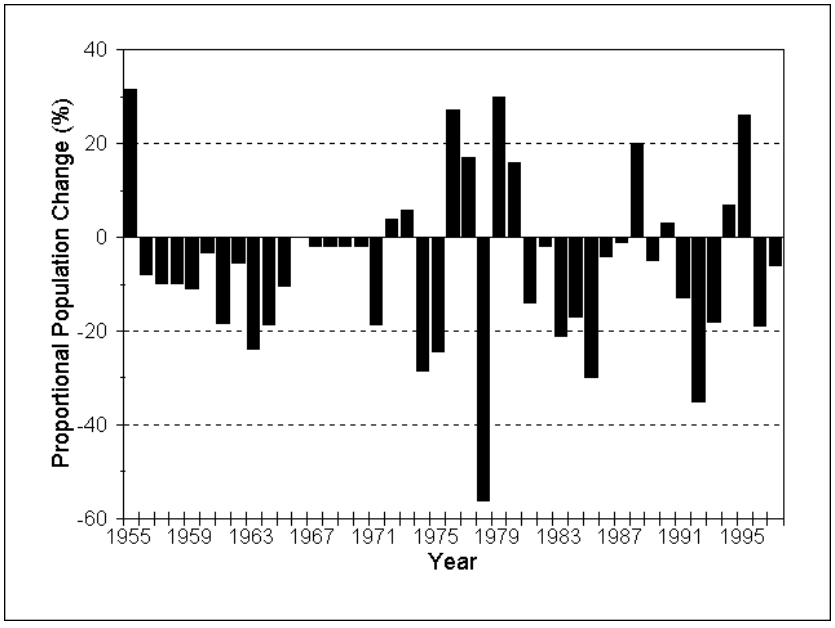

Figure 5. The proportional change in sharp-tailed grouse numbers estimated from annual lek counts.

Past population estimates are based upon back-calculation from current counts, following the percent annual population change from lek counts (Fig. 6). Overall, the population appears to have declined from approximately 7,430 individuals in 1970 to 760 in 1996, for an annual average decline of 5.9%. Following the same analysis back to 1960, the population estimate would be roughly 18,828 birds. Although lek counts have been conducted since 1954, the data since 1970 are likely best due to an increased number of leks counted and standardized counting procedures. This analysis has inherent sources of bias and is limited by the lack of complete historical survey information, and therefore numbers should be considered rough estimates. The principle assumption is that changes in historic lek counts reflect changes in population size. Confidence intervals for these estimates cannot be calculated.

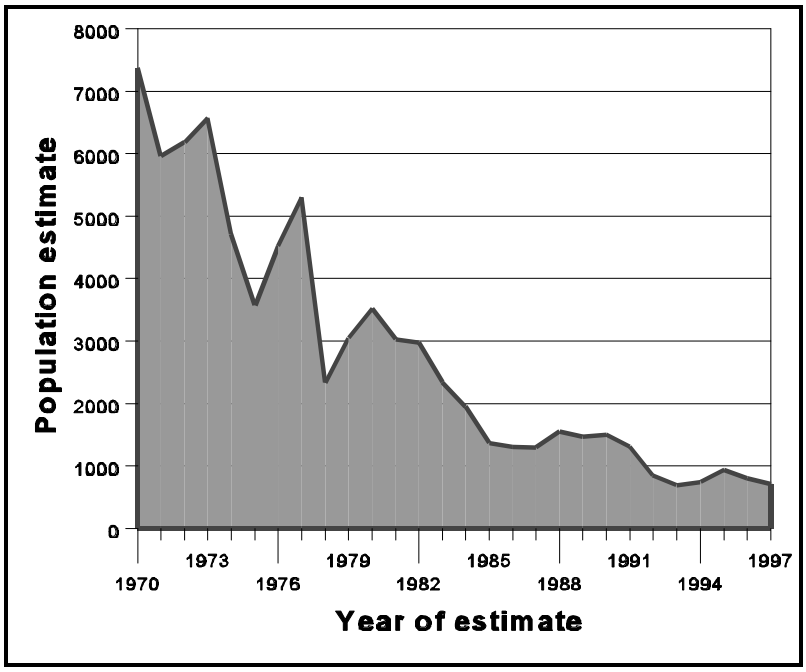

Figure 6. Estimates of the sharp-tailed grouse population in Washington, 1970-1997 (based on annual changes in lek counts).

The discussion and analyses above only look at leks that were active (birds present) in any year. The limited analysis resulted from reduced monitoring when active leks became inactive. The loss of active leks over time gives an indication of regional trend in reduced population, range, and the resulting isolation of subpopulations of sharp-tailed grouse. Active leks in Douglas, Okanogan, and Lincoln counties disappeared at similar rates (66%, 72%, and 63%, respectively) from 1954 to 1994 (Schroeder 1994).

In summary, historical accounts of tens of thousands of sharp-tailed grouse, declines in the number of males per lek, reductions of 63-72% in the number of active leks, and a range

reduction of approximately 97% indicate a persistent downward trend in the sharptail population in Washington.

Present

The 1997 breeding population of sharp-tailed grouse in Washington has been estimated through lek counts and a population model. During spring surveys, 358 grouse were counted on 44 leks in 3 counties (Table 2, Appendix B). A model based on scientific literature, input and survey data from WDFW biologists, and current research in Washington was used to estimate the size of the 1997 breeding population.

Table 2. Results of 1997 sharp-tailed grouse lek counts in Washington.

County	Birds	Leks	Birds/lek
Okanogan (on Colville Reservation)	169	17	9.9
Lincoln	88	10	8.8
Okanogan (off Colville Reservation)	59	9	6.5
Douglas	42	8	5.3
Total	**358**	**44**	**8.1**

The model assumed all leks were known and surveyed, all males were on leks during counts, and the male to female sex ratio was 1:1 (see "Sex and age ratios," page 12). This model would underestimate actual population size if some leks were not located, if all males were not on leks during counts, if the sex ratio was not 1:1, and if surveys were flawed (e.g., bad weather, incomplete counts, etc.). The model would overestimate actual population size if lek counts included females (which are difficult to distinguish). The population estimate based on the model is 716 sharp-tailed grouse in Washington in 1997 (Table 3). Allowing for additional unsurveyed habitat, M. Schroeder (pers. comm.) suggests as many as 1000 sharp-tailed grouse may remain in Washington.

Table 3. Estimated size of the Washington sharp-tailed grouse breeding population in 1997.

Sex	Population estimate	Estimate source	Reference
Male	358	Statewide lek counts	WDFW unpubl. data
Female	358	1:1 sex ratio	see Table 1
Total	**716**	**Males + Females**	

The remaining sharp-tailed grouse in Washington are distributed in eight fragmented subpopulations. Of these, the subpopulation on the Colville Indian Reservation is the largest remaining in the state (Table 2). It is estimated to include about 352 grouse and is considered self-sustaining. Of the subpopulations outside of the Reservation, the largest population is in western Lincoln County (177 birds). The subpopulation south of Bridgeport in Douglas County contains about 31 birds. Outside the reservation, Okanogan County supports a total of only 138 birds. This includes four subpopulations that each support fewer than 25 grouse and they are likely unstable and near extirpation. Sharp-tailed grouse in each of the eight geographic areas (Fig. 2) appear to be isolated (Schroeder 1996).

HABITAT STATUS

Past

Reduction in the population and range of sharp-tailed grouse in Washington is primarily attributed to habitat loss. Most shrub/meadow steppe has been sprayed, plowed, mechanically treated, burned, cut, or flattened to grow crops or forage for livestock. Before settlers arrived in the early 1800's, much of eastern Washington was covered with large tracts of sagebrush/ bunchgrass vegetation representative of shrub steppe and large tracts of native grasses/deciduous shrubs representative of meadow steppe (Daubenmire 1988). Within the shrub steppe zone, sagebrush coverage ranged from 5 to 26% and perennial grass coverage ranged from 69 to 146% on undisturbed sites (Daubenmire 1988). Few ungulates grazed these areas since the last glaciation (Mack and Thompson 1982, Daubenmire 1988). Therefore, large tracts of sagebrush/bunchgrass vegetation evolved without intense livestock grazing. Native Americans seldom burned these areas (Daubenmire 1988), although natural fires occurred.

Horses, which were obtained by Native Americans around 1730, were the first animals to intensively graze eastern Washington in recent history (Harris and Chaney 1984). Cattlemen were the first settlers in the Palouse region; they introduced cattle in 1834, sheep in the 1880's, and increased the number of horses from 1830 to 1880 (Daubenmire 1988). Where shrub/meadow-steppe vegetation was grazed excessively by domestic animals, the density and canopy cover of native grasses was reduced allowing adapted alien species to invade (Daubenmire 1988). Moderate to intense grazing can increase both canopy cover and density of sagebrush. However, shrub/meadow steppe that has not been greatly modified by grazing or fire contains many components, including varying densities and canopy cover of sagebrush and perennial bunchgrass. Fencing of rangeland and regulated grazing after 1930 (Harris and Chaney 1984) resulted in increased sagebrush and allowed some recovery of rangelands.

The Homestead Act of 1862 lead to the proliferation of small farms in eastern Washington between 1863 and 1910 (Harris and Chaney 1984). Horse-drawn combines were introduced in 1890 (Buss and Dziedzic 1955). Plowing and burning of shrub/meadow steppe for agricultural expansion were widespread (Buss and Dziedzic 1955, Yocom 1956). Although fire has relatively

little influence on meadow steppe, it seriously disturbs shrub steppe (Franklin and Dyrness 1973). Most of the land conversion for dryland farming occurred from 1900 through the 1940's, and for irrigated farming after 1950. The early development of dryland farming required large herds of horses, which grazed freely on rangelands when they were not being used for farming (Harris and Chaney 1984).

Initially, agriculture increased food and water supplies, which allowed sharp-tailed grouse to expand their range into previously unused areas (Yocom 1952). The introduction of tractor farming in the 1920's and 1930's reduced the need for horses and allowed some recovery of rangeland (Buss and Dziedzic 1955). However, tractor farming also increased the area under cultivation (Buss and Dziedzic 1955). The conversion of native habitat to cropland intensified, and sharptails declined further (Yocom 1952).

Mechanization enabled farmers to remove riparian habitat from drainage basins that separated small fields. Small fields were combined into large fields that were seldom used by sharptails. Much of the fescue/wheatgrass steppe of the Palouse and the sagebrush/grass shrub steppe of the Columbia Basin, which were important to sharptails, were replaced by cultivated fields (Yocom 1952). Brushy draws and creek bottoms were replaced by ditches and gullies. Pastures and fences formed of brush that provided food and cover were eliminated (Yocom 1952). As cultivation intensified and shrub/meadow steppe continued to decline, sharptails began using stubble fields for nesting and burning of fields in spring resulted in the destruction of nests (Yocom 1943, Myers 1948).

