WASHINGTON STATE STATUS REPORT FOR THE MARCH 1998

# Sage 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 de-listing, 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 Sage 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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This status report contains information from the *Washington State Management Plan for the Sage Grouse*, Washington Department of Fish and Wildlife, 1995.

# EXECUTIVE SUMMARY

Sage grouse inhabit the shrub steppe and meadow steppe region of eastern Washington. Typically, low rolling hills and adjacent valleys provide the best topography and habitat for sage grouse. Suitable sage grouse habitat contains medium to dense sagebrush stands with tall and short sagebrush plants along with a variety of forbs and grasses.

Sage grouse were historically distributed throughout much of the western United States and the southern border of three western Canadian provinces. Their range followed the distribution of sagebrush in the climax sagebrush and prairie ecosystems. From 1900 to the 1930's, sage grouse populations steadily declined throughout North America. From 1940 to 1950, sage grouse declines stabilized but remained permanently reduced because of habitat loss and degradation.

In Washington, sage grouse historically ranged from the Columbia River, north to Oroville, west to the foothills of the Cascades, and east to the Spokane River. By 1860, sage grouse had declined and were rarely seen in some areas that had formerly contained numerous birds. By the early 1900s, sage grouse had been extirpated from Spokane, Columbia, and Walla Walla Counties and perhaps other counties that historically contained small populations. The breeding population in Lincoln County was essentially eliminated by 1985 because of habitat alteration. The sage grouse population on the Fitzner and Eberhardt Arid Lands Ecology Reserve at Hanford (Hanford Site) in Benton County has evidently been extirpated due to catastrophic fires in 1981 and 1984. No sage grouse have been found there in recent surveys. The Badger Pocket area of Kittitas County historically supported large numbers of sage grouse, but they were extirpated by 1987 due to conversion of shrub steppe to agriculture in the 1970's and 1980's.

Recent surveys indicate there are 2 relatively isolated sage grouse populations remaining in Washington. One population is found in Douglas and Grant counties, predominantly on private land. The other population is found on the federally managed Yakima Training Center in Kittitas and Yakima counties which, together with the Hanford site, comprise the largest block of shrub steppe remaining in Washington. These sage grouse populations are isolated from surrounding populations in Idaho and Oregon.

The reduction in sage grouse numbers and distribution in Washington is primarily attributed to loss and degradation of habitat through conversion to agriculture and other land uses. Before the arrival of early settlers, the climax condition in the shrub steppe region of eastern Washington consisted of tracts of native sagebrush and bunchgrass species. Agricultural expansion, overgrazing, and sagebrush control through burning, mechanical removal, and chemical control, severely degraded sage grouse habitat. Approximately 40% remains of the estimated 4.16 million ha (10.4 million acres) of shrub steppe that existed in eastern Washington before European settlement. Sage grouse habitat is a subset of this remaining acreage, and factors affecting occupancy include elevation, slope, soil type, size of shrub steppe patch, and habitat quality.

Sources of mortality of sage grouse include predation, weather, accidents, disease and parasitism, and environmental hazards such as pesticides. These natural and man-influenced factors become more important management issues with small populations. Predation is a limiting factor throughout the annual sage grouse cycle, but its severity depends on habitat quality. Raptors and coyotes are the primary predators of sage grouse while corvids, badgers, and ground squirrels are the most important nest predators. Weather can influence nesting success and survival of young chicks. Diseases and parasites do not appear to be a significant source of mortality.

Sage grouse have survived in Washington in part because portions of the land in Douglas County are poorly suited to agriculture, and in part because military ownership of the Yakima Training Center prevented agriculture and most other development. Sage grouse habitat has improved on lands under the federal Conservation Reserve Program (CRP). Sage grouse populations have increased in Douglas County since 1992. This may represent improving habitat conditions or the cyclical nature of sage grouse populations evident in past years.

Listing sage grouse may be of concern for private landowners due to fears of regulation. However, listing will be a benefit to many landowners interested in enrolling lands in the federal CRP program, as concerns for sage grouse habitat increase the likelihood of land being enrolled. CRP contracts for approximately 785,000 acres in Washington expired in 1997. Applications for re-enrollment were submitted for 591,000 acres, and 483,000 were accepted (82%). The removal of important habitat in Grant and Douglas counties from the CRP program would reverse habitat gains in recent years, and could cause further declines in sage grouse numbers.

Lek counts and harvest information indicate a serious decline in the sage grouse population in Washington. Harvests averaged 1,842 sage grouse from 1951 to 1973, moved below 1,000 after 1974, and declined to 18 in 1987. The season was closed in 1988. The number of males per active lek declined statewide from 35 males/lek in 1970 to 16 males/lek in 1997. One factor that may exaggerate this trend is that the leks added to the count later in the period may have been smaller.

The statewide breeding population of sage grouse in Washington in 1997 was estimated to be approximately 900-1000 birds. About 600 sage grouse are located in Douglas County and 300 - 400 are located in Kittitas and Yakima counties. Scattered sage grouse also exist on the periphery of the range but are not believed to play a significant role in the dynamics of the population in Washington.

Management activities in Washington include annual surveys by the Department of Fish and Wildlife to monitor populations, development of a management plan for sage grouse, acquisition and restoration of habitat, and coordination of activities with other land management agencies. Research has and will continue to be conducted on both populations. A conservation agreement with the U.S. Army and U.S. Fish and Wildlife Service has been developed for management of sage grouse habitat on the Yakima Training Center.

The sage grouse population and corresponding sage grouse habitat in Washington has declined significantly. Sage grouse range has declined to about 8 - 10 % of historic range. Local populations were extirpated as recently as the mid-1980's. Major threats that remain to the two small populations include the potential for catastrophic fire, impacts of military training, impacts of intensive grazing, continued conversion of shrub steppe to cropland or residential development, and the uncertain long term future of the federal Conservation Reserve Program.

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

# TAXONOMY

Sage grouse belong to the family Phasianidae (pheasant-like birds) and subfamily Tetraoninae. Two subspecies of sage grouse are recognized: *Centrocercus urophasianus urophasianus* Bonaparte, or the eastern sage grouse, and *C. u. phaios* Aldrich, the western sage grouse. Genetic, morphological, and behavioral research is being conducted on sage grouse from different localities (M. Schroeder, pers. comm.). Preliminary evidence indicates sage grouse in a montane basin near Gunnison, Colorado, differ in several traits from conspecifics (Young 1991). The classification of a new species, *C. minimus*, is proposed (Schroeder pers. comm.). Common names of sage grouse include sage hen, sage fowl, spine-tail grouse, fool hen, cock of the plains, spiney-tailed pheasant, sage cock, and sage chicken (Coues 1893, Girard 1937, Patterson 1952, Jewett et al. 1953, Johnsgard 1973).

# DESCRIPTION

## Plumage and Extremities

Both sexes of adults have narrow, pointed tails, feathering to the base of the toes, and a variegated pattern of grayish brown, buffy, and black on the upper parts of the body (Johnsgard 1973). The flanks are pale and the abdomen exhibits a diffuse, black pattern. Males are larger and more colorful than females with a black throat and bib, scaly white foreneck feathers, and a large white ruff on the breast (Dunn et al. 1987). Males also exhibit two large, frontally directed air sacs (cervical apteria) of olive green skin and yellow superciliary combs which are enlarged during breeding display (Johnsgard 1973, Udvardy 1977). Females are characterized by grayish-white upper throats with an absence of black, no scaly feathers on the foreneck, and a partial extension of the white tips of the under tail coverts to the feather rachis (Pyrah 1963). The larger size, dark belly, and absence of white outer-tail feathers distinguish sage grouse from the sharp-tailed grouse (*Tympanuchus phasianellus*), a co-inhabitant of portions of sage grouse range in Washington.

## Measurements

Sage grouse are the largest North American grouse species and Washington's largest native upland game bird. Sage grouse weights vary by sex, age, time of year, and population (Autenrieth 1981) . For these reasons, comparisons of sage grouse weight can be misleading. Generally males weigh more than females and adults weigh more than yearlings. Adult males average 2-3.5 kg (4-7 lb), adult females average 1 to 2 kg (2-4 lb). Male weight is related to specialized body parts which are integral components of the male's display (Honess and Allred 1942, Clarke et al. 1942, Beck and Braun 1978). Adult males range in size from 66 to 76 cm (26-30 in) and adult females range from 48 to 58 cm (19-23 in) (Girard 1937, Jewett et al. 1953, Johnsgard 1973).

# GEOGRAPHICAL DISTRIBUTION

## North America

Historically, sage grouse were distributed throughout much of the western United States and along the southern border of three western Canadian provinces (Patterson 1952, Braun 1993) (Fig. 1). Their range followed the distribution of sagebrush (*Artemisia* spp.) north to British Columbia, south to New Mexico and Oklahoma, east into Nebraska, and west to California (Aldrich 1963, Guiquet 1970). Lewis and Clark first reported sage grouse at the head of the Missouri River, on the plains of the Columbia, and at the mouth of the Snake River (Coues 1893). Historical reports describe large numbers of sage grouse throughout their range (Coues 1893, Huntington 1897, Burnett 1905, Wilhelm 1970). Sage grouse populations declined throughout North America from 1900 to 1940 primarily due to habitat loss, uncontrolled grazing, and unrestricted hunting (Patterson 1952, Jewett et al. 1953).

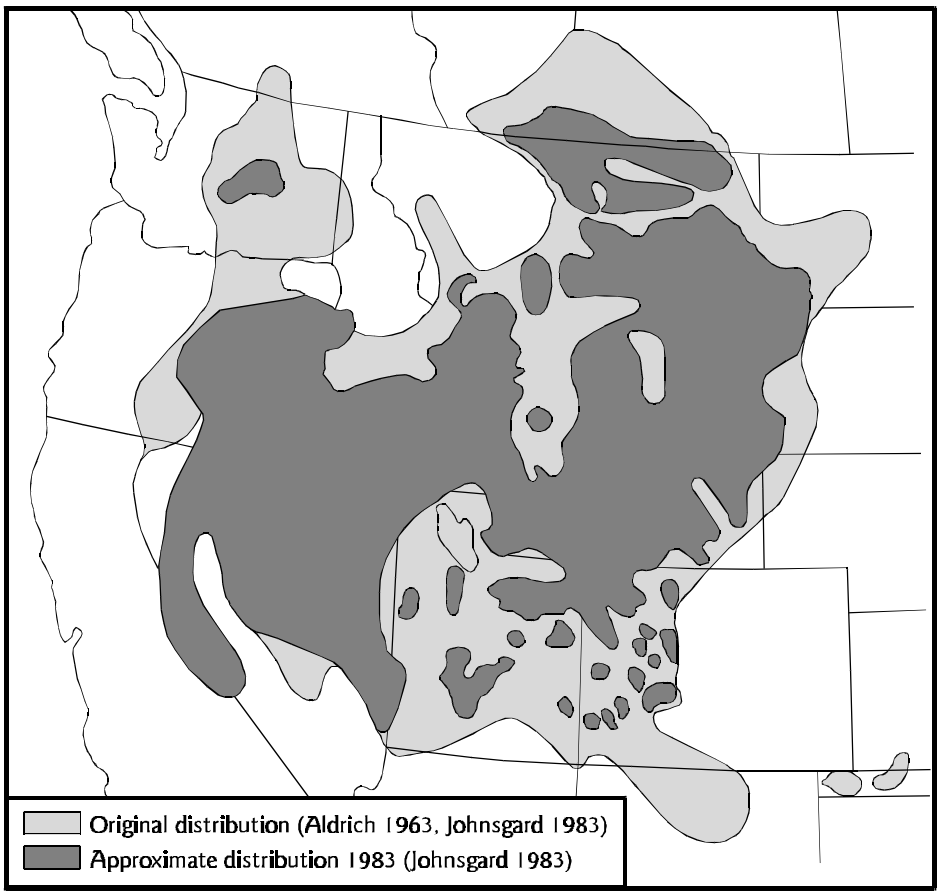


Figure 1. Approximate historic and current range of sage grouse in North America.

Currently, sage grouse range from southeastern Alberta and southern Saskatchewan, south to central Washington, eastern Oregon and California, and east to Nevada, Utah, western Colorado, southeastern Wyoming, and the western borders of North and South Dakota. The core range includes Colorado, Idaho, Montana, Nevada, Oregon, and Wyoming, with remnant populations in other states (Fig. 1). Sage grouse have been extirpated in British Columbia, Nebraska, New Mexico, and Oklahoma (Braun 1991, 1993). Braun (1993) considered populations remaining in Alberta, North Dakota, Saskatchewan, South Dakota, California, Colorado, Utah, and Washington as greatly reduced or marginal. The western subspecies of sage grouse (*C. u. phaios*) occurs in disjunct populations in central Washington and southeast Oregon (Johnsgard 1973).

## Washington

Historically, sage grouse ranged from the southern portion of the Columbia River to Oroville in the north, west to the Yakima River and east to the Spokane River (Yocom 1956) (Fig. 2; Appendix A). Lewis and Clark described large numbers of sage grouse near the mouth of the Snake River in 1805 (Jewett et al. 1953). Early explorers also reported sage grouse in the Priest Rapids, Pine Creek, Alder Creek, Horse Heaven Sand Hills, the Blue Mountains area, the sagebrush areas surrounding the Columbia River, and the Yakima and Simcoe Valley from 1840 to 1900 (Baird et al. 1874; Royal Historical Soc. 1914 and Ballou 1938, cited in Yocom 1956). Sage grouse also inhabited the Okanagan Valley in British Columbia and areas bordering the Palouse, Snake, Touchet, and Walla Walla rivers (Yocom 1956). Rare but resident sage grouse were found in Asotin County. Sage grouse occurred in 16 counties, with the largest concentrations likely in Adams, Douglas, Yakima, Franklin, Grant, and Lincoln counties. These counties encompassed the vast sagebrush areas in the Big Bend, Moses Coulee, Grand Coulee, and Crab Creek drainages southward to the Snake and Columbia rivers (Yocom 1956). By 1860, sage grouse had declined and were rarely seen on areas that had formerly contained numerous birds (Cooper 1869 and Cleman 1918, cited in Jewett et al. 1953). By the early 1900s, sage grouse had been extirpated from areas that historically contained small populations, such as Spokane, Columbia, and Walla Walla Counties (Jewett et al. 1953 , Yocum 1956).

Historic sage grouse range (Yocom 1956, Aldrich 1963) compared to current areas reveals an approximate reduction of over 90%. The current range includes both year-round and seasonal concentration areas and both contiguous and fragmented habitats (Fig. 2). Two sage grouse populations remain; the largest is found in Douglas and northern Grant counties, and a smaller population occurs in Yakima and southern Kittitas Counties. These populations are relatively small and isolated, corresponding to partially-intact areas of sagebrush habitat. Although the population has declined in Douglas County from historic numbers, there was little reduction in range.

