Greater Sage-Grouse

Centrocercus urophasianus

REGULATORY STATUS

USFWS: Listing Denied
USFS R2: Sensitive
USFS R4: Sensitive
Wyoming BLM: Sensitive
State of Wyoming: Game Bird (see regulations)

CONSERVATION RANKS

USFWS: No special status
WGFD: NSS4 (Bc), Tier II
WYNDD: G3G4, S4
Wyoming Contribution: VERY HIGH
IUCN: Near Threatened
PIF Continental Concern Score: 15

STATUS AND RANK COMMENTS

Greater Sage-Grouse (*Centrocercus urophasianus*) has been the subject of major conservation efforts in Wyoming and across its range [1-4]. Anecdotal reports suggest this effort may be the largest ever undertaken for a single species. As a result, many of the threats facing Greater Sage-Grouse are being addressed leading to a "Not Warranted" U.S. Fish and Wildlife Service (USFWS) listing decision in 2015 [1] and a Wyoming Game and Fish Department (WGFD) decision to change the status of the species from NSS2 to NSS4 [5].

NATURAL HISTORY

Taxonomy:

Greater Sage-Grouse (*C. urophasianus*) is genetically distinct from Gunnison Sage-Grouse (*C. minimus*), but the previous delineation of western (*C. u. phaios*) and eastern Greater Sage-Grouse (*C. u. urophasianus*) is not supported genetically [6]. Greater Sage-Grouse occasionally hybridizes with Dusky Grouse (*Dendragapus obscurus*) and Sharp-tailed Grouse (*Tympanuchus phasianellus*).

Description:

Greater Sage-Grouse is the largest North American grouse species. Males are larger than females; males are 1.7–2.9 kg and 65–75 cm long, while females are 1.0–1.8 kg and 50–60 cm long. Plumage is largely dark brown-gray, marked with drab gray and white. The belly is black. The tail is long and pointed and undertail coverts are black with large white spots on the tips. The sides of the male's neck, breast, and upper belly are white and form a ruff. The male has a yellow, fleshy comb above each eye and long filoplumes that arise from the back of the neck. Two patches of yellow skin on the breast are exposed briefly during courtship displays. Females are more cryptic. Immatures resemble adults of their sex but may be distinguished for up to 17 months by retained outermost 2 juvenile primaries [7].

Distribution & Range:
Greater Sage-Grouse currently occupies 56% of its historic North American range, inhabiting portions of 11 states and two Canadian provinces [8]. Of the 192,189 km^2 of potential historic Greater Sage-Grouse range in Wyoming, 173,949 km^2 is currently occupied (91%). This is 70% of the state and 26% of North America's occupied Greater Sage-Grouse range. Wyoming contains 37% of North America's population of Greater Sage-Grouse [9].

Habitat:
Greater Sage-Grouse is a sagebrush obligate species that depends on large areas of contiguous sagebrush [10, 11] that include a variety of semiarid shrub-grassland (shrub steppe) habitats, especially Big Sagebrush (*Artemisia tridentata*) [10, 12-14]. Greater Sage-Grouse distribution is strongly correlated with the distribution of sagebrush habitats [8, 15]. Greater Sage-Grouse is a lekking species [7]. Leks are typically located in openings of relatively low shrub and herbaceous cover within nesting habitat [7]. Nesting habitats are characterized by sagebrush with an understory of native grasses and forbs [7, 13, 15]. Greater Sage-Grouse moves to mesic areas, such as wet meadows, riparian areas, or alfalfa fields in response to summer desiccation of herbaceous vegetation in the uplands [13]. Greater Sage-Grouse depends entirely on sagebrush exposed above the snow for food and cover during winter [7].

Phenology:
Greater Sage-Grouse is a year-round resident of Wyoming. Some sub-populations and individuals may migrate between seasonal habitats [16]. During the spring breeding season, males gather together to perform courtship displays on traditional sites called "leks" [17]. Hens are typically bred on a lek and nest within 8.5 km of the lek [18] in Nests typically hatch in late May or early June in Wyoming. Some hens will renest if their first attempt is unsuccessful [13, 18]. Hens and chicks remain in upland habitats associated with the nest until herbaceous plants become desiccated during the summer and then move to more mesic sites [13, 19]. Fall snowfall triggers movement to winter habitat. Winter habitats are often associated with lekking and nesting habitat, although in some areas Greater Sage-Grouse concentrates on winter habitats away from breeding habitat [16]. Greater Sage-Grouse exhibits strong fidelity to seasonal habitats [11, 20].

Diet:
Sagebrush (*Artemisia* spp.) is essential for Greater Sage-Grouse survival and dominates diet during late autumn, winter, and early spring [10, 21, 22]. Insects are important for juveniles, particularly during first 3 weeks of life; forbs increase in importance as juveniles age [10, 23-26]. Forbs are also important for females during the pre-laying period [27].