By 1920, 80% of the Palouse region available for agriculture was cultivated (Buss and Dziedzic 1955). From 1920 to 1950, sharptails continued to occupy scattered patches of shrub/meadow steppe where cultivation was not practical (Hudson and Yocom 1954, Merker 1988). However, continued excessive livestock grazing on these patches contributed to the decline of sharptails after 1950 (Hudson and Yocom 1954, Merker 1988).

Much riparian habitat along the Columbia River and its tributaries was destroyed or degraded during the Columbia Basin Project and subsequent federal reclamation projects (Pedersen 1982). From 1947 to 1982, 301,500 ha (744,705 ac) of brush control occurred under the federal Agricultural Conservation Program and the Columbia Basin Project in Washington (Pedersen 1982). This brush control included 88,393 ha (218,331 ac) of sagebrush chemically or mechanically controlled and 213,120 ha (526,406 ac) converted to irrigated cropland and facilities. Twenty percent (60,800 ha [150,176 ac]) of all brush control occurred in Douglas, Lincoln, Kittitas, and Yakima counties; Douglas and Lincoln counties were core areas for sharptails. Sagebrush may reinvade an area over time following treatment. However, sagebrush control in eastern Washington is an on-going activity. Other reclamation projects that have reduced riparian habitat include the conversion of small streams to irrigation ditches and the use of subsurface waters to irrigate fields (Strahler 1952). Although significant, the amount of sagebrush removed under federal programs was small compared to sagebrush removed by private landowners for agriculture (Pedersen 1982).

Winter riparian habitat continued to be removed throughout areas occupied by sharptails. For example, Zeigler (1979) documented a 51% decline in waterbirch and aspen from 1945 to 1977 in Johnson Creek, Okanogan County. In addition, 13% of landowners contacted in Okanogan County were planning to remove waterbirch or aspen (Zeigler 1979). J. Patterson (pers. comm.) reports that much winter habitat in Okanogan County has been lost to home sites and a lek was destroyed by a recreational subdivision. Hofmann and Dobler (1988a) also reported the loss of waterbirch at two locations in Okanogan County in less than 3 months of observation. Sharptails no longer used these areas after waterbirch was removed (Hofmann and Dobler 1988a). In Lincoln and Douglas counties, most habitat was removed for cultivation before 1950.

Present

An estimate of remaining shrub/meadow steppe in Washington is unavailable, but the estimated 4.2 million ha (10.4 million ac) of shrub steppe that existed before settlers arrived in eastern Washington was reduced by about 60% (Dobler et al. 1996; Table 4).

Table 4. Historical and remaining shrub steppe (ha) habitat in Washington counties (Dobler et al. 1996)[a].

County	Historical	Remaining	% Loss
Adams	474,960	111,903	76
Benton	412,875	201,009	51
Chelan	80,770	30,761	62
Douglas	438,006	201,084	54
Franklin	301,486	92,311	69
Grant	645,822	228,732	65
Kittitas	232,466	129,578	44
Lincoln	504,013	189,470	62
Okanogan[b]	172,998	106,520	38
Walla Walla	308,007	71,215	77
Yakima	595,469	343,092	42
Total	**4,166,870**	**1,705,674**	**59**

[a] Values based on LANDSAT data analyzed by Jim Eby at the WDFW Remote Sensing Laboratory using predictions of plant community distributions from Daubenmire (1988).
[b] Analysis for only 20% of Okanogan County has been completed.

The current range of sharp-tailed grouse includes small portions of Douglas, Lincoln, and Okanogan counties. In 1992, 82% of the range was privately owned, 12% was managed by the Colville Confederated Tribes (CCT), 4% was managed by the Washington Department of Natural Resources (DNR), and 3% was managed by the WDFW, the U.S. Bureau of Land Management, and the U.S. Forest Service (Table 5). The table reflects land both owned and managed by federal or state agencies. Approximately 9000 hectares (22,250 acres) have been purchased by WDFW primarily for management of sharp-tailed grouse.

Table 5. Administration and ownership of land in sharp-tailed grouse range in Washington[a].

Agency/Ownership	Area (ha)	% of Total
Private/Other	142,709	64
Colville Confederated Tribes	63,385	28
Wash. Department of Natural Resources	11,053	5
Wash. Department of Fish and Wildlife	9,000	4
U.S. Bureau of Land Management	1,122	<1
U.S. Forest Service	135	<1
Total	**224,118**	**100**

[a] Ownership and administration tallies generated by the Washington Department of Fish and Wildlife Geographical Information System Program based on Washington Department of Natural Resources public land surveys, January 1992.

The Conservation Reserve Program (CRP) is a federal program which pays private landowners and public agencies that have highly erodible crop land (usually dryland wheat) to establish vegetative cover for a minimum of 10 years. Payments to individual landowners or land managers are described in a signed contract, which specifies a date of termination for the contract. Many acres of cropland in the counties that compose historical sharptail range were enrolled in CRP in the late 1980's. Lincoln County and Douglas County enrolled the most (Table 6). In 1996 the CRP program increased its emphasis on the restoration of native vegetation and wildlife benefits.

The CRP may benefit sharp-tailed grouse by establishing perennial vegetation, and allowing the reinvasion of sagebrush and other brush species. Improved grazing practices and CRP resulted in higher numbers of sharptails in southern Idaho (Meints 1991). In North Dakota, a sharptail lek was located on or near every tract of retired land $\geq$24 ha (60 ac) under the Soil Bank Program, a land retirement program similar to CRP (Kirsch 1969, Kirsch et al. 1973). As acres in the soil bank declined, the sharptail population also declined, and active leks remained only on soil bank land. In the southern United States, where sharp-tailed grouse range has receded markedly in modern times (Hamerstrom and Hamerstrom 1951, Aldrich and Duvall 1955), there is a tendency for sharptails to disappear as more land is cultivated (Bent 1963) and to increase when open ground becomes brushy (Hamerstrom 1939).

Table 6. Conservation Reserve Program (CRP) land in Washington counties within current sharp-tailed grouse range[a].

County	Approximate county land area (ha)	Land enrolled in CRP (ha)	Percent of total CRP enrolled
Douglas	465,165	56,453[b]	63
Lincoln	591,268	31,699	36
Okanogan	1,352,005	812	<1
Total	**3,652,539**	**88,964**	**100**

[a] Figures obtained from the U.S. Department of Agriculture, Farm Service Agency, Spokane, Washington. Areas presented in hectares.

[b] Data for Douglas County is 1998 preliminary; additional acres are pending.

In Lincoln County, sharptails used CRP land for nesting, brood rearing, foraging, and thermal and escape cover (Stralser 1991, M. McDonald, pers. comm.). Of 17 nests located in Lincoln County in 1995, 11 were on CRP lands (M. McDonald, pers. comm.).

In Douglas County, sagebrush has reinvaded many CRP fields (R. Friesz, pers. comm.), which may have increased the quality of habitat for sharp-tailed grouse. Sharptails likely use some CRP fields because, in terms vegetation height, they provide good nesting habitat. The quality of a CRP field depends on the type of vegetation planted and the length of time the field has been in CRP. The potential benefits of the CRP to sharp-tailed grouse are not realized when unsuitable species, such as crested wheatgrass, are planted. Sharp-tailed grouse select only CRP land that provides the grass, forb and shrub cover needed for nesting cover, and typically avoid CRP fields in poor condition (M. Schroeder, pers. comm.). In general, the longer a field is in CRP, the better its quality.

CONSERVATION STATUS

Legal Status

Sharp-tailed grouse are listed as a game species in Washington by the WDFW, although the season has been closed since 1988. By policy, sharptails have also been considered a Candidate species by the WDFW since 1991. Sharp-tailed grouse are designated a priority species and their habitat a priority habitat by the WDFW Priority Habitats and Species (PHS) Program.

The U.S. Fish and Wildlife Service (USFWS) considers the Columbian sharp-tailed grouse to be a species of concern.

Management Activities in Washington

Species monitoring. Since the 1950's, the WDFW has conducted counts of sharp-tailed grouse to assess population status, trends, hunting seasons and bag limits. Early surveys often occurred haphazardly, providing little information on population levels or trends. More intensive survey efforts were initiated in 1970. Counts of historical and newly established leks are conducted each spring. Winter surveys are currently conducted by the U.S. Bureau of Land Management (BLM) in cooperation with the WDFW in Lincoln County on BLM acquisition sites. In addition, the WDFW funded a project in cooperation with The Nature Conservancy to expand lek surveys in Okanogan County.

Management plan. A statewide management plan for sharp-tailed grouse was developed by the WDFW in 1995 (Wash. Dept. Fish and Wildl. 1995). This plan established population and habitat objectives and strategies for sharp-tailed grouse in Washington. The management plan primarily outlined activities to be conducted by the WDFW and holds no authority over activities on other public or private lands. Tasks and objectives included in the plan are currently being implemented.

Habitat protection and enhancement. The WDFW has been coordinating the acquisition of upland habitat for sharp-tailed grouse through the Bonneville Power Administration (BPA) and the Washington Wildlife and Recreation Coalition. A total of about 9000 ha (22,250 ac) has been purchased for sharp-tailed grouse. The following criteria are used to prioritize acquisition areas for sharp-tailed grouse:

- Areas of high quality shrub/meadow steppe currently occupied by sharp-tailed grouse
- Key wintering areas
- Overlapping leks and winter-use areas on remaining shrub/meadow steppe
- Areas supporting many shrub/meadow steppe obligates including sharp-tailed grouse
- Shrub/meadow steppe areas within 8 km (5 mi) of active leks
- Historic use areas/travel corridors

Land has been acquired by WDFW in the Scotch Creek, Tunk Valley, and Chesaw area of Okanogan County, and at Swanson Lakes in Lincoln County, specifically for sharp-tailed grouse. Shrub/meadow steppe on these wildlife areas is enhanced through grass and forb seeding and planting of sagebrush. Riparian areas are enhanced through shrub and tree plantings. The WDFW is also engaged in shrub and meadow steppe restoration activities on the Wells Wildlife Area in northern Douglas County.

The WDFW is actively working to increase the benefits of CRP lands to sharp-tailed grouse. The WDFW works with landowners and federal agencies to extend current CRP contracts and promote new contracts while requiring vegetative plantings beneficial to wildlife, such as native forbs, grasses, and sagebrush.

Potential sharp-tailed grouse habitat management is being provided through the WDFW Upland Wildlife Restoration Program (UWRP). The UWRP was designed to work directly with private landowners on the protection and enhancement of their lands for upland wildlife. Beneficial habitat enhancement projects by the UWRP are being conducted in Lincoln and Douglas counties.