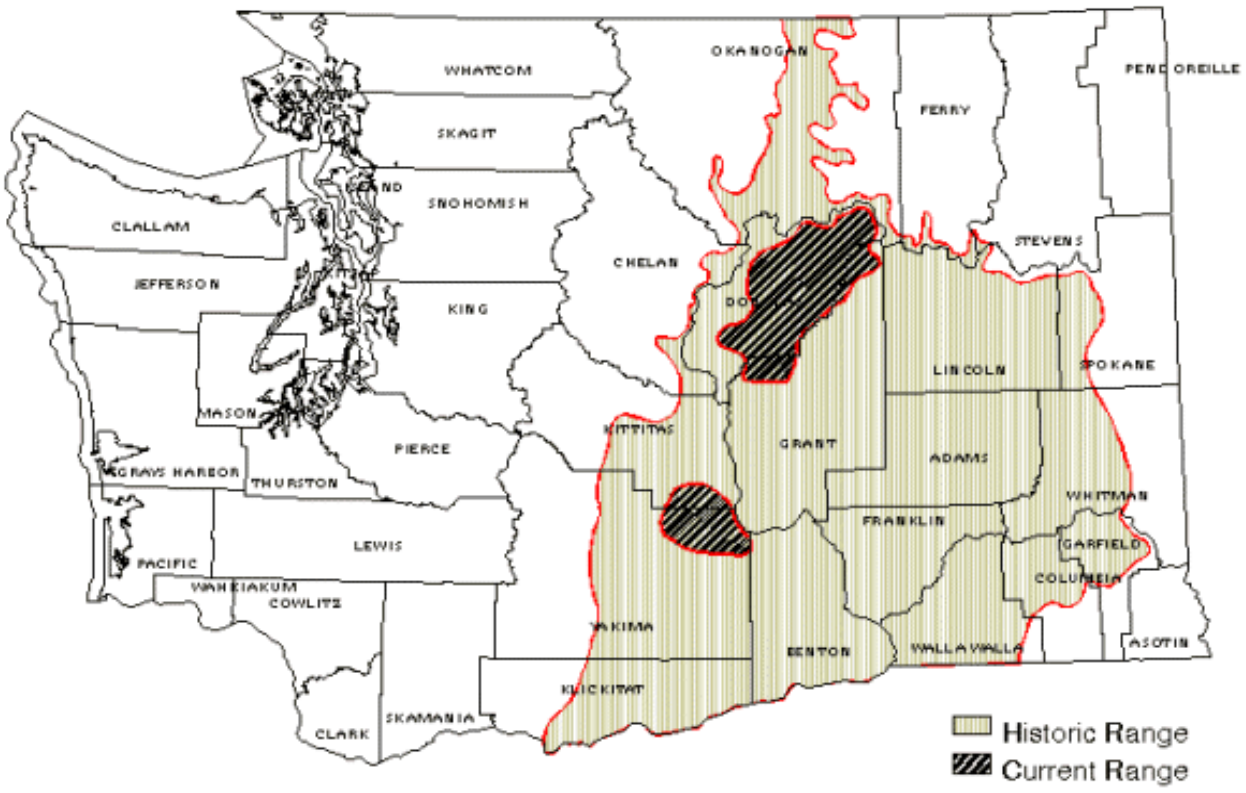


Figure 2. Historic and current range of sage grouse in Washington (based on historic records, habitat, and current known locations).

# NATURAL HISTORY

## Behavior

*Roost*. Sage grouse usually roost on the ground from evening until early morning, feed and rest during the afternoon, and return to their roosting site at night (Johnsgard 1973). In Nevada, sage grouse burrowed into the snow when snow depth was ≥25 cm (10 in) and the minimum temperature below −10 C° (14 F°) (Back et al. 1987).

*Territoriality and sociality*. Male and female sage grouse gather in the spring for displaying and mating at specific locations, called "leks." At the beginning of the breeding season, male sage grouse establish small territories on the lek. Males occupying territories near the center of the lek may be more successful at mating (Davis 1978). Males seek leks that are visited by many females. The ability to attract females and copulate is determined through display and aggressive behavior

by males (Hartzler and Jenni 1988). Adult males typically occupy and establish territories first (before yearlings) and dominate the breeding activities.

During most of the year, sage grouse segregate into flocks according to sex (Hjorth 1970). In late summer and early fall, they may congregate in flocks of both sexes in preparation for movement to wintering grounds (Patterson 1952). Similar aggregations may occur in late winter or early spring before movement to breeding areas (Patterson 1952). However, not all sage grouse populations undergo these movements (Connelly et al. 1988).

*Sexual behavior*. The most conspicuous sexual behavior is the spring courtship display performed by males on leks. Males display to proclaim and defend a territory and attract females for copulation (Johnsgard 1973). Males stand at least 25 to 50 cm (10-20 in) apart on their territory with tail feathers spread, wings dropped, neck feathers ruffled, and the cervical apteria inflated (Johnsgard 1973). To begin the display a male stands erect, fans his tail, lowers his folded wings, and steps forward. The white-tipped tail feathers contrast sharply with natural colors in the shrub-steppe environment; the tail attracts females and serves as a warning to males (Hjorth 1970). Ruffled neck feathers, inflated air sacs, and enlarged eye combs likely serve the same function (Hjorth 1970). The back is gradually raised, the white feathers above the eyes (filoplumes) are erected, and the cervical air sacs exposed. Next, the air sacs are pushed outward and the male jerks upwards. The sequence is then repeated with slight variations and more steps. Toward the end of the display, males pull their heads into the neck feathers and completely inflate their esophygeal pouches (air sacs). The release of air from the pouches makes a *plopping* sound and marks the end of one display (Johnsgard 1973).

## Food, Nutrition, and Energetics

Sagebrush, grasses, forbs, and insects comprise the annual diet of sage grouse. Sagebrush comprises 60 to 80% of the yearly diet of adult sage grouse (Martin et al. 1951, Patterson 1952, Wallestad et al. 1975, Rasmussen and Griner 1938, Remington and Braun 1985), and as much as 95 to 100% of the winter diet (Roberson 1984). Forbs may constitute $\geq$50% of the diet of juveniles up to 11 weeks of age (Rasmussen and Griner 1938, Klebenow and Gray 1968, Peterson 1970). Forbs also appear to be important to nesting hens in the pre-laying period (Barnett and Crawford 1993).

Insects make up $\geq$50% of the diet during the first and second week of life (Rasmussen and Griner 1938, Patterson 1952, Klebenow and Gray 1968, Peterson 1970). Johnson and Boyce (1990) found chicks <3 weeks old required insects for survival and chicks >3 weeks old had reduced growth rates when insects were removed from the diet. The availabilities of forbs and insects are important post-hatch limiting factors (Autenrieth 1981), especially in highly fluctuating sage grouse populations (usually those found in the xeric 18 to 25 cm [7-10 in] precipitation zone). In Oregon, forbs and invertebrates composed 80% of the dietary mass of chicks in one area with high grouse productivity, but only 36% in a less productive area where sagebrush composed 65% of the dietary mass (Drut et al. 1994).

In fall, sage grouse shift back to a sagebrush dominated diet (Girard 1937; Griner 1939 and Bean 1941, cited in Roberson 1984; Dargan et al. 1942; Patterson 1952; Trueblood 1954; Nelson 1955; Klebenow and Gray 1968; Savage 1969; Martin 1970; Peterson 1970; Oakleaf 1971; Wallestad et al. 1975; Autenrieth 1980). Remington and Braun (1985) observed sage grouse in winter selecting vegetative species with the highest protein levels, possibly because plants with high levels of protein are easily digestible and provide instant energy. Protein levels differ among subspecies of sagebrush; Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) may have the highest levels (Remington 1983). In Washington, big sagebrush (*Artemisia tridentata*) is the predominant species eaten (Eberhardt and Hofmann 1991).

Sage grouse require a higher quality winter diet relative to other grouse (Roberson 1984, Welch et al. 1988) and all age and sex classes gain or maintain weight and fat over the winter (Beck and Braun 1978, Roberson 1984, Remington and Braun 1988). Sage grouse lose weight during the breeding and nesting period when they experience a negative energy balance (Beck and Braun 1978, Roberson 1984).

Nutrition affects productivity of all Tetraoninae (Moss et al. 1975). Poor productivity may be caused by inadequate nutrition of hens during the breeding season (Moss et al. 1975, Barnett and Crawford 1993). Females in good nutritional condition contribute more nutrients to eggs (Jenkins et al. 1965), which leads to larger clutches and increased chick viability (Jenkins et al. 1963, Eastman and Jenkins 1970). Sage grouse may select both shrubs and forbs with high nutritional value.

*Water*. Some researchers consider water a key component of sage grouse habitat (Carr 1967, Savage 1969, Call and Maser 1985). Others have found no evidence that sage grouse prefer sites close to water (Wallestad 1975, Autenrieth 1981, Cadwell et al. 1994). Sage grouse need to consume water, but they typically obtain enough water by consuming vegetation that stores water, such as succulent forbs. Sage grouse may concentrate in late summer and fall where water or succulent forbs are available. Water sources include streams, springs, water holes, and cattle troughs. Where water is available, sage grouse normally visit water sites in the morning and evening. Sage grouse that occupy areas with little precipitation may migrate to areas containing water during the summer and fall. Chicks require water soon after hatching (Girard 1937), so hens with broods often migrate to areas containing water. Petersen (1980) found that hens with broods remained in upland habitat until succulent forbs disappeared then moved to wet meadows in late summer.

## Life Span and Mortality Rates

Sage grouse can survive up to 10 years in the wild (C. Braun, pers. comm.; J. Connelly, pers. comm.). The average life span of sage grouse in both hunted and protected populations in one study was 1 to 1.5 yr (Elman 1974); in another study sage grouse 3 to 4 yr of age were considered old (Wallestad 1975).

Braun (1975) reported that the annual mortality rate for sage grouse was 50 to 55%. In Colorado, Zablan (1990) found annual mortality rates of females to be higher than males (55 and 38%, respectively). In Washington, annual mortality rate for sage grouse was approximately 40% (M. Schroeder, pers. comm.). Chick mortality ranges from 40% (Wallestad 1975) to >60% (Braun 1975). In Montana, Wallestad (1975) estimated a 56% mortality rate for sage grouse chicks between time of hatch and the following fall, a 65% mortality rate for yearling hens, and a 60% mortality rate for adult hens. J. Connelly (pers. comm.) reported an annual mortality rate of 50 to 60% for all sage grouse in Idaho.

## Density

Sage grouse density fluctuates in response to habitat availability and quality, and demographic factors. A compilation from the 13 states and provinces that contain sage grouse had an average count of 16 to 32 males/lek from 1988 to 1990 (Braun 1991). In Wyoming, Patterson (1952) reported an average of one lek per 15 km² (6 mi²) with a density of 5 males/km² (13 males/mi² ). Edminster (1954) analyzed Patterson's data to estimate 12 to 19 grouse/km² (30-50 grouse/mi²) or 5 to 8 ha (13-21 ac) per grouse. In Colorado, Rogers (1964) estimated a fall density of 12 to 19 grouse/km² (30-50 grouse/mi²) in areas containing the best sage grouse habitat. Fall density in areas having marginal habitat ranged from 0.4 to 12 grouse/km² (1-30 grouse/mi²) (Rogers 1964). In Oregon, Gregg (1991) reported a density of 3 grouse/km² (8 grouse/mi²) in good habitat and 1 grouse/km² (3 grouse/mi²) in an area representing typical, remaining habitat. In Nevada, Zunino (1987) determined a spring density of 0.1 to 3 males/km² (0.3-8 males/mi²) and a fall density of 0.4 to 5 males/km² (1-13 males/mi²).

## Home Range

Sage grouse have large home ranges in comparison to other grouse species (Bergerud 1988). In Washington, home range estimates of sage grouse from the Yakima Training Center (YTC) were much higher than from Douglas County (Table 1)(Pederson 1982, Eberhardt and Hoffman 1991). Eberhardt and Hoffman (1991) attributed the large home ranges of sage grouse on the YTC to repeated disturbance. However, the two studies differed in the number of relocations, number of females followed, and time of year followed. Maximum distances moved from leks ranged from 4 to 36 km (2-22 mi) in Washington (Pedersen 1982, Eberhardt and Hofmann 1991, Cadwell et al. 1994, Schroeder 1994).

Seasonal movements depend on topography, vegetative cover, winter weather, and availability of winter food (Beck 1975, Autenrieth 1986). The winter ranges of females overlap extensively because they share refuge areas (Bradbury et al. 1989b). In Washington, most sage grouse of both sexes migrated between breeding areas and winter areas which were more or less distinct (Schroeder 1994). Schroeder (1994) hypothesized that the winter range was not used for nesting due to its overgrazed condition. Adult sage grouse often return to specific wintering areas regardless of weather or food conditions.

Table 1. Home range ($km^2$) estimates of sage grouse in Washington and Idaho.

| Location | Range | Sex/Age[a] | *n*[b] | Season | Source |
|---|---|---|---|---|---|
| Idaho | 44 | M | 6 | na | Sime (1991) |
| | 6 | F | na | na | |
| | 12 | Y | na | na | |
| Washington | 4 | M/A | 13 | Spring | Pedersen (1982) |
| | 6 | M/Y | 1 | Spring | |
| | 8 | M/Ad | 14 | Summer | |
| | 2 | M/Y | 1 | Summer | |
| | 5 | F/Ad | 1 | Spring-Summer | |
| | 0.28 | M/Ad | 3 | Winter | |
| | 2 | F/Ad | 1 | Winter | |
| Washington | 29 | C | 25 | Spring | Eberhardt and Hofmann (1991) |
| | 26 | C | 25 | Summer | |
| | 44 | C | 25 | Fall | |

[a] M=male, F=female, Ad=adult, Y=yearling, C=sex and age classes combined
[b] na=not available

Sage grouse occupying sagebrush communities at low elevation often do not migrate (Wallestad 1975), and those inhabiting mountain valleys or areas with distinct elevation gradients are often migratory (Dalke et al. 1960, Connelly et al. 1988). Migratory sage grouse generally move >16 km (10 mi) (Baker 1978, cited in Roberson 1984; Berry and Eng 1985). Migrations of 80 to 160 km (50-100 mi) from wintering areas to leks (Pyrah 1954, Dalke et al. 1963) and 81 km (50 mi) from leks to winter range (Connelly and Markham 1983) have been reported, but shorter distances are more common (Bradbury et al. 1989a). In Washington, males moved to summer habitat that averaged 12 km (7 mi) from leks (Cadwell et al. 1994). Within their home range, sage grouse move daily between feeding, breeding, and roosting sites (Wallestad 1971).

Mating, nesting, brood rearing, loafing, roosting, and foraging occur within 3 km (2 mi) of a lek in some areas (Wallestad and Pyrah 1974, Wallestad 1975, Autenrieth 1981), and at distances >3 km in other areas (Connelly et al. 1988, Wakkinen et al. 1992, Schroeder 1994).

# HABITAT REQUIREMENTS

## General

Sage grouse inhabit the shrub steppe and meadow steppe region of eastern Washington. 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, three-tipped sagebrush (*A. tripartita*), and bitterbrush (*Purshia tridentata*), and a variety of grasses and forbs. Meadow steppe communities 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 coverage is defined as the percentage of the ground surface covered with 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 local moisture (J. Connelly, pers. comm.; C. Perry, pers. comm.).