CONSERVATION CONCERNS

Abundance:
Continental: WIDESPREAD
Wyoming: ABUNDANT
Greater Sage-Grouse occupies 668,412 km^2 in North America [8] and173,949 km^2 in Wyoming. Thirty-seven percent of North America's population of Greater Sage-Grouse inhabits Wyoming [9]. In 2015, 85,674 males were counted on 3,559 known leks in the 11 western states [28]. In Wyoming, there are 1,833 known occupied leks in Wyoming and 1,609 (88%) of those were checked in 2015 according to the WGFD Greater Sage-Grouse database (accessed on 8/12/2015). A total of 35,854 males were counted on 1,196 active leks, as defined by the WGFD [29].

Population Trends:
Historic: LARGE DECLINE
Recent: MODERATE DECLINE
Greater Sage-Grouse has declined from historic levels but the scope of that decline is unclear as estimates of Greater Sage-Grouse abundance were mostly anecdotal prior to the implementation of systematic surveys in the 1950s [30]. Overall, the rate of population decline has moderated since the mid-1990s although trends vary locally [20, 28]. Greater Sage-Grouse populations in Wyoming are cyclic [31].

Intrinsic Vulnerability:
HIGH VULNERABILITY
Greater Sage-Grouse is highly to moderately vulnerable to extrinsic threats based on the fact that it is a sagebrush obligate [10, 11], has large home area requirements [11, 14], limited ability to disperse [7, 17], relatively low fecundity [7, 32], predisposed to West Nile virus mortality [33], and sensitive to habitat fragmentation and disturbance [34].

Extrinsic Stressors:
MODERATELY STRESSED
Threats to Greater Sage-Grouse populations in Wyoming and range wide are primarily from degradation, fragmentation, and loss of sagebrush steppe habitats. Sagebrush steppe is considered one of the most threatened ecosystems in North America [35]. Sagebrush habitats in Wyoming have been fragmented by energy development, agricultural activities, transportation corridors and rural residential development. Research conducted in Wyoming has demonstrated the impacts of energy development to sage-grouse [19, 36-38]. Invasive grasses represent another significant threat to sagebrush habitats, primarily from increased fire frequency, which has reduced the amount of sagebrush habitat [14, 17]. Greater Sage-Grouse is also subject to mortality from West Nile virus [33].

KEY ACTIVITIES IN WYOMING
The WGFD and partners increased Greater Sage-Grouse monitoring efforts since the mid-1990s [39]. At the same time, multiple universities and agencies have conducted research on Greater Sage-Grouse in Wyoming [39]. Wyoming implemented its "Core Area Strategy" in 2008, which was most recently updated in 2015 [2]. The Bureau of Land Management (BLM) and U.S. Forest Service (USFS) have incorporated most aspects of the Core Area Strategy into their land use planning decisions [3]. The Natural Resources Conservation Service (NRCS) has implemented its range-wide Greater Sage-Grouse Initiative [4].

ECOLOGICAL INFORMATION NEEDS
Knowledge of Greater Sage-Grouse distribution during winter is lacking. More refined estimates of population size and trend would be useful. Further assessments of Greater Sage-Grouse response to habitat modifications, energy development and climate change are needed.

MANAGEMENT IN WYOMING
This section authored solely by WGFD; Tom Christiansen. Greater Sage-Grouse is classified as a Species of Greatest Conservation Need in Wyoming. The USFWS recently determined that Greater Sage-Grouse is not warranted for Threatened or Endangered Species status [1]. Monitoring includes leks counts and surveys, hunter harvest surveys, age/sex structure based on wings from

harvest birds and habitat quality and condition. Wyoming retains management authority for establishing hunting seasons. Data analyses produce density, occupancy, and population trends at various scales and provide decision support tools for managers. Greater Sage-Grouse has been the subject of much research since the mid-1990s in Wyoming [39]. Local Greater Sage-Grouse Working Groups were establish in 2004. These groups developed conservation plans and have legislative funding to conduct conservation efforts across the state [39]. The governor appointed a Greater Sage-Grouse Implementation Team in 2007. This entity was codified by the legislature in 2015. This group advises the governor on Greater Sage-Grouse policy related to the Wyoming Governor's Greater Sage-Grouse Core Area Protection Policy [2]. This policy, established via an Executive Order, provides a mechanism to reduce human disturbance in areas with large Greater Sage-Grouse populations [2]. The BLM and USFS have incorporated most aspects of the Core Area Strategy into their land use planning decisions [3]. The NRCS has implemented its range-wide Greater Sage-Grouse Initiative [4].