Population reintroduction and augmentation. In the early 1950s, sharptails were trapped in Okanogan County and released on Turnbull National Wildlife Refuge. In the early 1960s, sharptails from Okanogan County were released on the Wooten Wildife Management Area. Neither of these releases were successful (J. Patterson, pers. comm.). The WDFW is currently evaluating potential sites for possible reintroduction or augmentation of populations.

Research. Studies of Washington's sharptails were conducted by Yocom in 1952 and by Zeigler in 1970. Zeigler (1979) investigated the distribution and status of sharptails in eastern Washington. In 1988, Hofmann and Dobler investigated wintering densities, home range, habitat use, and spring movements of Columbian sharptails in Okanogan, Douglas, and Lincoln counties (Hofmann and Dobler 1988a,b).

A sharp-tailed grouse research project entitled "Productivity and Habitat Use of Sharp-tailed Grouse in North-central Washington" was initiated by the WDFW in 1992 and is nearing completion. The research is focused on habitat-use, population status, and estimating rates of mortality and recruitment. The WDFW also funded a master's thesis project at the University of Idaho examining habitat selection of sharp-tailed grouse in Washington. That project should be completed in 1998 (M. McDonald, pers. comm.).

Coordination and partnership. The WDFW coordinates with several agencies on habitat management issues for sharp-tailed grouse. The WDFW is coordinating with the Bureau of Land Management on consolidation of shrub and shrub/meadow steppe habitat in eastern Washington. The WDFW is continuing to work with the Natural Resources Conservation Service to extend current CRP contracts, promote new contracts in areas inhabited by sharp-tailed grouse, and improve the benefits of CRP lands to wildlife.

Sharp-tailed grouse are benefitting from the Columbia River Wildlife Mitigation Project through the Bonneville Power Administration (BPA). Approximately 5,200 hectares (13,000 acres) of habitat added to the Swanson Lakes Wildlife Area will provide sharp-tailed grouse habitat. House Bill-1309 (Washington State Legislature 1993) requires the WDFW to develop goals to preserve, protect, and perpetuate wildlife and fish occupying shrub steppe (and shrub/meadow) habitat or lands that are classified agricultural lands, rangelands, or grazable woodlands.

Recreation. The sharp-tailed grouse hunting season was closed in Washington in 1988. There is increased interest in recreational viewing of sharp-tailed grouse, but no estimates of this activity are available.

Enforcement. Illegal harvest of sharp-tailed grouse is believed to be insignificant in Washington at this time. The current focus of enforcement is to discourage illegal harassment of sharp-tailed grouse breeding activity and to enforce the closed hunting season.

Information and education. The WDFW provides the public and other agencies with the most appropriate methods for managing sharp-tailed grouse habitat through the Department's *PHS Management Recommendations* and a *Sharp-tailed Grouse Fact Sheet*. Copies of these materials and the management plan are available at regional offices of the WDFW.

FACTORS AFFECTING CONTINUED EXISTENCE

The primary factors affecting the continued existence of sharp-tailed grouse in Washington relate to habitat loss and alteration and the precarious nature of small, geographically isolated subpopulations. Three of the major factors that contributed to the decline of sharp-tailed grouse and their habitat in Washington are still threats today: conversion to agriculture, conversion to pastureland for livestock, and overgrazing. The removal of shrubs as part of agricultural practices reduces the quantity and quality of winter habitat, and the degradation of shrub and meadow steppe habitat as a result of livestock management reduces the quality of breeding habitat. The remaining subpopulations are small and isolated from one another, which increases the risk of extirpation.

Threats to Small Isolated Populations

Population isolation is potentially a major factor influencing the continued existence of sharp-tailed grouse in Washington. As grouse populations naturally fluctuate due to environmental conditions, the lower the population level, the greater the risk of extirpation. The isolation of populations may have important ramifications for their genetic quality and recruitment (Lacy 1987). It may require human transport of individuals to counteract loss of fitness due to genetic drift.

It is not clear if the Washington populations are declining due to their isolation or because of a combination of other factors. Initial evidence (M. Schroeder, pers. comm.) indicates that most movements of radio-marked birds are insufficient to allow interchange of individuals among populations in north-central Washington. Although current estimates of the total population range up to 1000 individuals, it is divided among 8 small isolated subpopulations. Four of these populations are estimated to contain fewer than 25 birds. These populations are under immediate threat of extirpation (Reed et al. 1986). Near-term extirpation risks due to population size are present for two of three other populations remaining outside the Colville Indian Reservation (Gilpin 1987), as less than 100 individuals are estimated at each site (M. Schroeder, pers. comm.). These populations are likely much less tolerant of environmental changes, such as habitat degradation and weather extremes, than populations in Lincoln County and the Colville Indian

Reservation. Predation is more of a concern for these very small populations than it would be for larger populations in good habitat.

A wide variety of genetic problems can occur with small populations, and these genetic problems can interact with demographic and habitat problems and lead to extinction (Gilpin and Soule 1986). Overall threats to sharp-tailed grouse are greater with individuals spread through small subpopulations than one larger population.

Habitat Quality

Sharptails in Douglas and Okanogan counties, and to a lesser degree in Lincoln County, are now restricted to high-elevation areas, specifically those areas that have both shrubs and grasses (Schroeder 1996). High winter mortality resulting from declining quantity and quality of winter habitat is likely the most significant factor causing the decline in the sharptail population in Washington (Schroeder 1996). Protecting and enhancing high quality habitat where sharptails continue to concentrate, and restoring key low-elevation winter sites is vital to conservation of sharp-tailed grouse in Washington.

Habitat quality overall is improving for sharp-tailed grouse in Lincoln County, where WDFW and the Bureau of Land Management are actively managing habitat for sharp-tailed grouse. Continuation of lands enrolled in the Conservation Reserve Program is also important to improve habitat quality in Lincoln and Douglas counties. WDFW acquisition of lands in Okanogan County near Tunk Valley, Chesaw and Conconully should also result in improving habitats. Private and tribal lands with sharp-tailed grouse that are grazed change in habitat quality with the intensity of grazing. Trends on these grazed lands are not predictable.

Grazing

Increases in grazing pressure on currently occupied sharp-tailed grouse habitat is a principal threat to the continued existence of populations. In general, when grazing by livestock reduces the grass and forb component, sharp-tailed grouse are excluded (Hart et al. 1950, Brown 1966b, Parker 1970, Zeigler 1979). Loss of deciduous cover is especially severe near riparian areas that attract livestock in summer because of water and shade; this cover provides critical foraging areas and escape cover for sharptails throughout the year (Zeigler 1979, Marks and Marks 1987a). Trampling, browsing, and rubbing decrease the annual grass and forbs, deciduous trees, and shrubs needed for food and shelter in winter (Parker 1970, Kessler and Bosch 1982, Marks and Marks 1987a). Mattise (1978) found overgrazing very detrimental in nesting and brood-rearing habitat.

In Montana, Brown (1968) reported that the reduction in habitat due to intensive livestock grazing resulted in the elimination of sharptails in particular areas. Sharptails were observed shifting use to ungrazed areas following livestock use of traditional sites (Brown 1968). Marks

and Marks (1988) also found sharptails in western Idaho selecting home ranges that were least modified by livestock grazing.

The effects of grazing on sharp-tailed grouse reported vary and appear to depend primarily on intensity, duration of grazing, kind of livestock, site characteristics, precipitation levels, and past and present land-use practices. Grazing systems currently used in range management include seasonal, deferred, and rotation grazing (Stoddard, et al. 1975). Hart et al. (1950) found light to moderate grazing benefitting landowners and sharptails on the foothills and benchlands of Utah. Weddell (1992) concluded that rest rotation and deferred grazing were less detrimental to sharp-tailed grouse than season-long grazing, and suggested the disadvantages of increasing grazing under any of these systems outweigh the advantages for sharp-tailed grouse. Even light to moderate grazing can be detrimental in areas with a history of overgrazing, because it may prevent recovery of the native vegetation.

Kessler and Bosch (1982) surveyed sharp-tailed grouse management practices and concluded that grazing and the resulting habitat loss are the most serious threats to sharp-tailed grouse survival. Their survey of states and provinces with past or present Columbian sharp-tailed grouse populations found respondents regarded low intensity grazing as beneficial and high intensity grazing to be negative in its effects on sharptails (Kessler and Bosch 1982). Twenty percent more respondents found moderate grazing negative in its effects and twice as many preferred deferred and rest rotation over continuous grazing. Five of the seven states or provinces with Columbian sharp-tailed grouse listed overgrazing as a major issue/problem related to maintaining this species and its habitat (Braun 1991).

Grazing is a continuing threat to sharp-tailed grouse because of unpredictable changes in land ownership, grazing economics, and the needs of private landowners. Grazing pressure is increasing in several important sharptail areas in Washington (M. Schroeder, pers. comm.).

Future of the Conservation Reserve Program

The removal of CRP habitat in Lincoln, Douglas, and Okanogan counties could cause further declines in sharp-tailed grouse numbers. Contracts for approximately 318,000 ha expired in 1997. Washington farmers submitted applications for new contracts on 239,000 ha and nearly 196,000 ha were accepted. CRP lands placed back into grain production could cause further declines in the number of sharp-tailed grouse, depending upon how sharp-tailed grouse use these areas. CRP land and other habitat enhancement areas must be near existing sharptail populations to be beneficial (Meints et al. 1992). Although the WDFW is assisting landowners in applying for CRP funding, the long-term status of these areas is uncertain.

Chemical Treatment

The loss of deciduous trees and shrubs by chemical control was associated with declining sharptail populations in Washington (Zeigler 1979) and Utah (Hart et al. 1950).
Chemical treatment of vegetation in sharp-tailed grouse habitat is detrimental due to the direct loss of vegetation (McArdle 1977, Blaisdell et al. 1982, Oedekoven 1985, Klott 1987). Kessler and Bosch (1982) found most biologists regarded chemical brush control as a negative management practice for sharptails. However, in Michigan, herbicidal treatment was used to open dense areas and provide more adequate sharp-tailed grouse habitat (Van Etten 1960). In Washington, continued use of herbicides to control sagebrush and other vegetation may cause additional reductions in sharp-tailed grouse habitat.

Fire

Fire is a continual threat to sharp-tailed grouse populations. Fire has become a major tool for altering large blocks of sagebrush rangelands. In Lincoln County, three large prescribed fires and one chemical control of sagebrush in the 1980's in areas containing active leks, were believed to be directly responsible for the decline of both sharp-tailed and sage grouse populations (Merker 1988). McArdle (1977) found less use by sharptails in burned areas compared to other vegetation manipulations. Likewise, Hart et al. (1950) reported Columbian sharptails abandoning a lek site following a fire which also caused accelerated erosion, loss of nests, and loss of winter food and cover.