Low rolling hills and adjacent valleys provide the best topography for sage grouse (Call and Maser 1985). Sage grouse prefer slopes <30% (Call and Maser 1985). In Colorado, they preferred south-facing slopes year round (Rogers 1964). On the Yakima Training Center, habitat that contained successful nests was more likely to be on northeast aspects than on south or southwest aspects (Cadwell et al. 1997). Suitable habitat consists of sagebrush/bunchgrass stands having medium to high canopy cover of sagebrush in a variety of height classes and a diverse grass and forb understory (Peterson 1970, Wallestad 1971, Eng and Schladweiler 1972). Sagebrush is used as food and cover all year.

## Elevation

Sage grouse are found at elevations of 1,200 to 2,400 m (4,000-8,000 ft) in Oregon (Call and Maser 1985), 2,400 to 2,600 m (7,800-8,500 ft) in Colorado (Rogers 1964), 1,200 to 2,900 m (3,900-9,500 ft) in Idaho (Girard 1937, Klebenow and Gray 1968), and 2,500 to 2,700 m (8,000-9,000 ft) in Wyoming. In Washington, sage grouse on the Yakima Training Center were found at elevations of 500 to 900 m (1,650 to 2,970 ft) and on slopes less than 16° (Cadwell et al. 1997).

## Breeding

Leks are the focal point of the breeding season and range in size from 0.04 to 40 ha (0.1-99 ac) (Scott 1942, Call 1979, Call and Maser 1985). Leks are often near nesting habitat and between areas used in winter and summer (Wallestad 1975, Klebenow 1985, Connelly et al. 1988). They are found in gravel pits, burned areas, cultivated fields, air strips, abandoned homesteads, roads, bare ridges, grassy swales, natural and irrigated meadows devoid of grass, knolls, small buttes, openings in sagebrush stands, dry-lake beds, and areas denuded of vegetation by livestock (Roberson 1984, Call and Maser 1985, Autenrieth 1986). Given the diverse habitats where leks are placed, lek habitat availability is likely not a limiting factor for sage grouse (M. Schroeder, pers. comm.).

Most leks contain a central area that is barren and a surrounding area containing shrubs (Klebenow 1985, Ellis et al. 1989, Klott and Lindzey 1989). However, in Washington, numerous active leks are devoid of surrounding shrubs (L. Fitzner, pers. comm.; Schroeder 1994). Most

leks on the Yakima Training Center contain big sagebrush-bluebunch wheatgrass, occur on loamy soils, are moderately sloped (0-10%), and average 36 ha (89 ac) in size (Eberhardt and Hofmann 1991, Cadwell et al. 1994). Visibility is important on a lek and is necessary for females to observe displaying males and for all sage grouse to observe predators (Gill 1965, Wiley 1973). Water is not necessary on a lek (M. Schroeder, pers. comm.), although leks are often located near water (Call 1979). In areas containing both sage grouse and livestock, sage grouse may form leks near water because the vegetation has been flattened or removed by repeated livestock use (J. Connelly, pers. comm.).

Shrubs surrounding leks are used extensively by sage grouse. Males use shrubs $\leq$1 km (0.6 mi) from a lek for foraging, loafing, and shelter (Rothenmaier 1979, Emmons and Braun 1984, Autenrieth 1981). Shrub stands with medium to very high shrub cover are primarily used by sage grouse for foraging and loafing (Autenrieth 1981, Emmons and Braun 1984, Roberson 1984). Males select shrub stands 18 to 38 cm (7-15 in) high (Call and Maser 1985, Rothenmaier 1979) with a canopy coverage of 20 to 50% (Wallestad and Schladweiler 1974, Autenrieth 1981, Ellis et al. 1989).

## Late-Spring, Summer, and Fall

After mating, sage grouse hens leave the lek to nest. Most hens build nests under shrubs (Jarvis 1974, Wallestad and Pyrah 1974, Roberson 1984), specifically in areas with medium-high shrub cover and residual grass (dry grass from the previous growing season)(Schoenberg 1982, Gregg 1991, Sime 1991). However, females occasionally nest in grassland (Sveum 1995), cultivated fields that contain abundant insects for chicks after hatching (Autenrieth 1981), or in idle cropland, such as land enrolled in the Conservation Reserve Program (CRP) (Schroeder 1994). Sage grouse may require a balance of shrubs and grasses for greatest nest success (Sveum 1995). Shrubs located in nesting habitat act as an umbrella, which helps sheild the nest from weather and predators and increases nest success (Autenrieth 1981, Connelly et al. 1991, Gregg et al. 1994). In Washington, big sagebrush/bunchgrass is the predominant habitat selected for nesting (Schroeder 1994, Sveum 1995). In other states, additional species used for nesting include rabbitbrush (*Chrysothamnus* sp.), bitterbrush, three-tipped sagebrush, silver sagebrush (*A. cana*), and mountain big sagebrush (*A. tridentata vaseyana*) (Gregg 1991, Sime 1991, Gregg et al. 1994).

Tall, dense vegetation provides visual, scent, and physical barriers between predators and the nests of ground-nesting birds (Redmond et al. 1982; Sugden and Beyersbergen 1986, 1987; Crabtree et al. 1989; Sveum 1995). The presence of grass, especially tall grass, and forbs interspersed with sagebrush increase nest success (Autenrieth 1981, Wakkinen 1990, Gregg 1991, Sveum 1995). Grass may increase nest success by hiding the nest from ground predators and forming a microclimate that is warmer than the air above (Autenrieth 1981). Nests on the Yakima Training Center were characterized by a more even mixture of grass and shrubs in contrast to areas where unsuccessful nests occurred (Cadwell et al. 1997). In Oregon, a study of both real sage grouse nests and artificial nests found that nests placed in tall grass (>15 cm [6 in]) and

medium high shrubs (40-80 cm [16-32 in]) had the least predation (Crawford and DeLong 1993). A separate study in Oregon also found that sage grouse nests placed in medium high shrubs had the least predation (Gregg et al. 1994). Non-depredated nests had higher grass canopy coverage (18% vs. 5%) and higher shrub coverage (41% vs. 29%) than depredated nests within 1 m (3 ft) of the nest (Gregg et al. 1994).

Both sagebrush and tall grasses are important at nest sites (Sveum 1995). In Washington, most females nested in areas with medium to very high canopy coverage of sagebrush and grass (20% and 51%, respectively) (Schroeder 1994). Schroeder (pers. comm.) notes that grass cover at 10 - 30 cm is critical because sagebrush (which tends to be taller in Washington than in other study areas), does not provide the needed low cover.

During summer in Washington, Pedersen (1982) observed sage grouse moving from sagebrush communities to wet areas that contained annual forbs in fallow fields. Sage grouse on the YTC did not frequent springs, nor did they prefer major streams and associated riparian areas for water and food (Cadwell et al. 1994). Sage grouse broods used both big sagebrush/bunchgrass and grasslands on the YTC (Sveum 1995). In Oregon, sage grouse were generally observed feeding on forbs near playas, water holes, and meadows in summer (Willis et al. 1993).

### Winter

Winter habitat is typically the most limited seasonal habitat within the range of sage grouse (Patterson 1952, Eng and Schladweiler 1972, Beck 1977). Sagebrush, which constitutes nearly 100% of the winter diet, is relatively tall, evergreen, and nutritious. These properties become important when snow depth exceeds 30 cm (12 in) (Autenrieth 1981, Hupp and Braun 1989, Willis 1991). Sage grouse prefer sagebrush $\geq$25 cm (10 in) high with $\geq$15% canopy coverage (Wallestad and Schladweiler 1974, Autenrieth 1981, Schoenberg 1982) and forage in the tallest sagebrush with the highest canopy cover (Beck 1977).

Deep snow limits food availability and may prevent a flock from using a site in winter. The best wintering sites are often located at the lowest elevations (Rogers 1964) in areas having flat or gentle slopes with <15% gradient (Jarvis 1974, Beck 1977, Autenrieth 1981). Winter sites typically face south or west, possibly because less snow accumulates than on north or east aspects (Beck 1977, Autenrieth 1981, Hupp and Braun 1989). Drainage basins with abundant sagebrush (Pedersen 1982, Schoenberg 1982, Hupp and Braun 1989), or dry areas that may be unsuitable other times of the year, are often used during winter. In Washington, sage grouse were observed feeding on steep (>15%) south-facing slopes and roosting on gradual slopes (15%) and ridgetops during winter (M. Schroeder, pers. comm.). On the YTC, males used areas with more grass and less shrub cover in winter when compared with nest sites (Cadwell et al. 1997).

## POPULATION DYNAMICS

## Reproduction

*Age of first breeding.* Female sage grouse are sexually mature their first fall and nest the following spring (Patterson 1952). Males are sexually mature the spring following their first winter. Yearling males engage in display and breeding but devote less time and energy to courtship activities than adults (Wiley 1974).

*Seasons*. The mating season generally begins at about the same time each year depending on weather and vegetative conditions. In Washington, most females returned to breeding areas in late February to early March (Eberhardt and Hofmann 1991, Schroeder 1994), while most males returned from early to mid-April (Eberhardt and Hofmann 1991). Pedersen (1982) recorded the highest number of male and female sage grouse on leks from mid-March to mid-April.

*Fidelity to leks.* Most male sage grouse return to the same lek or lek complex each spring (Schlatterer 1960, Jarvis 1974, Braun and Beck 1976, Wiley 1978). In Montana, almost all males returned to the same lek regardless of their success at mating (Hartzler and Jenni 1988). Male sage grouse in Washington demonstrate strong fidelity to leks. All males ($n$ = 43) in Pederson's (1982) study remained at the same lek throughout the breeding season, and all males ($n$ = 4) that were monitored by Schroeder (1994) during consecutive breeding seasons attended the same lek. Lek sites may be used each year over a long period of time. For example, an arrowhead used to hunt sage grouse and made approximately 105- to 110-years ago was found at an active lek in Idaho (Dalke et al. 1963).

A male may choose a lek based on the number of females likely to visit (Bradbury et al. 1989b). Two scenarios could account for males returning to the same lek each year and concurrently searching for leks with many females. Individual females and males may attend the same lek in consecutive years by preference or coincidence, or individual females and males may attend different leks in consecutive years but are limited by the number of leks in a lek complex. Fluctuations in annual lek counts between adjacent leks (Wash. Dept. Fish and Wildl., unpubl. data) and observations of sage grouse moving among leks in the same area support the second scenario (Dalke et al. 1963; Eng, unpubl. data cited in Wallestad and Schladweiler 1974; Braun and Beck 1976).

Juveniles may establish new leks and other leks become obsolete because of habitat changes or disintegration of local populations. Males may also move to a new location near a primary lek (J. Connelly, pers. comm.); the new location is called a "satellite," and males may or may not return to the new location in subsequent years. Females do not return to the same lek every year; instead, they search for active males and a good nesting site (Bradbury et al. 1989b).

*Mating*. Mating begins after males and females congregate on a lek. Hens form clusters near a centrally-located, dominant male (Hartzler and Jenni 1988), and these few dominant males participate in most of the mating (Eng and Schladweiler 1972). Males spend early morning and late evening at leks and remain nearby the rest of the day (Batterson and Morse 1948, Wallestad

and Schladweiler 1974). After mating, males spend the summer alone or in small flocks. In Washington, males began to leave leks in late April and early May and moved to summer habitat (Pedersen 1982, Cadwell et al. 1994).

*Nesting*. After mating, females devote most of their time to building nests, laying eggs, and raising chicks; males do not assist in these activities (Rasmussen and Griner 1938, Patterson 1952, Harrison 1978). Females build nests within 7 - 10 days after mating (Autenrieth 1981, Call and Maser 1985).

Nests are typically located 2 to 6 km (1-4 mi) from leks (Gill 1965, Martin 1970, Jarvis 1974, Wallestad and Pyrah 1974, Petersen 1980, Pedersen 1982, Berry and Eng 1985, Eberhardt and Hofmann 1991, Wakkinen et al. 1992, Fischer et al. 1993). In Washington, nests were <1 to 19 km (0.62-12 mi) from leks on the Yakima Training Center (Cadwell et al. 1994). The average distance between the nest and the lek where the female was captured was 6.9 km (4.3 mi) in Douglas County (Schroeder 1994). Nest placement likely depends on habitat quality and not distance to the lek (Wakkinen et al. 1992). In California, hens chose nest sites before they chose a lek, they traveled farther from winter grounds to select a nest site than to select a lek, and after mating, they nested on the chosen site rather than nesting around the lek (Bradbury et al. 1989b). Hens returned to the same nest site each year in Idaho (Gates 1983, Fischer et al. 1993), Montana, and Wyoming (Berry and Eng 1985).

*Nest success*. Sage grouse nest success (% of nests with eggs that hatch) ranges from 10 to 64% (Batterson and Morse 1948, Patterson 1952, Nelson 1955, Gill 1966, Wallestad and Pyrah 1974, Wallestad 1975, Petersen 1980, Connelly et al. 1988, Zunino 1987, Wakkinen 1990, Gregg 1991, Sime 1991). Bergerud (1988) analyzed nest success rates from 12 studies and reported an average of 35%. In Washington, Schroeder (1997) reported overall nest success of 37%. Eighty seven percent of females renested following nest failure in Washington; consequently, overall breeding success was 61% (Schroeder 1997). Eberhardt and Hofmann (1991) reported a nesting-success rate of 38% on the YTC. Success rates were 39% (Nelson 1955) and 15% (Crawford et al. 1992) in Oregon, 61% (Wakkinen 1990) and 52% (Connelly et al. 1993) in Idaho, and 64% (Wallestad and Pyrah 1974) in Montana. Wallestad and Pyrah (1974) and Autenrieth (1981) reported greater productivity in adult females than yearlings, but Connelly et al. (1993) found no difference in nest success or re-nesting success among age classes.

*Brood-rearing*. After hatching, chicks wait until they are dry, then leave the nest. Sage grouse hens attempt to raise one brood in a season (Girard 1937). Chicks feed themselves, but hens spend considerable time keeping chicks warm and guarding them for the first 4 to 5 weeks (Patterson 1952). Chicks remain with hens until late summer or early fall and then congregate with other sage grouse in winter flocks. Brood size depends on nest success and chick survival. Average brood size was 4.6 chicks/hen in Washington (Pedersen 1982), 2.3 to 4 chicks/hen in Nevada (Zunino 1987), and 6.1 chicks/hen in Wyoming (Girard 1937). In Washington, Schroeder (1997) observed broods with 3.8 chicks/hen 45 - 75 days after eggs hatched, but this estimate of

brood size may be low because some chicks leave broods within 60 days after hatching (Dunn and Braun 1986).

*Juveniles*. Sage grouse chicks are considered juveniles when they lose their down. Juveniles become independent 10 to 12 weeks after hatching. Juveniles weigh the same as adults after 6 or 7 months (Patterson 1952). Broods separate by late August and early September, and juveniles join adult sage grouse in flocks. Yearling males become sexually mature in April or May and, although they display on leks, they seldom mate (Dalke et al. 1963, Patterson 1950).