CONTRIBUTORS

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Figure 1: Adult male (left) and female (right) Greater Sage-Grouse. (Photo courtesy of W. Zickefoose)

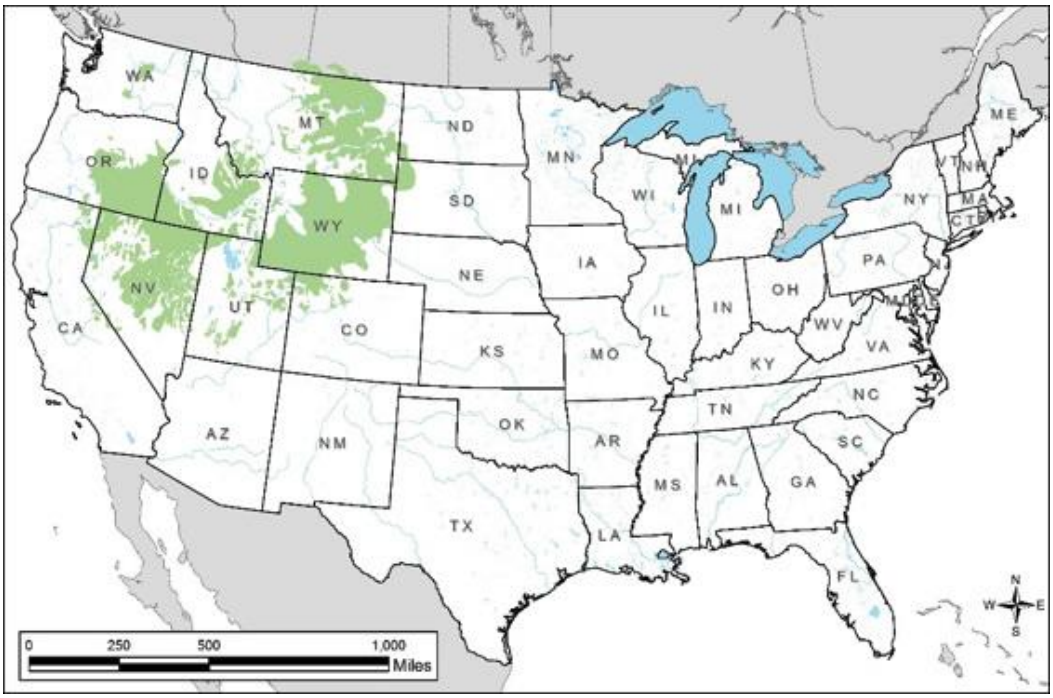

Figure 2: North American range of *Centrocercus urophasianus*. (Map courtesy of Colorado Parks and Wildlife)

Figure 3: Wyoming Big Sagebrush habitat in Sweetwater County, Wyoming. (Photo courtesy of Ian M. Abernethy)

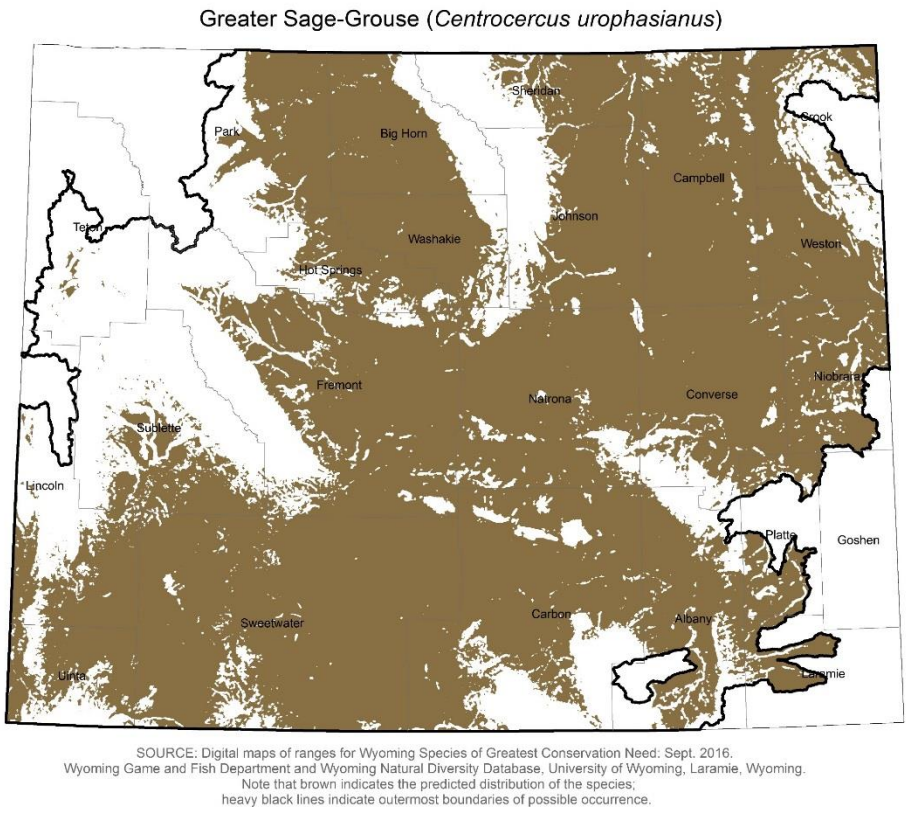

Figure 4: Range and predicted distribution of *Centrocercus urophasianus* in Wyoming.