Under some circumstances, burning can help improve sharp-tailed grouse habitat.
Burning dense sagebrush and thickly wooded areas was found to improve sharp-tailed grouse habitat in Utah (Hart et al. 1950), North Dakota (Kirsh et al. 1973), Colorado (Rogers 1969), and Wyoming (Oedekoven 1985). In Manitoba and British Columbia, a large movement of sharp-tailed grouse occurred from a high-use lek site to a burned area following a fire that eliminated all residual grass and forbs but did not greatly affect shrub or tree cover. Modern fire suppression policies have allowed conifers to invade bunchgrass-prairie habitats in some areas to the detriment of sharp-tailed grouse populations. In these situations, prescribed burning may be effective in maintaining suitable habitats (Giesen and Connelly 1993). In Washington, prescribed fire is not recommended in shrub/meadow steppe but may be acceptable for creating habitat where conifers have invaded traditional shrub/meadow steppe areas.

Relationships with Private Landowners

Most of the sharp-tailed grouse range in Washington exists on privately owned lands. Apart from recently acquired leks at Swanson Lakes in Lincoln County and at Scotch Creek and Tunk Valley in Okanogan County, all active sharp-tailed grouse leks in Washington are on private lands. This has affected and will continue to affect the future of sharp-tailed grouse in Washington. A good working relationship between conservation agencies and private landowners needs to be

developed and maintained. The WDFW needs access to private lands, in some cases, to conduct lek surveys and other research. Listing sharp-tailed grouse may result in strained relationships with private landowners due to fears of regulation, but may benefit some landowners by improving the chance of enrollment in the Conservation Reserve Program.

Adequacy of Existing Regulatory Mechanisms

Sharp-tailed grouse were protected from killing with the closure of the sharptail hunting season by the Washington Fish and Wildlife Commission in 1988. Populations have stayed at low levels or continued to decline since the season closure. House Bill-1309 (Washington State Legislature 1993) requires the WDFW and WDNR to develop goals to preserve, protect, and perpetuate wildlife and fish occupying shrub steppe (and shrub/meadow) habitat or lands that are classified agricultural lands, rangelands, or woodlands used for grazing. However, there are no existing state or federal regulatory mechanisms to protect sharp-tailed grouse habitat on private lands.

CONCLUSIONS AND RECOMMENDATION

The sharp-tailed grouse population in Washington has declined to between 700-1000 individuals in 8 isolated subpopulations. Estimated population declines for the past 27-year period is 5.9 percent per year. Six of these populations, with less than 100 individuals each, are faced with significant threats to their existence. These subpopulations are unlikely to increase substantially over current levels without restoration efforts and would likely continue to decline.
For these reasons, the Department recommends that the sharp-tailed grouse be designated a Threatened species in Washington.

There are three principal reasons why the Department does not recommend “Endangered” status for the sharp-tailed grouse. First, the population on tribal lands appears to be relatively stable in the short-term. Second, the Department has purchased about 9,000 ha (22,250 ac) for sharp-tailed grouse and manages an additional 5,600 ha (13,800 ac) of potential sharp-tailed grouse habitat. Habitat restoration is under way at several locations, but grouse re-introductions may be needed on at least half of the acquired lands. Third, much of the private lands currently supporting sharp-tailed grouse were re-enrolled in the Conservation Reserve Program.

REFERENCES CITED

Aldrich, J. W., and A. J. Duvall. 1955. Distribution of American gallinaceous game birds. U.S. Dept. Inter., Fish and Wildl. Serv. Circ. 34.

))))). 1963. Geographic orientation of American Tetraonidae. J. Wildl. Manage. 27:529-545.

American Ornithologists' Union. 1957. Check-list of North American birds, fifth edition. Am. Ornithol. Union., Ithaca, New York.

Ammann, G.A. 1957. The prairie grouse of Michigan. Fed. Aid Wildl. Restor. Proj. 5-R, 37-R, and 70R. Mich. Dept. Conserv., Lansing.

Bendire, C. E. 1892. Life histories of North American birds. U.S. Natl. Mus. Spec. Bull. 1.

Bent, A. C. 1963. Life histories of North American gallinaceous birds. Dover Publ., Inc., New York, New York.

Bergerud, A. T. 1988a. Mating systems in grouse. Pages 439-472 *in* A. T. Bergerud and M. W. Gratson, eds. Adaptive strategies and population ecology of northern grouse. Univ. Minnesota Press., Minneapolis.

))))). 1988b. Survival and breeding strategies of grouse. Pages 473-577 *in* A. T. Bergerud and M. W. Gratson, eds. Adaptive strategies and population ecology of northern grouse. Univ. Minnesota Press., Minneapolis.

))))). 1988c. Population ecology of North American grouse. Pages 578-685 *in* A. T. Bergerud and M. W. Gratson, eds. Adaptive strategies and population ecology of northern grouse. Univ. Minnesota Press., Minneapolis.

Bernhoft, L. S. 1969. Reproductive ecology of female sharp-tailed grouse (*Pedioecetes phasianellus jamesi* Lincoln) and food habits of broods in southwestern North Dakota. M.S. Thesis, Univ. N.D., Grand Forks.

Blaisdell, J.P., R. B. Murry, and E. D. McArthur. 1982. Managing intermountain rangelands--sagebrush-grass ranges. U.S. Dept. Agric., Inter. For. and Range Exp. Sta. Gen. Tech. Rep. INT-134.

Blus, L. J. 1965. Habitat analysis (analysis of vegetation). Fed. Aid Wildl. Restor. Proj. W-33-R-6, Job 4-64. Nebr. Game and Parks Comm., Lincoln.

))))), C. S. Staley, C. J. Henny, G. W. Pendleton, T. H. Craig, E. H. Craig, and D. K. Halford. 1989. Effects of organophosphorus insecticides on sage grouse in southeastern Idaho. J. Wildl. Manage. 53:1139-1146.

Boddicker, M. L. 1967. Characteristics of parasite infestations in sharp-tailed grouse. Seventh Prairie Grouse Tech. Counc., Sept. 12-14, Effingham, Illinois.

Braun, C. E. 1975. Morality, survival, and effects of hunting on grouse, partridge, pheasants, and quail, an annotated bibliography. Colo. Div. Wildl. Rep. 3.

))))), compiler. 1991. Questionnaire survey results, 1988-90. West. Sage Grouse/Columbian Sharp-tailed Grouse Tech. Comm., Colo. Div. Wildl., Fort Collins.

Bredehoft, R. 1981. Baggs sharp-tail study. Job Completion Rep. Wyo. Game and Fish Dept., Cheyenne.

Brewer, R., and K. L. Harrison. 1975. The time of habitat selection in birds. Ibis 117:521-522.

Brown, R. L. 1966a. Sharp-tailed grouse population study. Fed. Aid Wildl. Restor. Proj. W-91-R-6 and W-91-R-7, Mont. Fish and Game Dept., Helena.

))))). 1966b. Responses of sharp-tail grouse breeding populations to annual changes in residual grassland cover. Proc. Ann. Conf. West. Assoc. State Game and Fish Comm. 46:219-222.

))))). 1968. Effects of land use practices on sharp-tailed grouse. Fed. Aid Wildl. Restor. Proj. W-91-R-9, job II-F, Mont. Fish and Game Dept., Helena.

Buss, I. O., and E. S. Dziedzic. 1955. Relation of cultivation to the disappearance of the Columbian sharp-tailed grouse in southeastern Washington. Condor 57:185-187.

Cooper, J. G. 1860. Report upon the birds collected on the survey: Land Birds. Ch. 1., U.S. Pacific Railroad Explor. and Surv. 12. Book 2, Zoology. 3:140-226.

Crawford, J. A. 1986. Draft plan for the reintroduction of Columbian sharp-tailed grouse into Oregon. Oreg. Comm. Reintroduction Columbian Sharp-tailed Grouse, Dept. Fish and Wildl., Oregon State Univ., Corvallis.

Darwin, L. H. 1918. Third and fourth annual reports of the state game warden to the governor of the state of Washington, 3/1/15-2/28/17, Lamborn. Olympia, Washington.

Daubenmire, D. 1988. Steppe vegetation of Washington. Bull. EB 1446, Wash. State Univ. Coop. Ext., Pullman.

Dawson, W. L., and J. H. Bowles. 1909. Birds of Washington. Vol. 2. Occidental Publ. Co., Seattle, Washington.

Dick, T. A. 1981. Ectoparasites of sharp-tailed grouse, *Pediocetes phasianellus*. J. Wildl. Diseases 17:229-235.

Dobler, F. C., J. R. Eby, C. Perry, S. Richardson, and M. VanderHaegen. 1996. Status of Washington's shrub-steppe ecosystem: extent, ownership, and wildlife/vegetation relationships. Research Report. Wash. Dept. Fish and Wildl., Olympia.

Douglas, D. 1829. Observations of some species of the genera *Tetrao* and *Ortyx*, natives of North America; with descriptions of four new species of the former, and two of the latter genus. Linn. Soc. London, Trans. 16:133-149.

Edminster, F.C. 1954. American game birds. Chas. Scribner's Sons, New York, New York.

Evanich, J. 1983. Distribution: Columbian sharp-tailed grouse. Oreg. Birds 9:147-149.

Evans, K. E. 1968. Characteristics and habitat requirements of the greater prairie chicken and sharp-tailed grouse-a review of the literature. U.S. For. Serv. Conserv. Res. Rep. 12.

Farrar, I. 1975. Prairie grouse (sharptail) Nebraska natives: their past, present and future. Nebr. Game and Parks Comm., Lincoln.

Franklin, J. F. and C. T. Dyrness. 1969. Vegetation of Oregon and Washington. U.S.D.A. For. Serv. Res. Paper PNW-80.

Giesen, K.M., 1987. Population characteristics and habitat use by Columbian sharp-tailed grouse in northwest Colorado. Pages 251-279 *in* Fed. Aid Wildl. Restor. Final Rep. Proj. W-152-R. Colo. Div. Wildl., Denver.

))))) . 1992. Body mass of Columbian sharp-tailed grouse in Colorado. Prairie Nat. 24:191-196.

))))), and J. W. Connelly. 1993. Guidelines for management of Columbian sharp-tailed grouse habitats. Wildl. Soc. Bull. 21:325-333.

Gilpin, M.E. 1987. Spatial structure and population vulnerability. In M.E. Soule, ed., Viable Populations for Conservation, pp. 125-139. Cambridge: Cambridge University Press.