## Sex Ratios

Sex ratios are typically determined from information supplied by hunters or wing samples taken from harvested birds. Male to female sex ratio of 1:1 for all sage grouse (Girard 1937), and 1:1.2 and 1:2.3 for juvenile sage grouse (Patterson 1952) were reported in Wyoming. In Colorado, Rogers (1964) reported a sex ratio of 1:1.5 for all sage grouse, and Braun (1984), reported a ratio of 1:1.1 for juveniles, 1:1.6 for yearlings, and 1:2.6 for adults . Because of their conspicuousness during breeding, more adult males may be killed by predators than females. This may result in adult sex ratios that are skewed towards females as compared with more even sex ratios for chicks and juveniles.

## Mortality

*Predation*. Braun (1975) reports an annual mortality rate of about 50-55% for sage grouse. Predation typically accounts for about 85% of reported mortalities (excluding hunting) in grouse species, and 79% of nest failures (Bergerud 1988:615,684). Annual mortality in steppe grouse species is relatively constant, and population changes result from changes in nesting success (Bergerud 1988:647). Autenrieth (1986) reported nest predation was an important constraint on sage grouse population increase, followed by predation on chicks and adults. Predation during winter depends in part on the availability of alternative prey for predators, such as cottontail rabbits (*Sylvilagus* sp.) and jackrabbits (*Lepus* sp.) (Autenrieth 1986). Predator control programs can be locally effective at improving nest success (Greenwood and Sovada 1996), but they can be expensive and yield limited success (Autenrieth 1986, Drut 1994). Habitat quality, specifically the amount and type of vegetation available to nesting hens, ultimately affects the number of nests destroyed by predators (Gregg et al. 1994). In general, the territoriality of some predators prevents them from increasing markedly in response to grouse abundance (Bergerud 1988).

Raptors and crows are the primary avian predators of sage grouse (Patterson 1952, Lumsden 1968, Wiley 1973). Ground predators include coyotes (*Canis latrans*), bobcats (*Lynx rufus*), minks (*Mustela vison*), badgers (*Taxidea taxus*), and ground squirrels (*Spermophilus* sp.). In Montana, ground predators were seen less frequently than aerial predators but killed more grouse (Hartzler 1974). Schroeder (1994) found ravens, coyotes, badgers, and other small mammals preyed on sage grouse eggs and were primarily responsible for nest failure in north central Washington. On the Yakima Training Center, coyotes, ravens, Townsend's ground squirrel

(*Spermophilous townsendii*), badger, and an unidentified avian predator were probably responsible for instances of sage grouse predation (Eberhardt and Hofmann 1991, Sveum 1995).

*Hunting*. Historically, the sage grouse was the leading game bird in 9 of the 15 western states it occupied (Girard 1937). By 1937, sage grouse was the leading game bird in only three western states and of minor importance in a fourth state (Girard 1937, Rasmussen and Griner 1938, Patterson 1952).

The results of studies of the effect of hunting on sage grouse populations conflict. Leopold (1933) believed unregulated hunting could reduce any wildlife population to a level that was unstable. However, a well regulated harvest likely has little effect on stability in healthy populations (Autenrieth et al. 1982). In Oregon, there was no correlation between the number of sage grouse killed during hunting seasons and the size of the spring population (Crawford 1982). In Colorado, Braun and Hoffman (1979) believed hunting affected sage grouse stability only when $\geq$30% of the population was killed. In Nevada, regulated hunting had no effect on the stability of a sage grouse population at low density (Zunino 1987). In 10 studies involving 8 species of grouse, Bergerud (1988) reported that hunting increased annual mortality by adding to, rather than replacing, natural winter mortality. Most of the studies cited by Bergerud (1988) reported a harvest of >30% of the population, which may have caused the additive effect.

In Washington, Yocom (1956) believed healthy populations of sage grouse annually produced more birds than were needed to sustain the population. Surplus sage grouse died from predation or exposure to inclement weather if they were not harvested, and protecting habitat, rather than eliminating hunting, insured the survival of the population (Yocom 1956).

*Weather*. Weather influences nesting success and survival of young chicks (Rasmussen and Griner 1938, Crawford 1960, Schlatterer 1960, Gill 1966, Rothenmaier 1979). However, in Montana, Wallestad and Watts (1972) found no correlations between productivity of sage grouse and rainfall or temperature. Weather affected nest success in Idaho (Dalke et al. 1963, Autenreith 1981), but its impact depended on the availability of forbs and insects for broods immediately following hatch (Autenrieth 1981). In Colorado, Gill (1966) reported good sage grouse production when mean average temperature in spring exceeded 45° F and total precipitation was $\geq$5 cm (2 in). In Wyoming, Patterson (1952) found no nest failure resulting from low temperatures or snow but chicks apparently died from several consecutive days of cold rain, sleet, and snow accompanied by low temperatures. It appears adult sage grouse endure the winter reasonably well, provided wintering habitat contains adequate amounts of suitable sagebrush (Patterson 1952). The effect of weather on habitat quality is a possible explanation for the population fluctuations exhibited by sage grouse (M. Schroeder, pers.comm.).

*Accidents and pesticides*. In Idaho, Bean (1941) reported 11 male sage grouse killed by automobiles. Bean noted sage grouse use roads to dust which may make them vulnerable to vehicular accidents. In Washington, M. Schroeder (pers. comm.) reported one radio-marked

female and two other females killed by automobiles in 1993. In Idaho, sage grouse have also been observed flying into windows and powerlines (J. Connelly, pers. comm.).

Pesticides may also directly kill sage grouse. Blus et al. (1989) found organophosphorus insecticides (dimethoate or methamidophos) directly responsible for the death of sage grouse occupying or being near sprayed alfalfa or potato fields in southeastern Idaho.

*Disease*. There is anecdotal evidence that disease can cause local population declines (Girard 1937, Batterson and Morse 1948), but it is unknown if disease plays any role in long-term population dynamics. Coccidiosis is the most prevalent disease affecting sage grouse (Simon 1940, Thorne 1969), although it is not continuously epidemic (Honess 1947). Coccidiosis is transmitted by the single-celled *Eimeria angusta* and *E. centrocerci* in contaminated water and is more noticeable near drying water holes (Simon 1940). Maggots and beetles that feed on sage grouse droppings and then are consumed by sage grouse, are responsible for disease transmission (Grover 1944).

# POPULATION STATUS

## Past

Sage grouse numbers in Washington declined from the late 1800's to the early 1900's because of habitat conversion, overgrazing, and unrestricted hunting (Yocom 1956). In the 1920's and 1930's, grazing restrictions and the change from horse-drawn plow to tractor farming reduced overgrazing by horses and allowed some recovery of rangeland (Yocom 1956). This resulted in more grouse during the 1940's and 1950's (Yocom 1956). However, the population likely remained depressed in comparison to historic descriptions.

*Harvest*. When the Washington Department of Game (WDFW) was created in 1933, a moratorium was placed on sage grouse hunting. In 1950, a 2-day sage grouse hunting season was re-opened in the Badger Pocket area of Kittitas County, with a daily and possession limit of one bird. The 1950 hunt resulted in the harvest of an estimated 2,700 sage grouse (Table 2). From 1951 to 1973, the season varied from 2 to 11 days throughout eastern Washington, with daily and possession limits of one or two. Due to declining harvest and lek counts after 1973, the season was shortened to 2 days with a daily limit of one and possession limit of two. Possession limits for hunting were further reduced to one in 1977 and the area open for hunting was reduced in 1978. Continuing declines in the sage grouse population and the lack of sufficient biological information resulted in a statewide harvest closure in 1988. Harvest figures show a marked decline in the number of sage grouse harvested from 1951 to 1987. In just 7 years, between 1974

Table 2. Hunting seasons and harvests of sage grouse in Washington, 1950-1987[a].

| Year | Season length (days) | Counties open for harvest[b] | Harvested grouse[c] | Number of hunters[d] |
|---|---|---|---|---|
| 1950 | 2 | K | 2,700 | na[e] |
| 1951 | 2 | D, G, K | 1,625 | na |
| 1952 | 2 | D, G, K | 2,500 | na |
| 1953 | 2 | K, Y | 2,550 | na |
| | 8 | D, G | | |
| 1954 | 2 | K, Y | 2,375 | na |
| | 8 | D, G | | |
| 1955 | 2 | B, K, Y | 2,275 | na |
| | 10 | D, G | | |
| 1956 | 2 | B, K, Y | 1,550 | na |
| | 8 | D, G | | |
| 1957 | 0 | Closed Season | na | na |
| 1958 | 2 | D, G | 1,400 | na |
| 1959 | 2 | B, K, Y | 1,450 | na |
| | 8 | D, G, L | | |
| 1960 | 2 | B, K, Y | 2,700 | na |
| | 8 | D, G, L | | |
| 1961 | 2 | B, K, Y | 2,175 | na |
| | 10 | D, G, L | | |
| 1962 | 8 | B, D, G, K, L, Y | 1,600 | na |
| 1963 | 8 | B, D, G, K, L, Y | 1,900 | na |
| 1964 | 8 | B, D, G, K, L, Y | 1,750 | na |
| 1965 | 8 | Eastern Washington | 1,650 | na |
| 1966 | 8 | Eastern Washington | 1,750 | na |
| 1967 | 8 | Eastern Washington | 1,750 | na |
| 1968 | 8 | Eastern Washington | 1,400 | na |
| 1969 | 8 | Eastern Washington | 1,450 | 3,120 |
| 1970 | 8 | Eastern Washington | 2,065 | 3,300 |
| 1971 | 8 | Eastern Washington | 1,250 | 2,500 |
| 1972 | 8 | Eastern Washington | 1,250 | 2,700 |
| 1973 | 8 | Eastern Washington | 1,275 | 2,200 |
| 1974 | 2 | Eastern Washington | 900 | 2,100 |
| 1975 | 4 | Eastern Washington | 875 | 2,000 |
| 1976 | 2 | Eastern Washington | 865 | 2,200 |
| 1977 | 2 | Eastern Washington | 500 | 1,700 |
| 1978 | 2 | E Wash., except A, F, G, O | 410 | 2,000 |
| 1979 | 2 | E Wash., except A, F, G, O | 740 | 1,500 |
| 1980 | 2 | D, K, L, Y | 460 | 2,000 |
| 1981 | 2 | D, K, L, Y | 680 | na |
| 1982 | 2 | D, K, L, Y | 580 | na |
| 1983 | 2 | D, K, L, Y | 871 | na |
| 1984 | 2 | D, K, L, Y | 147 | na |
| 1985 | 2 | K, Y | 132 | na |
| 1986 | 2 | K, Y | 81 | na |
| 1987 | 2 | K, Y (on Yakima Training Center) | 18 | na |

[a] Information obtained from past WDFW hunting pamphlets and departmental records.

[b] A=Adams, B=Benton, D=Douglas, F=Franklin, G=Grant, K=Kittitas, L=Lincoln, O=Okanogan, Y=Yakima.

[c] Harvest and hunter estimates acquired from the WDFW Annual Game Harvest Questionnaire and WDFW license sales (Pedersen 1982, WDFW unpubl. data). Approximately 10% of all licensed Washington hunters were sent questionnaires from 1967 to 1980, 5% from 1958 to 1966, and 3% from 1957 to 1958. Responses, based on the total number of licensed Washington hunters, averaged 6.0% from 1967 to 1980. Numbers of grouse harvested and hunters were adjusted using a 26% error factor that had previously been reported for sage grouse questionnaire responses in Washington (Zeigler 1978).

[d] Number of sage grouse hunters were not tallied separately from other grouse hunters prior to 1969 or after 1980.

[e] na=data not available

and 1980, hunter success was cut nearly in half, from 0.43 grouse/hunter to 0.23 grouse/hunter. During this time, the hunting season was primarily 2 days/year (Table 2).

Harvest estimates were derived from the Washington Department of Wildlife (WDFW) Annual Game Harvest Questionnaire and wing envelopes (Pedersen 1982). Autenrieth et al. (1981) discussed the inadequacy of harvest questionnaires that sampled <25 to 30% of all hunters, which tend to overestimate harvest. Overestimates of ≥100% may result when sampling 1 to 10% of a state's hunters (Pedersen 1982), so Washington sampling may not have been adequate. Furthermore, season restrictions could be partly responsible for harvest declines, but despite sampling limitations and season changes, a declining trend in the sage grouse harvest in Washington from 1950 to 1987 was clear.

*Statewide population*. The average number of males per lek is useful in monitoring local populations. The total number of leks used by sage grouse can remain the same even though the population is declining. For these reasons, it is important for biologists to count the number of males at each lek rather than simply recording whether the lek was active or not. A decline in the number of males per lek likely indicates a declining population.

Possible biases in lek count data include: 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 with increasing survey effort, and 4) the same sample of leks are not necessarily monitored in consecutive years.

Lek counts performed since 1955 show annual changes in the population (Fig. 3). Population fluctuations may result from changes in weather or other factors. Sage grouse populations generally fluctuate on a 10-year cycle, based on lek counts and harvest data from several western states (Rich 1985). In Washington (Wash. Dept. Fish and Wildl. 1995) and Oregon (Willis et al. 1993), state and county lek counts peaked approximately every 10 years. Surveys indicate that sage grouse subpopulations can decline to 20 to 25% of previous counts several years following a peak.

Efforts to perform standardized lek counts increased in 1970. The total number of males counted statewide initially increased after 1970, because biologists included more leks in lek counts. Increased frequency of lek counts, standardized counting procedures after 1970, and the discovery of satellite leks likely influenced trends. Males per active lek declined statewide from 35 males/lek in 1970 to 14 males/lek in 1994 (Fig. 4).

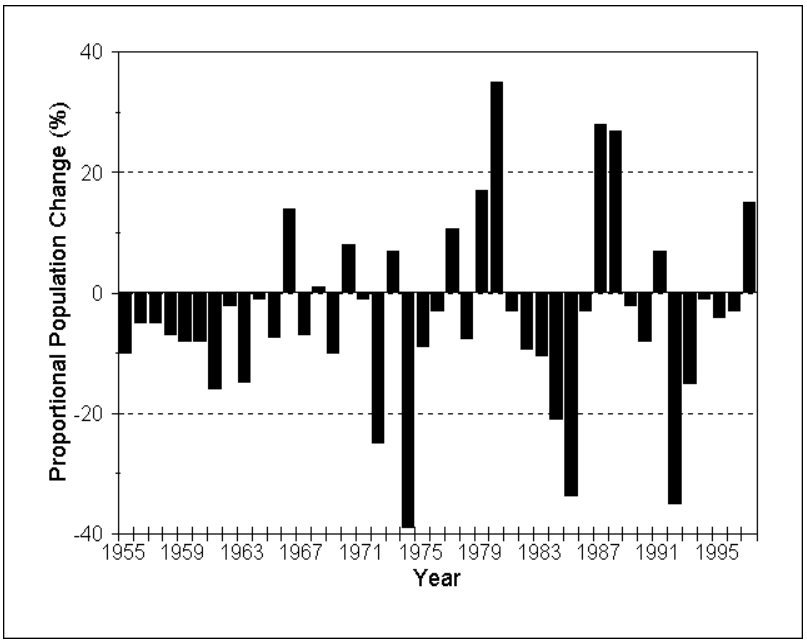


Figure 3. The proportional change in sage grouse numbers estimated from annual lek counts, 1955-1997.