))))), and M.E. Soule. 1986. Minimum viable populations: processes of species extinction. Pages 19 to 34 in M. E. Soule, editor. Conservation Biology: The Science of Scarcity and Diversity. Sinauer, Sunderland, Mass.

Gratson, M. W. 1988. Spatial patterns, movements, and cover selection by sharp-tailed grouse. Pages 158 to 192 *in* A. T. Bergerud and M. W. Gratson, eds. Adaptive strategies and population ecology of northern grouse, Volume 1. Univ. Minn. Press, Minneapolis.

Hamerstrom, F. N., Jr. 1939. A study of Wisconsin prairie chicken and sharp-tailed grouse. Wilson Bull. 51:105-120.

))))), and F. Hamerstrom. 1951. Mobility of the sharp-tailed grouse in relation to its ecology and distribution. Am. Midl. Nat. 46:174-226.

Harris, G. A., and M. Chaney. 1984. Washington State grazing land assessment. Wash. Range Land Comm. and Washington State Univ. Coop. Ext. Ser., Pullman.

Hart, C. M., O. S. Lee, and J. B. Low. 1950. The sharp-tailed grouse in Utah. Utah Dept. Fish and Game Publ. 3.

Hartzler, J. E. 1974. Predation and the daily timing of sage grouse leks. Auk 91:532-536.

Henderson, F. R. 1964. Grouse and grass: twin crops. S.D. Conserv. Digest 31:16-19.

Hickey, J. J. 1952. Survival studies of banded birds. U.S. Fish and Wildl. Serv. Spec. Sci. Rept.: Wildl. No. 15.

Hickman, J. 1989. Columbian sharp-tailed grouse lek biology in Lincoln County, Washington. Proc. 16th West. Sage and Sharp-tailed Grouse Workshop, Moses Lake, Washington.

Hillman, C. N., and W. W. Jackson. 1973. The sharp-tailed grouse in South Dakota. Tech. Bull. 3, S.D. Dept. Game, Fish and Parks, Pierre.

Hilton, M., and W. Wishart. 1981. A summary of the Camp Wainwright grouse season. Alta. Energy and Natl. Resour. Fish and Wildl. Div. 9pp.

Hjorth, I. 1970. Reproductive behavior in Tetraonidae, with special reference to males. Viltrevy 7:185-596.

Hofmann, L., and F. Dobler. 1988a. Observations of wintering densities and habitat use by Columbian sharp-tailed grouse in three counties of eastern Washington. Unpubl. rep., Wash. Dept. Wildl., Olympia.

))))), and))))). 1988b. Spring movements, home range size, and habitat use by Columbian sharp-tailed grouse in eastern Washington. Unpubl. rep., Wash. Dept. Wildl., Olympia.

))))), and))))). 1989. A history and inventory of sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) dancing grounds in eastern Washington. Unpubl. rep., Wash. Dept. Wildl., Olympia.

Hudson, G. E., and C. F. Yocom. 1954. A distributional list of the birds of southeastern Washington. Res. Stud., State Coll. Wash. 22:17.

Jackson, W. W., and F. R. Henderson. 1965. Prairie grouse movement study, 1964. Fed. Aid Wildl. Restor. Proj. W-75-R-6. S.D. Dept. Game, Fish and Parks, Pierre.

Janson, R. G. 1950. Prairie grouse banding returns, 1947 to 1950. Fed. Aid Wildl. Restor. Proj. W-17-R-5, S.D. Dept. Game, Fish and Parks, Pierre.

Jewett, S. G., W. P. Taylor, W. T. Shaw, and J. W. Aldrich. 1953. Birds of Washington State. Univ. Washington Press, Seattle.

Johnsgard, P. A. 1973. Grouse and quail of North America. Univ. Nebr. Press, Lincoln.

))))). 1983. Grouse of the world. Univ. Nebr. Press, Lincoln.

Jones, R. E. 1966. Spring, summer, and fall foods of the Columbian sharp-tailed grouse in eastern Washington. Condor 68:536-540.

Kessler, W. B., and R. P. Bosch. 1982. Sharp-tailed grouse and range management practices in western rangelands. Pages 133-146 *in* J. M. Peek and P. D. Dalke, eds. Proc. Wildlife-livestock Relationships Symposium. Univ. Idaho, For. Wildl. and Range Exp. Stn., Proc 10, Moscow.

Kirsch, L. M. 1969. Prairie grouse and land-use. Proc. 8th Conf. Prairie Grouse Tech. Counc., Sept. 9-11, Woodward, Oklahoma.

))))), A. T. Klett, and H. W. Miller. 1973. Land use and prairie grouse population relationships in North Dakota. J. Wildl. Manage. 37:449-453.

Kletts, A. T. 1962. Sharp-tailed Grouse Sex and Age Data Collected During the 1961 Hunting Season. Fed. Aid Wildl. Restor. Proj. W-67-R-2, Phase B, Job 6. N.D State Game and Fish Dept., Bismarck.

Klott, J. H. 1987. Use of habitat by sympatrically occurring sage grouse and sharp-tailed grouse with broods. M.S. Thesis, Univ. Wyoming, Laramie.

))))), and F. G. Lindzey. 1990. Brood habitats of sympatric sage grouse and Columbian sharp-tailed grouse in Wyoming. J. Wildl. Manage. 54:84-88.

Kobriger, G. D. 1964. Prairie grouse on two sandhills refuges in Nebraska. M.S. Thesis, Univ. Mo., Columbia.

Lacy, R.C. 1987. Loss of genetic diversity from managed populations: interacting effects of drift, mutation, immigration, selection, and population subdivision. Conservation Biology (2):143-158.

Larrison, E. J. and K. G. Sonnenberg. 1968. Washington birds: their location and identification. The Seattle Audubon Soc., Seattle, Washington.

Leopold, A. 1933. Game management. Oxford Univ. Press, New York, N.Y.

Locke, N. L., and M. Friend. 1992. Lead poisoning of avian species other than waterfowl. Pages *in* D. J. Pain, ed. Lead poisoning in waterfowl. Int. Waterfowl and Wetlands Res. Bur., Gloucester, U.K.

Mack, R. N., and J. N. Thompson. 1982. Evolution in steppe with few large, hooved mammals. Amer. Nat. 119:757-773.

Marks, J. S., and V. S. Marks. 1987a. Habitat selection by Columbian sharp-tailed grouse in west-central Idaho. U.S. Dept. Inter., Bur. Land Manage., Boise Dist., Idaho.

))))), and))))). 1987b. Influence of radio collars on survival of sharp-tailed grouse. J. Wildl. Manage. 51:468-471.

))))), and))))). 1988. Winter habitat use by Columbian sharp-tailed grouse in western Idaho. J. Wildl. Manage. 52:743-746.

Marshall, W. H. and M. S. Jensen. 1937. Winter and spring studies of sharp-tailed grouse in Utah. J. Wildl. Manage. 1:87-99.

Mattise, S. N. 1978. Effects of grazing systems on sharp-tailed grouse habitat. M.S. Thesis, Ut. State Univ., Brookings.

McArdle, B. A. 1977. The effect of sagebrush reduction practices on sharp-tailed grouse use in southeastern Idaho. M.S. Thesis, Utah State Univ., Logan.

McEwan, L.C. and R.L. Brown. 1966. Acute toxicity of dieldrin and malathion to wild sharp-tailed grouse. J. Wildl. Manage. 30:604-611.

Meints, D. R. 1991. Seasonal movements, habitat use, and productivity of Columbian sharp-tailed grouse in southeastern Idaho. M.S. Thesis, Univ. Idaho, Moscow.

))))), J. W. Connelly, K. P. Reese, A. R. Sands, and T. P. Hemker. 1992. Habitat suitability index procedures for Columbian sharp-tailed grouse. Id. For., Wildl. and Range Exp. Stn., Bull. 55.

Merker, C. 1988. The Columbian sharp-tailed grouse in the state of Washington. Unpubl. rep., Wash. Wildl. Coop. and the Wash. Dept. Wildl., Olympia.

Miller, G. C. and W. D. Graul. 1980. Status of sharp-tailed grouse in North America. Pages 18-28 *in* P. A. Vohs, Jr. and F. L. Knopf., eds. Proc. Prairie Grouse Symposium. Oklahoma State Univ., Stillwater.

Moyles, D. L. J. and D. A. Boag. 1981. Where, when, and how male sharp-tailed grouse establish territories on arenas. Can. J. Zool. 59:1576-1581.

Myers, C. E. 1948. Memoirs of a hunter. Shaw and Borden Co., Spokane, Washington.

Nielsen, L. S. and C. A. Yde. 1982. The effects of rest-rotation grazing on the distribution of sharp-tailed grouse. Pages 147-165 *in* J. M. Peek and P. D. Dalke, eds. Proc. 10: Wildl.-Livestock Relationships Symposium. For. Wildl. and Range Exp. Sta., Univ. Idaho, Moscow.

Oedekoven, O. O. 1985. Columbian sharp-tailed grouse population distribution and habitat use in south central Wyoming. M.S. Thesis, Univ. Wyoming, Laramie.

Oliver, W. H. 1983. Farm-wildlife history relationships and problems on Yakima Indian Reservation. Contract No. 82-7134, Yakima Indian Reservation, Yakima, Washington.

Parker, T. L. 1970. On the ecology of the sharp-tailed grouse in southeastern Idaho. M.S. Thesis, Idaho State Univ., Pocatello.

Pedersen, W. T. 1982. Sage grouse status, distribution, movement, seasonal use of habitat, and habitat status in eastern Washington. Fed. Aid Wildl. Restor. Proj. W-70-R-21, Study VI, Job 1 and 2. Wash. Dept. Fish and Wildl., Olympia.

Pepper, G. W. 1972. The ecology of sharp-tailed grouse during spring and summer in the aspen parklands of Saskatchewan. Saskatchewan Dep. Nat. Res. Rep. No.1. 55p.

Peterle, T. J. 1954. The sharp-tailed grouse in the upper peninsula of Michigan. Ph.D. Thesis, Univ. Michigan, Ann Arbor.

Post, G. 1960. Salmonella species isolated from intestinal contents of five sage grouse. Wyo. Fish and Game Comm. Wildl. Dos. Surv. FW-3-R-7.

Rasmussen, D. I. and L. A. Griner. 1938. Life history and management studies of the sage grouse in Utah, with special reference to nesting and feeding habits. Trans. North Am. Wildl. Conf. 3:852-864.

Reed, J. M., P. D. Doerr, and J. R. Walters. 1986. Determining minimum population sizes for birds and mammals. Wildl. Soc. Bull. 14:255-261.

Rippin, A. B. 1970. Social organization and recruitment on the arena of sharp-tailed grouse. M.S. Thesis, Univ. Alberta, Edmonton.