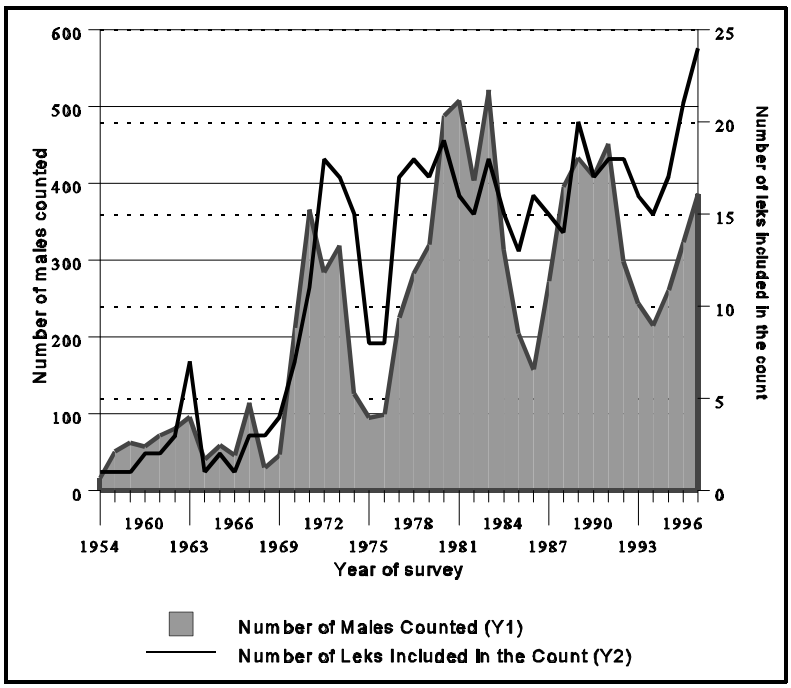


Figure 4. Male sage grouse counted in Washington during lek counts, 1954-1997. Statewide counts are influenced by the number of leks in the count.

To roughly estimate historic population size and rate of decline, we looked at counts of active leks surveyed only in consecutive years. We used only consecutive year counts because frequently-monitored leks are the best indicators of trends in populations. Rate of decline was calculated from the annual change in mean number of birds per lek (Fig. 5). The estimated population declined an annual average of 3.4% between 1970 and 1997.

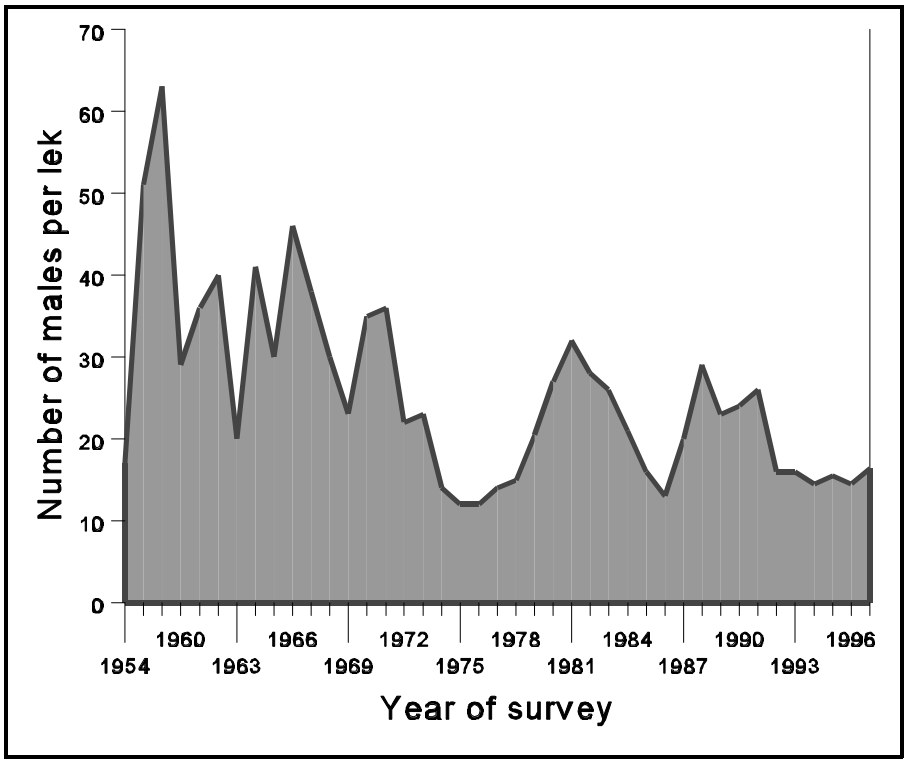


Figure 5. The mean number of males per lek in Washington, 1954-1997.

Past population estimates are also based upon back-calculation, following the estimated percent annual population change in lek counts. Overall, the population appears to have declined from a high of approximately 3,800 in 1970 to about 1,000 in 1997 (Fig. 6). Following this analysis back to 1954, an estimated population would be roughly 9,000 birds. Although lek counts have been conducted since 1954, the data since 1970 are more reliable due to an increased number of leks counted and standardized counting procedures implemented that year. This analysis has inherent sources of bias, and is limited by the lack of complete historical survey information. Therefore, these numbers should be considered rough estimates. The principal assumption is that changes in historic lek counts reflect changes in population size.

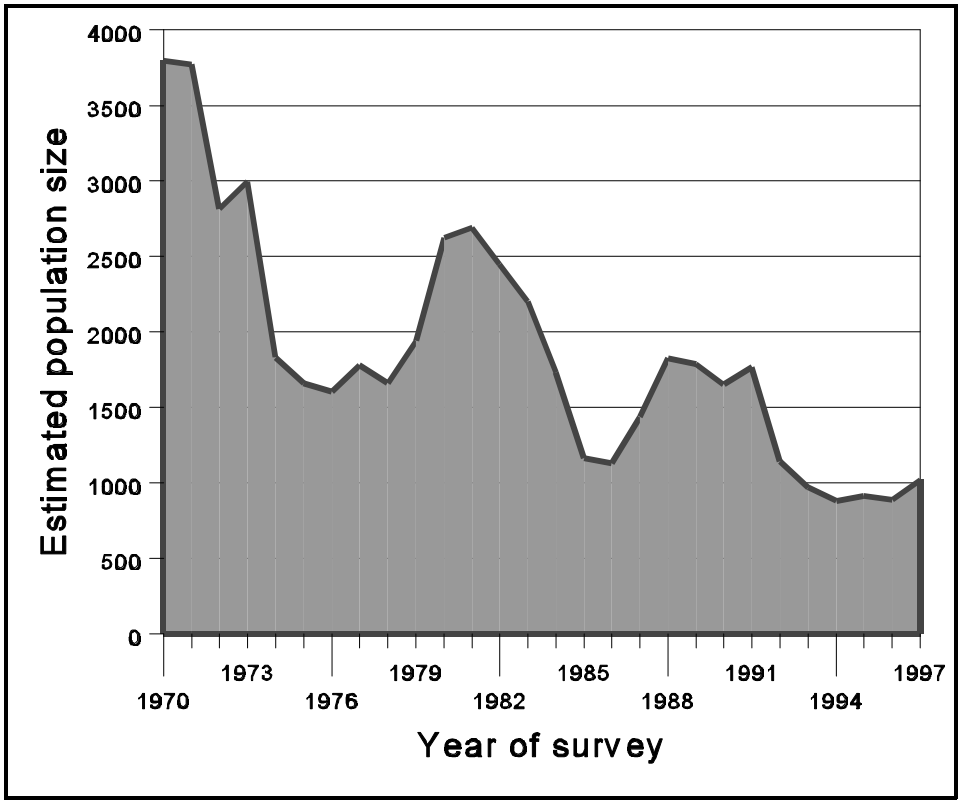


Figure 6. Estimated statewide sage grouse population based on annual proportional changes in lek counts.

*Regional populations*. Sage grouse in Lincoln County illustrate how rapidly populations can disappear. Lek counts declined from 79 males in 1981 to 0 in 1987 (Fig. 7). The cause of the decline is unknown, but may be related to continued habitat removal (J. Hickman, pers. comm.) and degradation over time. Although no current leks are known, at least one sighting of a sage grouse brood was reported in 1993, 1994, and 1995. The last peak in the Grant and Douglas county population was in 1988 when it reached 335; since that time the population declined to a low of 110 males in 1993 before rebounding to 235 in 1997 (Fig. 8). Some of the recent increase may be from newly discovered leks. Thirteen leks were active in 1995, up from 11 between 1988 and 1992. The average number of males per active lek increased from a low of 10.5 in 1994 to 18 in 1997, but is still below levels that occurred between 1988 and 1992 (28 males/lek in 1990, for example).

Over the past 10 years, habitat conditions in Douglas County have likely improved for sage grouse (M. Schroeder, pers comm.), largely as a result of the Conservation Reserve Program (CRP) on private lands. Although sage grouse numbers have increased in Douglas County since 1992, it is too early to tell whether this reflects the improving underlying habitat conditions or represents the cyclic pattern observed in lek counts in past years (Fig. 8).

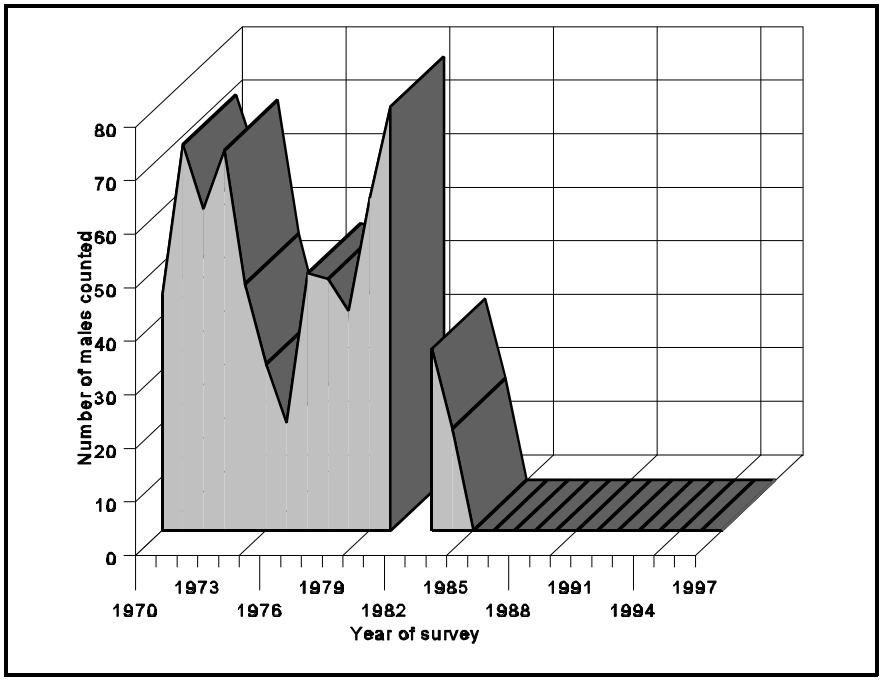


Figure 7. Lek counts in Lincoln County, 1970-1997.

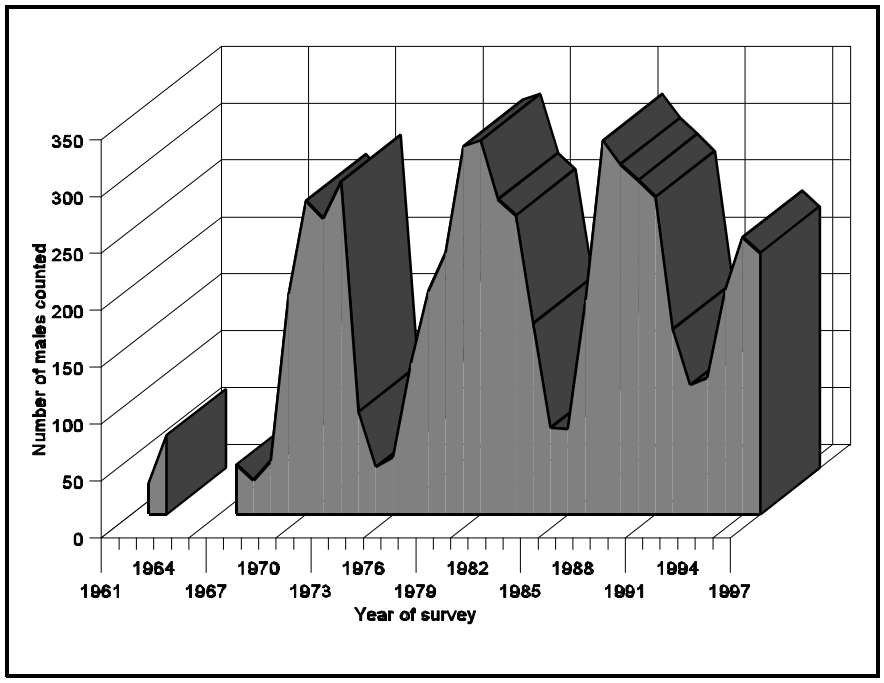


Figure 8. Lek counts in Douglas County, 1961-1997.

In Yakima, Benton, and Kittitas counties, hunters took approximately 900 sage grouse annually between 1967 and 1972. Limited lek counts began in 1971. These intensified to encompass all known leks on the Yakima Training Center (YTC) in 1989. With more intensive survey effort conducted on the YTC since 1989, use of maximum counts from leks likely resulted in some double counting of males (because males may attend different leks on different days). A more conservative population estimate is obtained by counting all the leks during a single day, as is now done at the YTC.

A trend toward a greater number of active leks with fewer males per lek is evident from survey data on the YTC. Numbers of males counted since 1989 declined from a high of 168 in 1991 to 76 in 1996, and increased to 158 in 1997 (S. Kruger, pers. comm.). Similarly, the average number of males per lek declined from 28 in 1991 to 7.6 in 1996, then increased to 14 in 1997 (S. Kruger, pers. comm.). The total number of active leks has increased from 5 in 1989 to 11 in 1997. The small population on the YTC is the only known population remaining in Yakima and Kittitas counties.

The sage grouse population on the Fitzner and Eberhardt Arid Lands Ecology Reserve at Hanford (Hanford Site) in Benton County has been extirpated because of habitat degradation, development, powerline construction, and wildfires (C. Braun, letter dated 4 March 1992 to D. Ware; L. Fitzner pers. comm.). It is unknown when grouse were abundant at the Hanford site, but there were few grouse present after 1978 (L. Cadwell, pers. comm.). Three historic leks are recorded from Benton County. One, near the southern edge of the Hanford reservation, was last known to be active in 1991.

A viable population of sage grouse no longer inhabits the Badger Pocket area of Kittitas County. This area, adjacent to the YTC, was known to support large numbers of sage grouse historically (L. Stream, pers. comm.), and hunters took 2,700 grouse there in 1950. Sage grouse persisted at the site until 1987. During the 1970s and 1980s much of the native shrub steppe habitat in the area was converted to agriculture.

In summary, the sage grouse population in Washington has declined substantially. This assessment is based on: historical measures of abundance; a decline of 88.5% in harvest from 1974 to 1984 with a corresponding steep decline in hunter success; a decline in the number of males per lek; the absence of grouse on all traditional leks in Lincoln County; a range reduction of approximately 90-92%.

## Present

Currently two subpopulations of sage grouse remain in Washington; one on the Yakima Training Center in Yakima and Kittitas counties and one in Douglas and Grant counties (Fig. 2). The two populations appear to be separated by approximately 13 miles, which includes the Columbia River

and lands dominated by orchards and croplands. While unlikely, it is possible that there may be interchange between these populations.

The 1997 breeding population of sage grouse in Washington has been estimated through lek counts and a population model. During spring surveys, 393 grouse were counted on 24 leks in 4 counties.

A model based on observations of the WDFW field researcher (M. Schroeder, pers. comm.), input and survey data from WDFW biologists, review of research outside Washington, and peer review by other sage grouse researchers was used to estimate the size of the 1997 breeding population (Table 3). The model assumed all leks were known and surveyed, all males were on leks during counts, and the male to female sex ratio was 1:1.6.

Table 3. Estimated size of the Washington sage grouse breeding population in 1997 (based on lek counts).

| | Males | Female estimate[a] | **Total estimate** |
|---|---|---|---|
| Low | 355[b] | 568 | 923 |
| High | 393[c] | 629 | 1022 |

[a] Number of females = males X 1.6.
[b] Based on low YTC estimate (counts from highest single day).
[c] Based on the total of the maximum number of grouse on **all leks** on any day.

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 1:1.6, and if surveys were flawed (e.g., bad weather, incomplete counts, etc.). The model would overestimate actual population size if lek counts included females or if individual males were counted at more than one lek.

Based on 1997 lek counts, approximately 312 - 411 sage grouse occur on the Yakima Training Center (YTC) in Kittitas and Yakima counties, (S. Kruger, pers. comm.). The lower estimate represents counts from the highest single day (all leks on the YTC are counted in one day). The higher estimate represents the total of the maximum number of grouse on all leks on any day. The higher estimate may be somewhat inflated by double-counting if males move between leks.

The sage grouse population in Washington was estimated to be 923 - 1022 birds in 1997. Populations and resulting estimates will fluctuate from year to year. Approximately 611 of these birds are located in Douglas County and 312 - 411 birds are on the YTC.

# HABITAT STATUS

## Past

Much of Washington's shrub steppe has been overgrazed or converted to cropland or pasture for livestock, which eliminated or degraded sage grouse habitat. Most shrub steppe has been sprayed, plowed, mechanically treated, burned, cut, or flattened to grow crops or forage for livestock. Before settlement, much of eastern Washington was covered with large tracts of sagebrush/bunchgrass vegetation (Daubenmire 1988). Sagebrush coverage ranged from 5 to 26% and perennial grass coverage ranged from 69 to 100% on undisturbed sites (Daubenmire 1988).

Few ungulates grazed these areas since the last glaciation (Mack and Thompson 1982, Daubenmire 1988), and Native Americans seldom burned shrub steppe (Daubenmire 1988). Therefore, large tracts of sagebrush/bunchgrass vegetation evolved without intense ungulate grazing and without frequent, intentional burning. Grazing of cattle, sheep, and horses by settlers and Native Americans began the era of rangeland degradation. Horses, which were introduced to Native Americans around 1730, were the first to intensively graze eastern Washington in historic times (Harris and Chaney 1984). Cattlemen were the first settlers in the Palouse region; they introduced cattle in 1834, sheep in the 1880's, and expanded wild-horse herds from 1830 to 1880 (Daubenmire 1988). Where shrub-steppe vegetation was grazed excessively by domestic animals, the density and canopy cover of native grasses was reduced, which allowed non-native species to invade (Daubenmire 1988).

The Homestead Act of 1862 lead to the proliferation of small farms in eastern Washington between 1863 and 1910 (Harris and Chaney 1984). Burning and plowing of shrub steppe for agricultural expansion were widespread (Yocom 1956). Most of the land conversion for dryland farming occurred from 1900 through the 1940's, and for irrigated farming after 1950. The 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). The combination of agricultural expansion and horses used in farming operations caused the most serious damage and deterioration to eastern Washington's shrub steppe in the late 1800's and early 1900's (Harris and Chaney 1984). Initially, agriculture increased food and water supplies, and perhaps reduced predators, which allowed sage grouse to expand their range to previously unused areas (Yocom 1956). The introduction of tractor farming in the 1920's and 1930's reduced the need for horses and allowed some recovery of rangeland, but it also increased the area under cultivation. The conversion of native habitat to cropland intensified, and sage grouse began to decline (Yocom 1956).

Large-scale reclamation projects in the 1950's and 1960's further reduced sage grouse habitat (Hofmann 1991). From 1947 to 1982, 301,500 ha (744,705 ac) of brush control were documented 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; these counties also contained the most sage grouse. Sagebrush may re-invade areas following treatment, but sagebrush control in eastern Washington is an on-going activity. Although significant, the amount of sagebrush removed under federal programs was small compared to sagebrush removed by private landowners for agriculture (Pederson 1982).

## Present

Based upon habitat classification of Daubenmire (1988) and LANDSAT analysis by Dobler et al. (1996), approximately 40% remains of the estimated 4.16 million ha (10.4 million acres) of shrub steppe that existed in eastern Washington before European settlement (Table 4). Additional shrub steppe exists in Okanogan County, but is outside of the range of sage grouse. Sage grouse habitat is a subset of the remaining shrub steppe; occupancy is dependent upon elevation, soil type, slope, size of shrub steppe area, and habitat quality. Of the historical sage grouse range, approximately 468,448 hectares (1,157,066 acres), or about 8 - 10% remains. Three of the largest blocks of shrub-steppe occur on the Yakama Indian Nation, the Hanford Site in Benton County, and the Yakima Training Center (YTC) in Yakima and Kittitas counties (Dobler et al. 1996). Of these, sage grouse remain only on the YTC.

Table 4. Historical and remaining shrub steppe (ha) habitat in Washington counties within the historic range of sage grouse (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). Data is not available for the five other counties in the historical sage grouse range.

[b] Analysis for only 20% of Okanogan County has been completed.

A large contiguous block of shrub steppe habitat of about 1322 $km^2$ (510 $mi^2$) remains on the YTC (Dobler et al.1996). The YTC is used for military training exercises. Cadwell et al. (1994) found approximately 85% of all sage grouse use was within an L-shaped area in the southeast portion of the YTC, generally south and east of Umtanum Ridge. Sage grouse used a variety of shrub-steppe habitats, but tended to use areas with greater cover of sagebrush more frequently, especially for nesting (Sveum 1995, Cadwell et al. 1997).

Another large parcel of shrub-steppe is located on the Department of Energy Hanford site north of Richland in Benton County. Recent fires have decreased the abundance of sagebrush on the Hanford site, and likely contributed to the loss of sage grouse from Benton County. Currently, shrub-steppe at Hanford is in 3 general conditions: mature sagebrush, recovering shrub steppe (grass-dominated), and recovering agricultural lands (U.S.Dept. Of Energy 1996).

Land administration and ownership within the sage grouse range are based on the Washington Department of Natural Resources 1992 public lands survey and WDFW 1995 ownership/control data obtained from the WDFW Land Resources Program (Table 5). Recent acquisitions or changes in management control since 1992 are not represented (except for WDFW), so current areas and percentages may differ.

Table 5. Administration and ownership of current sage grouse range in Washington[a].

| Agency/Ownership | Area (ha) | % of Total |
|---|---|---|
| Private | 312,312 | 67 |
| U.S. Department of Defense | 95,543 | 20 |
| Washington Department of Natural Resources | 45,463 | 10 |
| U.S. Bureau of Land Management | 10,277 | 2 |
| U.S. Bureau of Reclamation | 1,871 | <1 |
| Washington State Parks and Recreation Commission | 718 | <1 |
| Washington Department of Fish and Wildlife | 602 | <1 |
| **Total** | **468,238** | **100** |

[a] Ownership and administration tallies generated by the WDFW Geographical Information System Program based on WDNR public land surveys, January 1992, and revised for WDFW acquistions through 1997.

The federal Conservation Reserve Program (CRP) can benefit sage grouse by removing land from crop production, replacing those crops with perennial vegetation, and allowing sagebrush to invade. The CRP pays private landowners and public agencies that have highly-erodible cropland (usually dryland wheat) to establish 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. More than 160,000 hectares (395,000 acres) of cropland within the sage grouse range were enrolled in the CRP in the late 1980's. Douglas County enrolled the most at 60,000 hectares (150,000 acres) (Table 6).

Because CRP establishes permanent cover, it provides more year-round security to wildlife than land under cultivation. Sage grouse were observed displaying, feeding, roosting, and nesting in CRP grassland in eastern Washington (Schroeder 1994). M. Schroeder (pers. comm.) reports that 40% of about 60 nests found in Douglas County from 1992 to 1996 were in CRP fields, and these nests were as successful as ones built in other cover. The CRP fields that appear to be most important are those near islands of shrub steppe (Schroeder 1994). These islands of shrub steppe are privately owned ranches with poor suitability for agricultural conversion and too small in area for efficient livestock use, but are selectively used by sage grouse (M. Schroeder, pers. comm.).

Sage grouse likely use CRP fields because the cover is continuous and can provide good nesting habitat. The quality of a CRP field for grouse habitat depends on the type of vegetation planted and the length of time the field has been in the CRP. In general, the longer a field is in CRP, the better its quality. In Douglas County, sagebrush has invaded many CRP fields (R. Friesz, pers. comm.), which may have increased habitat available for sage grouse. Sage grouse select only these higher quality CRP fields and avoid CRP fields without the desirable vegetation (M. Schroeder, pers. comm.).

Table 6. Conservation Reserve Program (CRP) lands (ha) in eastern Washington counties in current sage grouse range.

| County | Approximate county land area | Land enrolled in CRP | Percent of total CRP |
|---|---|---|---|
| Douglas | 465,165 | 56,453 | 54 |
| Grant[a] | 680,904 | 29,199 | 28 |
| Yakima | 1,097,398 | 17,329 | 17 |
| Kittitas[a] | 590,917 | 836 | <1 |
| **Total** | **2,825,384** | **103,804** | **100** |

[a] Figures for these counties are for 1996 (U.S. Department of Agriculture, Farm Services Agency, Spokane, Washington).

# CONSERVATION STATUS

## Legal Status

Sage grouse are listed as a game species in Washington by the WDFW, although the season has been closed since 1988. They have been a Candidate species since 1991. Sage grouse are designated a priority species and their habitat designated a priority habitat by the WDFW Priority Habitats and Species (PHS) Program.

Sage grouse are not protected under the federal Migratory Bird Treaty Act and jurisdiction is the state's responsibility. The U.S. Fish and Wildlife Service has placed the western sage grouse subspecies on its species of concern list.

## Management Activities in Washington

*Management plan*. A statewide management plan for sage grouse was developed by the WDFW in 1995 (Wash. Dept. Fish and Wildl. 1995). The management plan establishes goals, objectives, and strategies for securing sage grouse populations in Washington. The management plan primarily directs WDFW activities and holds no authority over other public agencies. Specific tasks and objectives in the management plan such as habitat acquisition, enhancement, and monitoring are being implemented. Tasks identified in the plan include increased participation and coordination with all the state, federal, and tribal agencies that manage sage grouse habitat in restoration efforts.

*Population monitoring*. The WDFW has conducted counts of sage grouse to assess population status and trends since the 1950's. Survey data were also used for establishing hunting seasons and bag limits. More intensive surveys were initiated in 1971 because of a recognized decline in the sage grouse population and the need to closely monitor the remaining population. The WDFW conducts lek counts and surveys for new leks each spring. Lek counts and searches for new leks are also conducted by the U.S. Army on the Yakima Training Center.

Winter surveys are conducted by the U.S. Bureau of Land Management (BLM) in cooperation with the WDFW in Lincoln County on sites acquired by the BLM. The reliability and feasibility of winter surveys in other areas are being determined as part of a current WDFW research project.

*Habitat protection, acquisition and restoration*. The WDFW is acquiring and restoring habitat for sage grouse in eastern Washington. Funding comes from the Bonneville Power Administration (BPA) mitigation funds and the Washington Wildlife and Recreation Program (WWRP). The Bonneville Power Administration (BPA) is obligated to mitigate for habitat and wildlife, including sage grouse, that were impacted during the construction and operation of

federal dams on the Columbia River. The following criteria are used to prioritize acquisition areas for sage grouse:

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

The WDFW is restoring sagebrush on the Wells Wildlife Area in northern Douglas County and planted 30,000 sagebrush seedlings on the Hanford Site in Benton County during 1995. Lands purchased by the WDFW in Douglas and Lincoln counties that are designated Wildlife Areas are also being enhanced for sage grouse, specifically through grass and forb seeding and planting of shrubs and trees. WDFW Wildlife Areas that contain high quality shrub steppe can potentially be used for reintroduction or augmentation projects in the future. The WDFW works with landowners and the Natural Resources Conservation Service to promote and extend CRP contracts. Landowners are also encouraged to plant native forbs, grasses, and sagebrush on CRP land.

Sage grouse may also benefit from WDFW Upland Wildlife Restoration Program (UWRP) projects focused on other species. The UWRP was designed to work directly with private landowners on the protection and enhancement of private lands for upland wildlife. Although no projects specific to sage grouse have been conducted, habitat enhancement for pygmy rabbits in Douglas County and for sharp-tailed grouse in Lincoln County is expected to benefit sage grouse.

*Research*. The WDFW began a project entitled, "Productivity and Habitat Use of Sage Grouse in North-central Washington" in 1992 and it is still in progress. This project targets the sage grouse population centered in Douglas County. Current sage grouse research is focused on habitat-use assessment, population status, and identifying mortality rates and population recruitment. An index of habitat suitability is also being developed to refine habitat objectives and evaluate acquisition, augmentation, and reintroduction. Another WDFW study by Pederson (1982) evaluated distribution, home range and seasonal habitat use of sage grouse primarily in Douglas County.

The Battelle Memorial Institute Pacific Northwest National Laboratory has been studying sage grouse on the Yakima Training Center (YTC) since 1989. Current research involves the development of a habitat model that integrates habitat suitability with potential training impacts (M. Livingston, pers. comm.). The model will incorporate habitat data (Cadwell et al.1997) with the magnitude, location, and season of training activities. In addition, since 1994, sage grouse lek searches, lek counts, and population studies have been undertaken by the wildlife staff of the Directorate of Environment and Natural Resources (DENR) of the YTC. Research includes investigating seasonal habitat use, lek locations and annual use, population levels, survey

techniques, and management techniques. Hofman (1991) examined habitat selection at the landscape scale on the YTC. Sveum (1995) examined sage grouse nesting and brooding habitat selection on the YTC (Sveum 1995).