Ritcey, R. 1995. Status of the sharp-tailed grouse in British Columbia. Rept. No. WR-70, British Columbia Ministry of Environment, Land, and Parks. 40p.

Robel, R., F. R. Henderson, and W. W. Jackson. 1972. Some sharp-tailed grouse population statistics from South Dakota. J. Wildl. Manage. 36:87-98.

Rogers, G. E. 1969. The sharp-tailed grouse in Colorado. Colo. Game, Fish and Parks Tech. Publ. 23.

Sauer, R. H., and D. W. Uresk. 1976. Phenology of steppe plants in wet and dry years. Northwest Sci. 50:133-138.

Schroeder, M. 1994. Progress report: Productivity and habitat use of sharp-tailed grouse in north-central Washington. Unpublished report, Washington Dept. of Fish and Wildlife, Olympia.

))))). 1996. Progress report: Productivity and habitat use of sharp-tailed grouse in north-central Washington. Unpublished report, Washington Dept. of Fish and Wildlife, Olympia.

Snyder, L. L. 1935. A study of the sharp-tailed grouse. Biol. Ser. Number 40. Univ. Toronto Press, Toronto.

Starkey, E. E., and R. A. Schnoes. 1979. The Columbian sharp-tailed grouse: with special reference to their potential reintroduction to Lava Beds National Monument. Pages 497-500 *in* R. M. Linn, ed. Proc. First Conference on Scientific Research in the National Parks. Natl. Park Serv. Trans. Proc. Ser. 5.

Strahler, A. N. 1952. Dynamic basis of geomorphology. Bull. Geol. Soc. Am. 63:923-938.

Stoddard, L. A. , A. D. Smith, and T. W. Box. 1975. Range Management. 3rd edition, McGraw-Hill, New York. 532 pp.

Stralser, T. 1991. A description of habitats surrounding Columbian sharp-tailed grouse leks in Lincoln County, Washington. M.S. Thesis, East. Wash. Univ., Cheney.

Suckley, G. 1860. Railroad route explorations and surveys. Thirty-sixth U.S. Congress, vol. 12, book 2:223-224.

Sullivan, S. L. 1988. Status reviews of some important animals of the shrub-steppe of Washington. Washington Department of Wildlife. 126 pp.

Swenson, J. E. 1985. Seasonal habitat use by sharp-tailed grouse, *Tympanuchus phasianellus,* on mixed-grass prairie in Montana. Can. Field-Nat. 99:40-46.

Twedt, C. M. 1974. Characteristics of sharp-tailed grouse display grounds in Nebraska Sandhills. Ph.D. Diss., Univ. Nebr., Lincoln.

Uhlig, H. G. and W. H. Hamor. 1960. Land management for sharp-tailed grouse. U.S. Dept. Agric., Soil Conserv. Serv. Publ. BI-10.

United States Department of Agriculture. 1986. Conservation Reserve Program: outline and administration handbook. Conserv. Reserve Program, Deputy Adm., State and County Operations, Washington, D.C.

Van Ettan, R.C. 1959. Ecological changes in sharp-tailed grouse habitat resulting from an aerial application of 2,4-D. Michigan Dept. of Conservation Rept. No. 2256.

Vance, D.R., and R.L. Westemeier. 1979. Interactions of pheasants and prairie chickens in Illinois. Wildl. Soc. Bull. (7):221-225.

Washington Department of Fish and Wildlife. 1995. Washington State management plan for the sharp-tailed grouse. Game Div., Wash. Dept. Fish and Wildl., Olympia. 99 pp.

Washington State Legislature. 1993. House Bill 1309. First Special Session, Wash. State Leg., Olympia.

Weber, J. W., and E. J. Larrison. 1977. Birds of southeastern Washington. Univ. Press Id., Moscow.

Weddell, B. J. 1992. Biology and conservation of the sharp-tailed grouse, with special reference to the Columbian sharp-tailed grouse in Washington. Unpublished report, The Nature Conservancy, Seattle, Wash.

))))), S. Johnston, and J. Martin. 1991. Sharp-tailed grouse winter habitat inventory in Douglas, Lincoln, and Okanogan counties, Washington, 1990-1991. Unpubl. rep., The Nature Conservancy, Seattle, Washington.

Wick, W. O. 1955. A recent record of the sharp-tailed grouse in Nevada. Condor 57:243.

Yocom, C. F. 1943. The Hungarian partridge *Perdix perdix* in the Palouse Region, Washington. Ecol. Mono. 13:167-202.

))))). 1952. The Columbian sharp-tailed grouse (*Pediocetes phasianeillus columbianus*) in the state of Washington. Am. Midl. Nat. 48:185-192.

))))). 1956. The sage hen in Washington State. Auk 73:540-550.

Zeigler, D. L. 1979. Distribution and status of the Columbian sharp-tailed grouse in eastern Washington. Fed. Aid Wildl. Restor. Proj. W-70-R-18. Wash. Dept. Game, Olympia.

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Appendix A. Museum specimens of Columbian sharp-tailed grouse collected in Washington, 1880-1961.

Location	County	Date	Sex or set	*n*	Source[a]
Fort Walla Walla	Walla Walla	11/1/1880	female		CMNH # 62153
Fort Walla Walla	Walla Walla	11/26/1881	female		CMNH # 62151
Unknown	Whitman	4/22/1884	egg set	8[b]	CAS # 6959
Pullman	Whitman	1895	na		WSUCM # 420
Almota	Whitman	8/23/1895	male		USNM # 141363
Pullman	Whitman	10/20/1895	female		WSUCM # 681
Dayton	Columbia	5/12/1897	egg set	9	PSM # 13571
Dayton	Columbia	5/1/1897	egg set	10	CMNH # 899
Dayton	Columbia	5/15/1897	egg set	15	WFVZ
Dayton	Columbia	5/21/1897	egg set	10	WFVZ
Toppenish	Yakima	7/17/1897	na		USNM # 157956
Conconully	Okanogan	9/13/1897	na		USNM # 157955
Conconully	Okanogan	9/12/1897	male		USNM # 157957
Dayton	Columbia	4/21/1898	egg set	8	WFVZ
Dayton	Columbia	5/11/1898	egg set	1	USNM # B43523
Yakima	Yakima	10/25/1910	male		AMNH 751239
Okanogan	Okanogan	5/6/1920	male		USNM # 270794
Danville	Ferry	11/16/1920	female		USNM # 271895
Danville	Ferry	11/16/1920	female		USNM # 271896
Loon Lake	Stevens	11/9/33	female		No number assigned
Bridgeport	Douglas	10/22/39	female		WSUCM # 40-3
na	Douglas	Fall 1952	female		WSUCM # 53-22
na	Douglas	Fall 1952	male		WSUCM # 53-23
na	Douglas	Fall 1952	female		WSUCM # 53-24
Omak Lake	Okanogan	6/21/1953	male		UWBM # 12175
Del Rio	Douglas	10/14/1953	male		WSUCM # 54-115
Tonasket	Okanogan	2/16/1954	female		WSUCM # 54-73
Tonasket	Okanogan	2/16/1954	female		WSUCM # 54-74
Mosquito Creek	Okanogan	5/21/1954	male		WSUCM # 54-113
Mosquito Creek	Okanogan	5/21/1954	male		WSUCM # 54-114
Twisp	Okanogan	6/3/1960	male		WSUCM # 61-214
Riverside	Okanogan	10/15/1961	male		PSM # 07052
Riverside	Okanogan	10/15/1961	male		PSM # 07054
Riverside	Okanogan	10/16/1961	female		PSM # 07051
Riverside	Okanogan	10/16/61	female		PSM # 07053
Bridgeport	Douglas	10/20/73	female		UWBM # 33950
Bridgeport	Douglas	10/20/75	female		UWBM # 31342
T24N R34E S4	Lincoln	10/12/75	na		UWBM # 33419
T24N R34E S4	Lincoln	10/12/75	male		UWBM # 33420
Central Ferry Canyon	Douglas	10/16/79	male		UWBM # 33090
Central Ferry Canyon	Douglas	11/24/79	female		UWBM # 33091
Walla Walla	Walla Walla	na	male		ANSP # 24304
River	na	na	na		USNM # 429140
Sinyakwateen	Okanogan	na	na		USNM # 022011

[a] UWBM=University of Washington, Burke Museum, Seattle; PSM=University of Puget Sound, Slater Museum, Tacoma; CMNH=The Carnegie Museum of Natural History, Pittsburgh, Pennsylvania; WFVZ=Western Foundation of Vertebrate Zoology, Camarillo, California; CAS=California Academy of Sciences, San Francisco; ANSP=The Academy of Natural Sciences, Philadelphia, Pennsylvania; AMNH=American Museum of Natural History, New York, New York; USNM=Smithsonian Institution National Museum of Natural History, Washington, D.C.; CMNH=The Cleveland Museum of Natural History, Cleveland, Ohio.

[b] Four eggs were broken in the collection; original clutch held 12 eggs.

Appendix B. Sharp-tailed grouse lek counts in Washington 1970-1997[a].

	Year																											
Lek Sites	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
Okanogan County																												
1																					8	8	0	0				
2					9	3	4	8	0	4	1	1																
3									9	1	4	4							>1		9	7	3	3	2	0		
4	17	2	2	11	14	1	8	12	10	6	3	6	5	4	0	0	0	0	0	0		5	2	2	1	1	4	3
5																								1	0			
6																					2	1	0	0	0	5	2	4
7																						11	4	5	4	7	1	
8																>1								0	0	0		
9 *			0																									
10 *																								0				
11	21	12	17	20	17	15	15	16	5	3	3	7	8	7	5	0	0	0	20	18	8	0	0		0	0		0
12																						4	0		0	0		
13																						3		2	4	4		4
14																				9	15	8	>1	10	3	3	1	6
15									9	1	4	4	1	0												0		
16																									11	2	1	0
17	>1																											
18							14	19	5	12	4	23	9	12	4	0	3	0	0	0	2	0	0	0	0	0	0	0
19																					14	3	2	0	0	0	0	0
20																					15	9	5	1	1	1	0	0
21																					7	2	2	0	0	0	0	0
22											10	0		>1					>1		0							
23																						3		0	0	0		0
24																						7	5		1			0
25																								>1				
26 *																												
27																					10	3		0	0	0		
28																					10	8		0	0	0		

Appendix B. Cont'd.