*Coordination and partnership*. A conservation agreement was developed between WDFW, the U.S. Fish and Wildlife Service, and the U.S. Army for the protection of sage grouse and their habitat on the Yakima Training Center. The agreement focuses on fire, military training and equipment, maintenance and construction of roads and facilities, stabilization of soil using exotic vegetation, grazing, invasion of introduced knapweed (*Centaurea* sp.). It also addresses hunting of other upland game birds and possible illegal harvest of sage grouse, disease and predation, restoration of disturbed sites, and potential changes in training levels or type of equipment used. Research guides management decisions on the training center and is used to resolve conflicts between sage grouse and military training.

The WDFW coordinates with federal and other state agencies on habitat management and enhancement. Some public land that is administered by the U.S. Bureau of Reclamation and the U.S. Fish and Wildlife Service is managed by the WDFW. The WDFW currently works with the U.S. Department of Agriculture (through the Natural Resources Conservation Service and the Consolidated Farm Service Agency) on reducing the effect of brush control on sage grouse and other wildlife.

House Bill-1309 *Ecosystem Standards for State-owned Agricultural and Grazing Land* (Washington State Legislature 1993) requires the WDFW and WDNR to develop goals to preserve, protect, and perpetuate fish and wildlife on state land used for agriculture, rangeland, or woodland used for grazing. The goals are submitted to the Washington State Conservation Commission, the legislative body responsible for coordinating the county conservation districts. A technical advisory committee appointed by the Conservation Commission has developed ecosystem standards for managing WDFW and WDNR land. These state agencies are required to implement practices on managed land to help achieve the standards for the site.

*Enforcement*. Illegal harvest of sage grouse is believed to be insignificant in Washington at this time, based on reports from WDFW enforcement agents. No mortality due to hunting or illegal harvest has been discovered during WDFW research in north-central Washington. Enforcement activities currently focus on discouraging harassment of sage grouse.

*Information and education*. The WDFW Priority Habitats and Species management recommendations for sage grouse are distributed to county planning departments, state and federal agencies, Native American tribes, and the public. A WDFW *Sage Grouse Fact Sheet* describes sage grouse and their habitat, life history, status, and management. Landowners are also encouraged to protect and enhance habitat for upland wildlife through the WDFW Upland Wildlife Restoration Program. Copies of these materials, the management plan, and technical assistance are available through regional offices of the WDFW.

# FACTORS AFFECTING CONTINUED EXISTENCE

Sage grouse populations in Washington have declined in virtually every decade this century, and their range has declined by approximately 92%. Neither of the two remaining populations is considered secure; significant threats remain in each case. Both populations exhibit relatively low numbers of males at leks, which makes them vulnerable to predation, inclement weather, fire, and increased grazing pressure. Small reductions in habitat quality may have significant effects on the continued use of leks. Without continued conservation effort to address the remaining threats, the sage grouse population in Washington will likely not increase substantially over current levels and may continue to decline.

Over half of the remaining sage grouse occur in Douglas County. Sage grouse in Douglas County remain due to two primary factors: non-suitability of land for agriculture (which has resulted in the maintenance of remnant patches of shrub-steppe habitat) and the enrollment of private agricultural lands in the Conservation Reserve Program (CRP). The CRP program has helped improve habitat conditions adjacent to remnant patches of shrub-steppe in Douglas County. Many of the island patches of shrub steppe have been maintained by private landowners for the past several decades. The principal difference between lands in Franklin County (where sage grouse were recently extirpated) and Douglas County is the presence of remnant habitat patches in Douglas County. Both areas have significant acreages enrolled in the CRP and have similar CRP habitats. The continued protection of leks, nesting grounds, and wintering sites in Douglas County, as well as continued monitoring are high priorities.

Although predation is the most important proximate cause of mortality, the rate of predation is ultimately dependent on the quality of habitat (Drut 1994). Grouse have long coexisted with predators and the number of predators may be lower today than they were pre-historically when grouse numbers were much higher. Habitat that provides good shrub and grass cover for nesting and wintering allows grouse to increase despite predation, but losses to predation can be significant for small populations.

Primary threats to remaining sage grouse populations include the potential reduction of lands in the Conservation Reserve Program and the potential for large-scale fires eliminating large stands of sagebrush, especially at the YTC. Additional threats of habitat reduction and disturbance occur from military training exercises at the YTC. In Douglas County, continuation of the Conservation Reserve Program and protection of remnant patches of native habitat are the most critical needs for sage grouse. On the YTC, fire prevention and training activity management are critical to maintaining sage grouse.

## Population Isolation

Population isolation is potentially a significant factor influencing the continued existence of sage grouse in Washington. As grouse populations naturally fluctuate due to environmental

conditions, the lower the population level, the greater the risk of extirpation. The potential for compounded effects of habitat change are great when populations have dropped to low levels.

Both sage grouse subpopulations have fluctuated to estimated lows of 100-150 females during the 1990's. Many authors indicate that long-term survival (greater than 100 years) of isolated populations may require many more individuals (Lande and Barrowclough 1987, Dawson et al. 1987, Grumbine 1990) although a needed effective population size for sage grouse has not been determined. The isolation of populations may have important ramifications for their genetic quality and recruitment (Lacy 1987) that may require human transport of individuals to counteract loss of fitness in small populations.

## Compatibility with Military Training

The majority of sage grouse in Kittitas and Yakima counties are situated on the Yakima Training Center (YTC). The U.S. Army, U.S. Fish and Wildlife Service, and the WDFW have developed a cooperative agreement for the protection of sage grouse habitat on the training center. Key areas for sage grouse breeding, nesting, and wintering on the YTC were identified (Eberhardt and Hofmann 1991, U.S. Army, unpubl. data). Year-round habitat for sage grouse occurs in the Lmumma Creek (formerly Squaw Creek) and Selah Creek watersheds. These areas contained the majority of active leks and nest sites (S. Kruger, pers. comm.) and are a priority for habitat and population protection. They do not, however, include all the areas used by sage grouse on the YTC. The U.S. Army has also initiated a comprehensive sage grouse research, monitoring, and habitat restoration program to mitigate impacts of training exercises.

The destruction of sagebrush on the training center adversely impacts the sage grouse population in Kittitas and Yakima counties (Eberhardt and Hofmann 1991). Troop and vehicle activity on the training center has been shown to cause atypical and extensive movements of sage grouse and may be responsible for large home ranges (Eberhardt and Hofmann 1991). The prospect of sage grouse survival in Kittitas and Yakima counties in the future is uncertain and depends on the maintenance of quality habitat on the YTC and restriction of military activities in critical areas. However, because of increased training activity and potential fires, there is no guarantee that current efforts to conserve habitat by the U.S. Army will result in stable or increased populations of sage grouse.

Sagebrush levels on the YTC are low when compared to studies from other states (Cadwell et al. 1996). A recent training exercise called Cascade Sage impacted approximately 14% of the big sagebrush occurring in the primary sage grouse habitat, causing death of 1.7% of sagebrush plants, and major structural damage to 7.8% (Cadwell et al. 1996). Military vehicle use near active sage grouse leks was similar to that elsewhere. The destruction of sagebrush during the exercise probably had negative impacts on the sage grouse population (Cadwell et al. 1996). Future training exercises similar to Cascade Sage would likely result in additional negative impact (Cadwell et al. 1996).

The actions taken by the U.S. Army are significant in the protection of sage grouse on the YTC. However, potential adverse impact from training exercises like Cascade Sage still threaten sage grouse inhabiting the YTC. Additionally, fires resulting from training exercises could have a devastating effect on the population.

## Habitat Security on Private Lands

The reduced distribution and abundance of sage grouse in Washington appear to be related to the loss of shrub steppe. There has been a 90 - 92% reduction in the distribution of sage grouse in Washington. They survive in 4 of 16 counties they originally occurred in. The loss of shrub steppe in these counties ranges from 38 to 77% (Table 4).

Sage grouse survive in Washington in part because the remaining sagebrush habitat occurs on lands unsuitable for farming (Douglas County), and in part because agriculture, grazing, and development have been limited on the YTC by military land ownership. Examples include the scablands of Grant and Douglas counties and the steep, rocky slopes of southern Kittitas and northern Yakima counties (Pedersen 1982). An important exception may be the Department of Energy's Hanford site. Significant portions of the Hanford Site may be converted to agricultural uses through transferral of management from federal to local authorities. Along with Lincoln County, the Hanford Site may hold Washington's greatest potential for expanding the current sage grouse population.

In Douglas County, however, where agriculture is the major land use, brush control and shrub steppe conversion continue. Remaining shrub steppe in Douglas County is believed to be vulnerable because of the extent of private lands and the intensity of land use for agriculture. Sagebrush has begun to invade many CRP lands, which may also result in better habitat conditions for sage grouse. Habitat improvement on CRP lands is thought to be a significant factor in the increasing population in north-central Washington. The CRP appears to benefit sage grouse by providing essential cover for nesting, cover that would otherwise be unavailable (M. Schroeder, pers.comm.). Beneficial CRP lands are those adjacent to remnant shrub-steppe patches. However, reliance on CRP lands involves significant uncertainty. The initial acceptance rate in Washington in 1997 was only 21%, but this rate increased to 82% after re-application. What will happen at the conclusion of these 10 year contracts is unknown.

*Relations with landowners*. Sage grouse in Douglas County are entirely dependent upon private lands. A good working relationship between agencies trying to conserve sage grouse and private landowners needs to be developed and maintained. WDFW needs access to private lands, in some cases, to complete lek surveys and other research. Listing sage grouse may result in strained relationships with private landowners due to fears of regulation. It may also be a benefit to private landowners interested in the federal CRP program, as concerns for sage grouse habitat results in an increased likelihood of lands being enrolled in the CRP program. The presence of sage and sharp-tailed grouse may have contributed to the high acceptance rate of CRP applications in Washington in 1997.

## Fire

Controversy exists regarding the frequency of fire in shrub steppe prior to settlement. Some authors believe fire maintained some bunchgrass-sagebrush ecosystems (Blaisdell et al. 1982). Braun (1987), however, contends this was possible only in mesic areas where silver and sand (*A. filifolia*) sagebrush dominated. C. Perry (pers. comm.) considers a fire-maintained sagebrush community in Washington unlikely, because the predominant species (big sagebrush) is fire intolerant. The fact that most sagebrush species are sensitive to fire and early explorers found sagebrush abundant in the sagebrush-grass region (Tisdale et al. 1969, Vale 1975) suggests that fire was infrequent (Tisdale and Hironaka 1981). Tisdale and Hironaka (1981) found it likely that fire was uncommon in the drier sagebrush types but more frequent in mesic communities where the fuel supply would be greater.

Following white settlement, the combination of fire and overgrazing greatly reduced the sagebrush and the understory species of grasses and palatable forbs (Tisdale and Hironaka 1981). The affected areas were then invaded by various aggressive, less-palatable species, especially introduced cheatgrass (Pickford 1932, Stewart and Hull 1949). The result was the domination of several million acres of the sagebrush-grass region by cheatgrass (Hironaka and Tisdale 1981). Cheatgrass is highly flammable, and its presence greatly increased the incidence of wildfire in the sagebrush-grass region (Klemmedson and Smith 1964, Kauffman 1990).

Harniss and Murray (1973) reported that sagebrush only re-invades burned areas by seed, so 30 years or more may be required to regain pre-burn densities. Natural reseeding would also depend on a seed source in the general vicinity. Burning may also result in the invasion of noxious weeds (Autenrieth 1986) and introduced cheatgrass, which usually out-competes other grasses and forbs (C. Perry, pers. comm.; E. Bracken, pers. comm.). In Idaho and Nevada, wildfires converted large tracts of sagebrush to cheatgrass monocultures that were unsuitable as sage grouse habitat (Drut 1994). In Idaho, Sime (1991) observed sage grouse using non-burned areas for cover and feeding during the winter and nesting period; vegetation in recovering burned areas provided overhead canopies for young grouse seeking palatable forbs during brood rearing.

Fire is a constant threat on the Yakima Training Center (YTC), particularly when training activities occur during the driest months of May - October. The mission of the YTC is to train soldiers. Fire is an inevitable outcome of training activities. A fire on the YTC in August 1996 started in a military impact zone and burned over 15,000 ha (37,000 ac) on the YTC and approximately 5,000 ha (13,000 ac) on adjacent lands (M. Pounds, pers. comm.). Some areas known to be used by sage grouse were burned, but the fire missed critical lek and nesting habitats managed for sage grouse. The YTC is implementing a program to accelerate re-vegetation of burned and disturbed areas. Even though the training center has the best intentions through a comprehensive fire management plan to control fires, fire remains a significant threat to the sage grouse population.

## Chemical Treatment

Insecticides applied to agricultural and shrub steppe communities are often detrimental to sage grouse. Approximately 91,000 $km^2$ (35,000 $mi^2$) of western rangelands were sprayed for grasshopper control from 1985 to 1990 (Johnson and Boyce 1990). Areas sprayed were commonly used by nesting sage grouse. Insects such as grasshoppers were found to be key food items in the diet of chicks (Rasmussen and Griner 1938, Patterson 1952, Klebenow and Gray 1968, Peterson 1970, Johnson and Boyce 1990), and chicks more than 3 weeks old show reduced growth rates when insects are removed from their diet (Johnson and Boyce 1990). Blus et al. (1989) also reported detrimental effects of organophosphorus insecticides (dimethoate and methamidophos) on sage grouse in southeastern Idaho.

Chemical treatment of vegetation has been found to reduce wintering, breeding, nesting, and brood-rearing activities of sage grouse (Enyeart 1956, Rogers 1964, June and Higby 1965, Kufeld 1968, Klebenow 1970, Martin 1970, Peterson 1970, Pyrah 1972, Wallestad 1975, Blus et al. 1989). However, Autenrieth (1969) found sprayed leks will continue to be used if the surrounding nesting and brood-rearing habitat has not been made uninhabitable by the removal of sagebrush and forbs. The herbicide 2,4-D is commonly used to reduce sagebrush and has been found to detrimentally impact sage grouse by altering the vegetational composition (Blaisdell and Mueggler 1956, Martin 1970, Autenrieth et al. 1982). Future efforts to control grasshoppers and sagebrush in Washington's shrub-steppe habitat may contribute to depressed sage grouse populations.

## Grazing

Intensive grazing has been identified as a factor in the decline in sage grouse numbers throughout their range. This decline coincided with the maximum livestock use of range resources between 1900 and 1915 (Patterson 1952). Ungulate grazing pressure played no significant part in the evolution of ecotypes of the shrub steppe and steppe plants of Washington prior to the arrival of early settlers (Mack and Thompson 1982, Daubenmire 1988). In contrast to natural grazing systems in which wild ungulates are able to follow the rains, confinement forces grazing animals to forage in localized sites despite drought and regardless of range condition. The inability to determine grazing capacity or to rapidly adjust the number of animals to range conditions led to either periodic or continuous overgrazing (Autenrieth et al. 1977). The result was an eventual decline in range production (Autenrieth et al. 1977). Yocom (1956) believed overgrazing during the cattle, sheep, and horse era had a depressive effect on sage grouse population levels.