	Year																										
Lek Sites	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
29	14	2	17	8				8		1	11		0													0		
30	>1																											
31	30	35	39	27	9	>1	18	16	6	6	10	9	0	12	9	8	5	0	5	8	7	7	2	1	1	8	5	3
32																						4	0	0		0	0	0
33																					9	6	4	6	5	2	4	6
34																						12	11	11	13	28	20	18
35																					11	13	5	3	5	1	1	2
36	12	>1	11				6	17	10	7	15	11		14	3	8	0	0	4		14	13	6	12	20	23	12	13
37	16	>1	>1	17	11	12	21	14	17	17	28	18	12	8	8	0	0		10	7	12	6	2	0	0	0		0
38																						2	2	1	3	1	0	0
39	9		7	14	16	16	17	21	6	8	8	2	2	0	0					0	0							
40 *	0	0																										
41	>1	18	11	15	12	12	20	35	7	23	11	7	6	1	4	0	0	0							0			
42								8	2	2		0									0							
43								10	0	3	7	6	5				0			0	0					0		
Colville Indian Reservation																												
1																										21	16	13
2																										3		0
3																							2					
4																							4		0			
5																		>1									0	
6									7		17									0		0	0					
7	45	35	30	27	12	5	12	8	0	0	0	0			0				18	>1			4		0	3	2	
8																							3		0	18	12	13
9																							3		0	7		7
10																											2	0
11																											1	
12																							11		11	19	13	14

Appendix B. Cont'd.

	Year																										
Lek Sites	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
13									12	12	0	0											0					
14																>1							0					
15																											10	16
16																											7	10
17										23	40	37	33	19		17		16				10	7		>1	28	22	30
18																										7	0	0
19																							6					5
20																							3					
21																											7	6
22																											21	16
23	3	12	9	0	1	0																	0					
24										10	16	27	32	21													23	18
25									>1	>1										8		2	0					
26																											6	8
27																								>1				>1
28																											8	4
29 *																									0			
30																										3	2	1
31										>1																		
32											5									0		0						
33																											2	2
34																										3	3	0
35																										2	1	0
36																										3	6	2
37										7	8	17	23	17		7		5					5			16	14	4
Douglas County																												
1	7							10	5	6									1		0				0	0		2
2																									>1	1		

Appendix B. Cont'd.

	Year																										
Lek Sites	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
3																			3	1	0	0	0	0	0	0	0	0
4																					20	19	9	5	5	0	6	3
5					10	7	7	2	0	0	0	0							0		0	0	0	0	0	0	0	0
6							10	9	8	16	8	8	11	11	2	0	2	0	0	0	0	0	0	0	0	0	0	0
7																						13	15	3	6	1	0	0
8																						2		1	2	1	1	4
9																										7	2	2
10																					27	22	22	12	10	17	13	7
11																							2	0	0	0	0	0
12	26	9	10	23	16	13	16	31	10	13	11	7	14	12	15	6	0	0	3		0	0	0	0	0	0	0	0
13																						7		3	9	7	3	4
14																						4	4	4	1	0	0	0
15	6	>1						4	2										>1			0		0				
16				17	9		0	0	0	0	0										0				0	0	0	0
17																						1	0		0	0	0	0
18																	5	11	8	10	14	6	3	3	1	0	0	0
19									>1																0	0	0	0
20																							7		11	12	7	9
21																							4					0
22	7							4	2										24	21	15	17	10	2	8	12	18	11
23																							1	0	0	0	0	0
Lincoln County																												
1								0			0	0									0	1	0	0	0	0	4	0
2			18	30	17	6		6	7	4	6	1	8	7	13	9	7	5	0	0	0	0	0	0	>1		>1	13
3 *										0								0	0	0	0					0		0
4																						12				0		0
5																												10
6						1		9			45	20	23	10	13	6	0	0	0	2	0	0	0	0	0	0	0	0
7																								>1	0	>1	>1	0

Appendix B. Cont'd.

	Year																										
Lek Sites	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
8								12	0	14	19	16	11	5		4	7	6	0		0	0		0		0		0
9							5																					
10											9	0	0										0	0	0	0	0	0
11										10	7	12	11	6	14	0	0	0	0	0	0	0	0	0	0	0	0	0
12 *										0								0										
13										7	0	0		3	1	2	0		0		0	0	0	0	0	0	0	0
14							9	11	0	0	0								0		0	1						
15														3					5		0	0	0	0	1	0		0
16																						2						0
17														12						1	2	14		16	15	22	18	11
18										10	12	13	9	6	2	0	4	3	3	5	8	6	4	3	3	9	2	2
19																						2	7	>1				1
20																								>1			6	9
21										14		5	3	12	9	2	2	0	0	0	0	0	0	0	0	0	0	0
22																			7	11	7	4	2	2		16	13	10
23		18	13	20	11	9	18	18	1	9	6	6	12	5	0	0	0		0	0	2	20	11	9	13	14	17	21
24										10	12	13	18	6	9	5	7	7	9	9	6	4	0	0	0	0		0
25										6	22	2	16	16	9	6	6	9	13	9	19	25	14	17	11	9	8	6
26		4	7					0	0	0	0	0						0	0	0	0	0	0	0				0
27		18	16		13	10		10	6	8	14	21	12	7	1	2	8	7	10	8	10	12	3	3	0	0	4	5
Spokane County																												
1 *								0													0							
2 *								0										0			0							

[a] 0 = the lek was surveyed, but no birds were present; >1 =more than one bird was seen,but no counts are available.

* Historic site; lek counts prior to 1970.

Appendix C. Washington Administrative Codes.

WAC 232-12-011 Wildlife classified as protected shall not be hunted or fished.

Protected wildlife are designated into three subcategories: Threatened, sensitive, and other.
(1) Threatened species are any wildlife species native to the state of Washington that are likely to become endangered within the foreseeable future throughout a significant portion of their range within the state without cooperative management or removal of threats. Protected wildlife designated as threatened include:

Common Name	Scientific Name
Western gray squirrel	*Sciurus griseus*
Steller (northern) sea lion	*Eumetopias jubatus*
North American lynx	*Lynx canadensis*
Aleutian Canada goose	*Branta canadensis leucopareia*
Bald eagle	*Haliaeetus leucocephalus*
Ferruginous hawk	*Buteo regalis*
Marbled murrelet	*Brachyramphus marmoratus*
Green sea turtle	*Chelonia mydas*
Loggerhead sea turtle	*Caretta caretta*

(2) Sensitive species are any wildlife species native to the state of Washington that are vulnerable or declining and are likely to become endangered or threatened in a significant portion of their range within the state without cooperative management or removal of threats. Protected wildlife designated as sensitive include:

Common Name	Scientific Name
Gray whale	*Eschrichtius robustus*
Larch Mountain salamander	*Plethodon larselli*

(3) Other protected wildlife include:

Common Name	Scientific Name
Cony or pika	*Ochotona princeps*
Least chipmunk	*Tamius minimus*
Yellow-pine chipmunk	*Tamius amoenus*
Townsend's chipmunk	*Tamius townsendii*
Red-tailed chipmunk	*Tamius ruficaudus*
Hoary marmot	*Marmota caligata*
Olympic marmot	*Marmota olympus*
Cascade golden-mantled ground squirrel	*Spermophilus saturatus*
Golden-mantled ground squirrel	*Spermophilus lateralis*
Washington ground squirrel	*Spermophilus washingtoni*
Red squirrel	*Tamiasciurus hudsonicus*
Douglas squirrel	*Tamiasciurus douglasii*
Northern flying squirrel	*Glaucomys sabrinus*
Fisher	*Martes pennanti*
Wolverine	*Gulo gulo*
Painted turtle	*Chrysemys picta*
California mountain kingsnake	*Lampropeltis zonata*;

All birds not classified as game birds, predatory birds or endangered species, or designated as threatened species or sensitive species; all bats, except when found in or immediately adjacent to a dwelling or other occupied building; mammals of the order *Cetacea*, including whales, porpoises, and mammals of the order *Pinnipedia* not otherwise classified as endangered species, or designated as threatened species or sensitive species. This section shall not apply to hair seals and sea lions which are threatening to damage or are damaging commercial fishing gear being utilized in a lawful manner or when said mammals are damaging or threatening to damage commercial fish being lawfully taken with commercial gear.

[Statutory Authority: RCW 77.12.020. 97-18-019(Order 97-167), § 232-12-011, filed 8/25/97, effective 9/25/97. Statutory Authority: RCW 77.12.040, 77.12.020, 77.12.030 and 77.32.220. 97-12-048, § 232-12-011, filed 6/2/97, efective 7/3/97. Statutory Authority: RCW 77.12.020. 93-21-027 (Order 615), § 232-12-011, filed 10/14/93, effective 11/14/93; 90-11-065 (Order 441), § 232-12-011, filed 5/15/90, effective 6/15/90. Statutory Authority: RCW 77.12.040. 89-11-061 (Order 392), § 232-12-011, filed 5/18/89; 82-19-026 (Order 192), § 232-12-011, filed 9/9/82; 81-22-002 (Order 174), § 232-12-011, filed 10/22/81; 81-12-029 (Order 165), § 232-12-011, filed 6/1/81.]

WAC 232-12-014 Wildlife classified as endangered species.

Endangered species include:

Pygmy rabbit	*Brachylagus idahoensis*
Gray wolf	*Canis lupus*
Grizzly bear	*Ursus arctos horribilis*
Sea otter	*Enhydra lutris*
Sei whale	*Balaenoptera borealis*
Fin whale	*Balaenoptera physalus*
Blue whale	*Balaenoptera musculus*
Humpback whale	*Megaptera novaeangliae*
Black right whale	*Balaena glacialis*
Sperm whale	*Physeter catodon*
Columbian white-tailed deer	*Odocoileus virginianus leucurus*
Woodland caribou	*Rangifer tarandus*
American white pelican	*Pelecanus erythrorhynchos*
Brown pelican	*Pelecanus occidentalis*
Peregrine falcon	*Falco peregrinus*
Sandhill crane	*Grus canadensis*
Snowy plover	*Charadrius alexandrinus*
Upland sandpiper	*Bartramia longicauda*
Spotted owl	*Strix occidentalis*
Western pond turtle	*Clemmys marmorata*
Leatherback sea turtle	*Dermochelys coriacea*
Oregon silverspot butterfly	*Speyeria zerene hippolyta*
Oregon spotted frog	*Rana pretiosa*

[Statutory Authority: RCW 77.12.020. 97-18-019 (Order 97-167), § 232-12-014, filed 8/25/97, effective 9/25/97; 93-21-026 (Order 616), § 232-12-014, filed 10/14/93, effective 11/14/93. Statutory Authority: RCW77.12.020(6). 88-05-032 (Order 305), § 232-12-014, filed 2/12/88. Statutory Authority: RCW 77.12.040. 82-19-026 (Order 192), § 232-12-014, filed 9/9/82; 81-22-002 (Order 174), § 232-12-014, filed 10/22/81; 81-12-029 (Order 165), § 232-12-014, filed 6/1/81.]

WAC 232-12-297 Endangered, threatened, and sensitive wildlife species classification.

PURPOSE

1.1 The purpose of this rule is to identify and classify native wildlife species that have need of protection and/or management to ensure their survival as free-ranging populations in Washington and to define the process by which listing, management, recovery, and delisting of a species can be achieved. These rules are established to ensure that consistent procedures and criteria are followed when classifying wildlife as endangered, or the protected wildlife subcategories threatened or sensitive.

DEFINITIONS

For purposes of this rule, the following definitions apply:

2.1 "Classify" and all derivatives means to list or delist wildlife species to or from endangered, or to or from the protected wildlife subcategories threatened or sensitive.

2.2 "List" and all derivatives means to change the classification status of a wildlife species to endangered, threatened, or sensitive.

2.3 "Delist" and its derivatives means to change the classification of endangered, threatened, or sensitive species to a classification other than endangered, threatened, or sensitive.

2.4 "Endangered" means any wildlife species native to the state of Washington that is seriously threatened with extinction throughout all or a significant portion of its range within the state.

2.5 "Threatened" means any wildlife species native to the state of Washington that is likely to become an endangered species within the forseeable future throughout a significant portion of its range within the state without cooperative management or removal of threats.

2.6 "Sensitive" means any wildlife species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened in a significant portion of its range within the state without cooperative management or removal of threats.

2.7 "Species" means any group of animals classified as a species or subspecies as commonly accepted by the scientific community.

2.8 "Native" means any wildlife species naturally occurring in Washington for purposes of breeding, resting, or foraging, excluding introduced species not found historically in this state.

2.9 "Significant portion of its range" means that portion of a species' range likely to be essential to the long term survival of the population in Washington.

LISTING CRITERIA

3.1 The commission shall list a wildlife species as endangered, threatened, or sensitive solely on the basis of the biological status of the species being considered, based on the preponderance of scientific data available, except as noted in section 3.4.

3.2 If a species is listed as endangered or threatened under the federal Endangered Species Act, the agency will recommend to the commission that it be listed as endangered or threatened as specified in section 9.1. If listed, the agency will proceed with development of a recovery plan pursuant to section 11.1.

3.3 Species may be listed as endangered, threatened, or sensitive only when populations are in danger of failing, declining, or are vulnerable, due to factors including but not restricted to limited numbers, disease, predation, exploitation, or habitat loss or change, pursuant to section 7.1.

3.4 Where a species of the class Insecta, based on substantial evidence, is determined to present an unreasonable risk to public health, the commission may make the determination that the species need not be listed as endangered, threatened, or sensitive.

DELISTING CRITERIA

4.1 The commission shall delist a wildlife species from endangered, threatened, or sensitive solely on the basis of the biological status of the species being considered, based on the preponderance of scientific data available.

4.2 A species may be delisted from endangered, threatened, or sensitive only when populations are no longer in danger of failing, declining, are no longer vulnerable, pursuant to section 3.3, or meet recovery plan goals, and when it no longer meets the definitions in sections 2.4, 2.5, or 2.6.

INITIATION OF LISTING PROCESS

5.1 Any one of the following events may initiate the listing process.

5.1.1 The agency determines that a species population may be in danger of failing, declining, or vulnerable, pursuant to section 3.3.

5.1.2 A petition is received at the agency from an interested person. The petition should be addressed to the director. It should set forth specific evidence and scientific data which shows that the species may be failing, declining, or vulnerable, pursuant to section 3.3. Within 60 days, the agency shall either deny the petition, stating the reasons, or initiate the classification process.

5.1.3 An emergency, as defined by the Administrative Procedure Act, chapter 34.05 RCW. The listing of any species previously classified under emergency rule shall be governed by the provisions of this section.

5.1.4 The commission requests the agency review a species of concern.

5.2 Upon initiation of the listing process the agency shall publish a public notice in the Washington Register, and notify those parties who have expressed their interest to the department, announcing the initiation of the classification process and calling for scientific information relevant to the species status report under consideration pursuant to section 7.1.

INITIATION OF DELISTING PROCESS

6.1 Any one of the following events may initiate the delisting process:

6.1.1 The agency determines that a species population may no longer be in danger of failing, declining, or vulnerable, pursuant to section 3.3.

6.1.2 The agency receives a petition from an interested person. The petition should be addressed to the director. It should set forth specific evidence and scientific data which shows that the species may no longer be failing, declining, or vulnerable, pursuant to section 3.3. Within 60 days, the agency shall either deny the petition, stating the reasons, or initiate the delisting process.

6.1.3 The commission requests the agency review a species of concern.

6.2 Upon initiation of the delisting process the agency shall publish a public notice in the Washington Register, and notify those parties who have expressed their interest to the department, announcing the initiation of the delisting process and calling for scientific information relevant to the species status report under consideration pursuant to section 7.1.

SPECIES STATUS REVIEW AND AGENCY RECOMMENDATIONS

7.1 Except in an emergency under 5.1.3 above, prior to making a classification recommendation to the commission, the agency shall prepare a preliminary species status report. The report will include a review of information relevant to the species' status in Washington and address factors affecting its status, including those given under section 3.3. The status report shall be reviewed by the public and scientific community. The status report will include, but not be limited to an analysis of:

7.1.1 Historic, current, and future species population trends.

7.1.2 Natural history, including ecological relationships (e.g., food habits, home range, habitat selection patterns).

7.1.3 Historic and current habitat trends.

7.1.4 Population demographics (e.g., survival and mortality rates, reproductive success) and their relationship to long term sustainability.

7.1.5 Historic and current species management activities.

7.2 Except in an emergency under 5.1.3 above, the agency shall prepare recommendations for species classification, based upon scientific data contained in the status report. Documents shall be prepared to determine the environmental consequences of adopting the recommendations pursuant to requirements of the State Environmental Policy Act (SEPA).

7.3 For the purpose of delisting, the status report will include a review of recovery plan goals.

PUBLIC REVIEW

8.1 Except in an emergency under 5.1.3 above, prior to making a recommendation to the commission, the agency shall provide an opportunity for interested parties to submit new scientific data relevant to the status report, classification recommendation, and any SEPA findings.

8.1.1 The agency shall allow at least 90 days for public comment.

8.1.2 The agency will hold at least one public meeting in each of its administrative regions during the public review period.

FINAL RECOMMENDATIONS AND COMMISSION ACTION

9.1 After the close of the public comment period, the agency shall complete a final status report and classification recommendation. SEPA documents will be prepared, as necessary, for the final agency recommendation for classification. The classification recommendation will be presented to the commission for action. The final species status report, agency classification recommendation, and SEPA documents will be made available to the public at least 30 days prior to the commission meeting.

9.2 Notice of the proposed commission action will be published at least 30 days prior to the commission meeting.

PERIODIC SPECIES STATUS REVIEW

10.1 The agency shall conduct a review of each endangered, threatened, or sensitive wildlife species at least every five years after the date of its listing. This review shall include an update of the species status report to determine whether the status of the species warrants its current listing status or deserves reclassification.

10.1.1 The agency shall notify any parties who have expressed their interest to the department of the periodic status review. This notice shall occur at least one year prior to end of the five year period required by section 10.1.

10.2 The status of all delisted species shall be reviewed at least once, five years following the date of delisting.

10.3 The department shall evaluate the necessity of changing the classification of the species being reviewed. The agency shall report its findings to the commission at a commission meeting. The agency shall notify the public of its findings at least 30 days prior to presenting the findings to the commission.

10.3.1 If the agency determines that new information suggests that classification of a species should be changed from its present state, the agency shall initiate classification procedures provided for in these rules starting with section 5.1.

10.3.2 If the agency determines that conditions have not changed significantly and that the classification of the species should remain unchanged, the agency shall recommend to the commission that the species being reviewed shall retain its present classification status.

10.4 Nothing in these rules shall be construed to automatically delist a species without formal commission action.

RECOVERY AND MANAGEMENT OF LISTED SPECIES

11.1 The agency shall write a recovery plan for species listed as endangered or threatened. The agency will write a management plan for species listed as sensitive. Recovery and management plans shall address the listing criteria described in sections 3.1 and 3.3, and shall include, but are not limited to:

11.1.1 Target population objectives.

11.1.2 Criteria for reclassification.

11.1.3 An implementation plan for reaching population objectives which will promote cooperative management and be sensitive to landowner needs and property rights. The plan will specify resources needed from and impacts to the department, other agencies (including federal, state, and local), tribes, landowners, and other interest groups. The plan shall consider various approaches to meeting recovery objectives including, but not limited to regulation, mitigation, acquisition, incentive, and compensation mechanisms.

11.1.4 Public education needs.

11.1.5 A species monitoring plan, which requires periodic review to allow the incorporation of new information into the status report.

11.2 Preparation of recovery and management plans will be initiated by the agency within one year after the date of listing.

11.2.1 Recovery and management plans for species listed prior to 1990 or during the five years following the adoption of these rules shall be completed within five years after the date of listing or adoption of these rules, whichever comes later. Development of recovery plans for endangered species will receive higher priority than threatened or sensitive species.

11.2.2 Recovery and management plans for species listed after five years following the adoption of these rules shall be completed within three years after the date of listing.

11.2.3 The agency will publish a notice in the Washington Register and notify any parties who have expressed interest to the department interested parties of the initiation of recovery plan development.

11.2.4 If the deadlines defined in sections 11.2.1 and 11.2.2 are not met the department shall notify the public and report the reasons for missing the deadline and the strategy for completing the plan at a commission meeting. The intent of this section is to recognize current department personnel resources are limiting and that development of recovery plans for some of the species may require significant involvement by interests outside of the department, and therefore take longer to complete.

11.3 The agency shall provide an opportunity for interested public to comment on the recovery plan and any SEPA documents.

CLASSIFICATION PROCEDURES REVIEW

12.1 The agency and an ad hoc public group with members representing a broad spectrum of interests, shall meet as needed to accomplish the following:

12.1.1 Monitor the progress of the development of recovery and management plans and status reviews, highlight problems, and make recommendations to the department and other interested parties to improve the effectiveness of these processes.

12.1.2 Review these classification procedures six years after the adoption of these rules and report its findings to the commission.

AUTHORITY

13.1 The commission has the authority to classify wildlife as endangered under RCW 77.12.020. Species classified as endangered are listed under WAC 232-12-014, as amended.

13.2 Threatened and sensitive species shall be classified as subcategories of protected wildlife. The commission has the authority to classify wildlife as protected under RCW 77.12.020. Species classified as protected are listed under WAC 232-12-011, as amended. [Statutory Authority: RCW 77.12.020. 90-11-066 (Order 442), § 232-12-297, filed 5/15/90, effective 6/15/90.]