The livestock era impacted habitat primarily through the reduction and alteration of native vegetation (Daubenmire 1988). Since most of the herbaceous species are more palatable than sagebrush, the former were reduced while the shrubs flourished (Tisdale and Hironaka 1981). Each period of overuse by domestic animals reduced the density of the large perennial grasses and forbs to a lower level than the preceding one, and highly-adapted alien species (including cheatgrass and noxious weeds) invaded. Lowered water tables through headcutting in meadow

areas and erosion also resulted (Cottam and Stewart 1940, West 1983). Native shrub steppe was later converted to pastureland by livestock managers through burning, cutting, and spraying (Yocom 1956). By the 1930's, federal range personnel estimated that 84% of the sagebrush-grass region in the United States was severely depleted (USDA 1936).

Excessive grazing of sagebrush-bunchgrass communities that results in a low stubble and/or destruction of deciduous shrubs used for nesting and brood rearing negatively impacts sage grouse. Vegetative cover, specifically the provision of an understory of native grasses and forbs, contributes to sage grouse nesting success (Hein et al. 1980, Autenrieth 1981, Crawford and Delong 1993, Gregg et al. 1994, Sveum 1995). In Oregon, the availability of tall, dense grass cover and medium shrub cover decreased the likelihood of predation (Crawford and Delong 1993, Gregg et al. 1994) and land management practices that reduced herbaceous cover were discouraged (Crawford and Delong 1993). Grazing of tall grasses to <18 cm (7 in) would decrease their value for nest concealment (Gregg et al. 1994). The trampling of vegetation near riparian areas is detrimental to most upland wildlife. In general, valley bottoms and areas around water sources are grazed first by cattle; only after depletion of the vegetation at these mesic sites are cattle forced to use less-accessible, rougher terrain (Stoddart and Smith 1955). Upland meadows containing mesic sites (streams, springs, and associated meadow-type vegetation) provide critical habitat for sage grouse in arid regions (Savage 1969, Oakleaf 1971, Autenrieth et al. 1982).

Even light to moderate levels of grazing may be detrimental to grouse in areas with a history of overgrazing. The recovery of native grasses and shrubs from past overgrazing may not occur where intensive grazing continues.

Overgrazing was a concern on the Yakima Training Center until it was halted in 1995. The return of grazing in the future to the YTC combined with training impacts could have significant adverse impacts to sage grouse habitat. In addition, overgrazing of shrub steppe habitats in Douglas and Grant Counties would likely result in more degraded sage grouse habitats and depress the population further.

## Harassment and Disturbance

The only current recreational use of sage grouse is viewing. Uncontrolled viewing could disrupt breeding populations and should be monitored and controlled if necessary. During the breeding season, daily disturbance at a lek has the potential to reduce mating opportunities and cause decreased production. When humans approach the display site, grouse often flush and may or may not return again that day (Call 1979). Viewing at a distance from automobiles does not appear to disrupt courtship activity; but grouse flush when people leave cars to get a closer look. In Washington, viewing tours occur on the Yakima Training Center using strict guidelines; no reduction in lek attendance or disruption of breeding activities due to controlled public viewing has been reported (M. Pounds, pers. comm.).

## Adequacy Of Existing Regulatory Mechanisms

Sage grouse individuals are protected from killing by Washington Department of Fish and Wildlife regulations; the Fish and Wildlife Commission closed the hunting of sage grouse in 1988. Populations have stayed at low levels or declined since then. There are no existing state or federal regulatory mechanisms to protect sage grouse habitat. The statewide management plan for sage grouse holds no authority over activities on public or private lands outside of those managed by the WDFW.

# CONCLUSIONS AND RECOMMENDATION

The sage grouse population and corresponding sage grouse habitat have declined dramatically in Washington. Sage grouse range has declined to only 8 - 10 percent of what it was historically. Population declines have occurred in the 1970s and 1980s as well as early in this century. Local populations were extirpated as recently as the mid-1980's. Only 2 populations totaling between 900 and 1000 individuals remain in the state. Major threats to the two populations are the potential for catastrophic fire, impacts of military training, conversion of lands to other uses, overgrazing, and the uncertainty of the federal Conservation Reserve Program. Because of these factors, it is recommended that the sage grouse be designated a threatened species in Washington.

There are three principal reasons why the Department does not recommend “endangered” status for the sage grouse. These are: the relative size of the remaining populations; efforts by the Yakima Training Center to reduce impacts to sage grouse; and the existence of the Conservation Reserve Program (CRP). Private lands critical to the survival of sage grouse were re-enrolled in CRP during 1997.

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Appendix A. Museum specimens of sage grouse in Washington, 1853-1949.

| Location | County | Date[a] | Sex or set | *n* | Source[b] |
|---|---|---|---|---|---|
| Crab Creek | Lincoln | na | na | | USNM # 429139 |
| na | na | 9/16/1853 | na | | USNM # A10019 |
| Spokane Plain | Spokane | 11/1853 | na | | USNM # A10021 |
| Yakima River | Yakima | 9/14/1853 | na | | USNM # A10022 |
| Coulee City | Grant | 6/30/1902 | female | | WSUCM # 682 |
| White Bluffs | na | 6/28/1903 | female | | WSUCM # 421 |
| Yakima | Yakima | 6/22/1910 | female | | MCZ # 253835 |
| Yakima | Yakima | 7/1910 | male | | MCZ # 253836 |
| Yakima | Yakima | 10/25/1910 | male | | AMNH # 751239 |
| Kiona | Benton | 2/28/1919 | male | | FMNH # 157308 |
| Priest Rapids | Yakima | 4/29/1919 | egg set | 9 | PSM # 13559 |
| Tampico | Yakima | 4/11/1921 | egg set | 11 | PSM # 13561 |
| Kiona | Benton | 11/15/1921 | male | | FMNH # 157307 |
| na | Yakima | 4/7/1926 | egg set | 11 | PSM # 13560 |
| Rattlesnake Hills | Benton | 10/16/1927 | male | | PSM # 05890 |
| Selah | Yakima | 4/1/1928 | egg set | 7 | WFVZ # 309a |
| Beverly | Kittitas | 4/18/1928 | egg set | 1 | WFVZ # 309c |
| Squaw Creek | Kittitas | 4/16/1933 | male | | UWBM # 11462 |
| Squaw Creek | Kittitas | 4/28/1935 | male | | PSM # 07065 |
| Rattlesnake Hills | Benton | 3/30/1941 | egg set | 8 | WFVZ # 309b |
| Badger Pocket | Kittitas | 10/5/1941 | male | | PSM # 08429 |
| 10 mi W of Ephrata | Grant | 7/15/1949 | female | | WSUCM # 49-355 |
| Badger Pocket | Kittitas | 6/24/1950 | male | | PSM # 07061 |
| Badger Pocket | Kittitas | 6/24/1950 | female | | PSM # 07064 |
| Tieton | Yakima | 9/18/1955 | female | | PSM # 07067 |
| Selah | Yakima | 3/19/1964 | female | | PSM # 07066 |
| Bridgeport | Douglas | 10/20/1973 | female | | UWBM # 35310 |
| 7 mi E of Winthrow | Douglas | 4/23/1979 | male | | UWBM # 32148 |

[a] na=information not available.

[b] USNM=Smithsonian Institute, National Museum of Natural History, Washington D.C.; MCZ=Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; WSUCM=Washington State University, Conner Museum, Pullman, Washington; AMNH=American Museum of Natural History, New York, New York; FMNH=Field Museum of Natural History, Chicago, Illinois; WFVZ=Western Foundation of Vertebrate Zoology, Camarillo, California; UWBM=University of Washington, Burke Museum, Seattle, Washington; PSM=University of Puget Sound, Slater Museum, Tacoma, Washington.

Appendix B. Sage 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 |
| **Douglas County** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 22 | 38 | 33 | 23 | 19 | 12 | | 11 | 6 | 5 | 3 | 2 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 6 | 8 |
| 2 | | | 6 | | 2 | | | 3 | 10 | 26 | 16 | 12 | 14 | 10 | 5 | 1 | 1 | 7 | 0 | 3 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 3 | | 0 | | | | | | | | | | | | | | | | | | | 0 | | | | | | | 0 |
| 4 | | | 5 | 40 | 2 | | | 24 | 28 | 27 | 25 | 29 | 19 | 23 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 24 | 40 | 20 | 21 | 19 | 13 | 7 | 7 | 6 | 4 | 7 | 0 | | | 2 | 0 | 1 | 0 | 3 | 0 | | 0 | 13 | 7 | 10 | 14 | 23 | 25 |
| 6 | | 67 | 34 | 51 | 27 | | | 16 | 15 | 20 | 24 | 35 | 32 | 33 | | 16 | 14 | 24 | 57 | 63 | 64 | 69 | 13 | 29 | 33 | 34 | 60 | 58 |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | 9 | 11 |
| 8 | | | | | >1 | | | | | | | | | | | | 4 | | | | | | | | | 21 | 14 | 11 |
| 9 | 50 | 52 | 59 | 54 | 21 | | 17 | 30 | 24 | 46 | 47 | 31 | 27 | 30 | 31 | 9 | 11 | 10 | 13 | 11 | 14 | 5 | 6 | 4 | 5 | 6 | 6 | 2 |
| 10 | | | 55 | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 11 | | 25 | 13 | 11 | 19 | | 17 | 19 | 16 | 13 | 12 | 21 | 23 | 13 | 15 | 5 | 5 | 5 | 14 | 14 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 0 |
| 12 | | | | | | | | | | >1 | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | 6 | 1 | 0 | 0 | 0 | 0 | 0 |
| 14 | | | | | | | | | 16 | 20 | 67 | 71 | 47 | 39 | 23 | 12 | 61 | 71 | 90 | 91 | 88 | 71 | 36 | 11 | 18 | 25 | 22 | 22 |
| 15 | | 26 | 15 | 20 | 0 | | | 0 | | | | | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | | | | | | | | | | | | | | | | | | | | | | | 0 | 0 | 4 | 1 | 0 | 0 |
| 17 | | | | | | | | | | | | | | | | | | | | | | 2 | | 1 | 0 | 0 | 0 | 1 |
| 18 | | | | | | | | | | 28 | 33 | 38 | 30 | 31 | 17 | 2 | 3 | 15 | 45 | 46 | 55 | 49 | 26 | 14 | 8 | 26 | 22 | 36 |
| 19 | | | | | | | | | 33 | 45 | 48 | 35 | 61 | 57 | 43 | 22 | 19 | 37 | 52 | 63 | 57 | 53 | 24 | 26 | 19 | 20 | 21 | 26 |
| 20 | | | | | | | | | | | 4 | | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | | | | | | | | | >1 | | | | | | | | | | | | | | | | 2 | 0 | 0 | 0 |
| 22 | | | | | | | | 9 | 4 | 3 | 7 | 7 | | 0 | | | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | | | | | | | | >1 | | | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | | | | | | | | | | | | | | | | | | | | | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | | | | 13 | 0 | | | 3 | 0 | 0 | 0 | | | | | | | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | | | 21 | 17 | 10 | | | 11 | 14 | 16 | 37 | 33 | 19 | 23 | 15 | 8 | 5 | 19 | 22 | 25 | 16 | 19 | 16 | 13 | 11 | 11 | 14 | 23 |
| 27 | 63 | 42 | 36 | 23 | 11 | 3 | 1 | 0 | 0 | 0 | | | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 28 | | 15 | | | | | | | 9 | 0 | | 0 | | | | | | | 23 | 5 | | | 9 | 4 | >1 | 21 | 20 | 8 |

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 | | | 15 | 18 | 5 | | | 0 | 0 | 0 | | | | | | | | | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| **Grant County** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 21 | | 20 | 19 | 18 | 13 | 8 | 9 | 6 | 5 | 5 | 2 | 6 | 5 | 5 | 0 | 9 | 9 | 14 | 6 | 1 | 8 | 14 | 11 | 13 | 11 | 5 | 4 |
| 2 | | | | | | | | >1 | | | | | | | | | | | | | | | | | | | | |
| 3 | | | >1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | >1 | | | | | | | | | | | | | | | | | | | | | | | |
| 5 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | >1 | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | >1 | | | | | | | | | | | | | | | | | | |
| 8 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | 4 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | 8 | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | 4 | | | | | | | | | | | | | | | |
| 12 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Benton County** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | | | | | | | | | 10 | | | | | | |
| 2 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Lincoln County** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 44 | 38 | 25 | 56 | 18 | 17 | 20 | 25 | 28 | 28 | 37 | 54 | | 27 | 17 | 6 | 2 | 0 | 0 | 0 | | | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | | 34 | 23 | 9 | 15 | | | 18 | 15 | 13 | 25 | 25 | | 7 | 2 | 0 | | 0 | 0 | 0 | | | | | | | | |
| 3 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | 12 | 6 | 13 | 14 | | 5 | 4 | 0 | 0 | | | | | | | | 0 | | | | | | | | | |
| 7 * | | | 0 | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Okanogan County** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 * | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 | |
| **Franklin County** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 |
| **Kittitas County** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | 0 |
| 2 | | | | | | | | | | | | | | 14 | | 15 | 2 | 10 | 0 | 2 | 1 | 0 | | | | | | 0 |
| 3 | | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | |
| 4 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | 4 | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | 7 | | | | | | | | |
| 7 | | | | | | 18 | 20 | 36 | 29 | 39 | 83 | 94 | 96 | 88 | 80 | 73 | 42 | 54 | 54 | 53 | 50 | 74 | 67 | 49 | 43 | 33 | 24 | 34 |
| 8 * | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | 6 | | | | | | | | | | | | | | |
| **Yakima County** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | | | | | | | 6 | 7 | 14 | 19 | 22 | 13 | 8 | 7 | 5 |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 25 |
| 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | 5 | 21 |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | 17 | 18 |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | 11 | 14 |
| 6 | | | | | | | | | | | 15 | | | | | | | | | | | | | | | | | 0 |
| 7 | | | | | | | | | | | | | | | | | | 10 | | 22 | 17 | 33 | 18 | 18 | 15 | 12 | 8 | 10 |
| 8 | | | | | | | | | | | | | | | | | | | | 15 | 15 | 16 | 9 | 15 | 5 | 3 | 3 | 4 |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 13 |
| 10 | | | | | | | | | | | | | | 28 | 15 | 26 | 17 | 19 | 11 | 7 | 7 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | | | | | | | | | | | | | | | | | | | | 12 | 11 | 31 | 22 | 25 | 19 | 8 | 4 | 4 |
| 12 | 20 | 18 | 12 | 8 | 5 | 4 | 9 | 8 | 11 | 10 | 19 | 26 | 30 | 30 | 25 | 18 | 15 | 5 | 2 | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | 0 | 2 | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 10 |

[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 Code 232-12-297.

**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, effective 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.]