

**Appendix B:** Description of Greater sage-grouse Management Zones (MZ) as defined by WAFWA (Stiver et al. 2006, pp. ?). The descriptions include a list of populations by MZ, as well as the primary threats facing each population as defined in the 2013 Conservation Objectives Team Report (FWS 2013, pp. ?)

## MZ I-NORTHERN GREAT PLAINS

Management Zone 1 is within the Great Plains floristic province and encompasses the northeastern distribution of sage-grouse (Figure X-3). This MZ has 12.4% of the birds across the range. This MZ has a high percentage of private lands (FWS 2013, p. 63). The Conservation Objectives Team (FWS 2013, entire) identified the primary threats for this MZ as habitat loss, fragmentation, and degradation as a result of conversion of native areas to cropland and energy development with its associated infrastructure (FWS 2013, pp 16-17). Sage-grouse populations in this MZ also experienced significant negative population impacts from West Nile virus outbreaks beginning in the early 2000s.

Populations	Description	Status in 2010	Primary Threats (FWS 2013)
<b>Dakotas</b>	Small population in southwest ND and northwest SD separated from adjacent populations by 30–40 km and habitat features.	ND had a total of 77 males on 18 leks in 2008 (NDGFD 2008, News Release). SD had a total of 339 males on 22 leks in 2008 (SDGFP 2008, p. 9)	Energy Development, Agricultural Conversion, Localized Overgrazing, Small Population Sizes, Disease
<b>Northern Montana</b>	Large population north of Missouri River in north central Montana, southeast Alberta, and southwest	Minimum male count of 2,700 (Garton et al. 2011, p. ?), projected low risk of extirpation.	Energy Development, Localized Overgrazing, Infrastructure, Localized Agricultural Conversion,

	Saskatchewan; separated from adjacent populations by 20 km and Missouri River		
<b>Powder River Basin</b>	Large population in southeast Montana and northeast Wyoming separated from adjacent populations by 20 km and habitat features.	In 2010, Northeast Wyoming has the lowest average male lek attendance in the state (WGFD 2010 JCR, p. 138); long-term population viability compromised (Taylor et al. 2012, p. ?)	Energy Development, Disease, Mining, Infrastructure, Recreation, Localized overgrazing, Invasive annual weeds
<b>Yellowstone watershed</b>	Large population in central and southeast Montana separated from adjacent populations by 20–30 km and topography.	Long-term(100 years) population viability compromised (Garton et al. 2011, p. ?)	Energy Development, Localized Overgrazing, Invasive annual weeds, Infrastructure

## MZ II–WYOMING BASIN

Management Zone II is within the Wyoming Basin floristic province and contains the highest abundance of sage-grouse relative to all other MZs (36.8%). This MZ contains five separate populations, but is dominated by the expansive Wyoming Basin population. Primary threats identified in the COT report (FWS 2013, pp. 17-19) for this MZ include habitat loss, fragmentation, and degradation as a result of energy development with its associated infrastructure.

Populations	Description	Status in 2010	Primary Threats (FWS 2013)
<b>Eagle–south Routt Counties,</b>	Small population north of the Colorado River separated from adjacent populations by	Proportion of active leks and male attendance declining, long-term	Urbanization, Agricultural Conversion, Small Population Size, Invasive

<b>Colorado</b>	20–30 km and topography.	persistence unlikely (Garton et al. 2011, p. 316).	Weeds, Infrastructure, Localized Overgrazing, Small Population Size
<b>Middle Park, Colorado</b>	Small population in Middle Park, Colorado, separated from adjacent populations by 20–30 km and terrain.	Population slowly decreasing from 2000 to 2007 (Garton et al. 2011, pp. 317-319).	Small Population Size, Sagebrush Elimination, Agricultural Conversion, Wildfire, Invasive Weeds, Energy Development, Mining, Infrastructure, Localized Overgrazing, Recreation, Urbanization
<b>Laramie, Wyoming</b>	Small isolated population southwest of Laramie, Wyoming.	Five leks known, only one routinely occupied.	Small Population Size, Fire, Conifers, Invasive Weeds, Energy Development, Infrastructure, Localized Overgrazing, Recreation, Urbanization
<b>Jackson Hole, Wyoming</b>	Small isolated population near Jackson Hole, Wyoming, separated from adjacent populations by 50 km and topography.	Population consists of 16 leks (13 active). Population is declining slightly (FWS 2013, p. 67).	Small Population Size, Invasive Weeds, Recreation
<b>Wyoming basin</b>	Large population centered in Wyoming and extending into Montana, Idaho, Utah, and Colorado. Supports the highest number and density of sage-grouse across the range.	Supports the largest population within the species' range; experiencing long-term population declines	Energy Development, Infrastructure, Recreation, Localized Overgrazing, Fire, Conifers, Urbanization, Agricultural Conversion, Sagebrush Elimination, Invasive Weeds, Mining,

## MZ III–SOUTHERN GREAT BASIN

Management Zone III is within the Southern Great Basin floristic province. This MZ contains five populations, and includes the Bi-State DPS (which is not discussed further). This

MZ is home to approximately 12.2% of the entire sage-grouse population. Due to soil type and precipitation, this MZ is the driest of all MZ across the species' range. Therefore, habitat loss due to fire is a predominant threat.

<b>Populations</b>	<b>Description</b>	<b>Status in 2010</b>	<b>Primary Threats (FWS 2013)</b>
<b>Southern Great Basin</b>	Occurs primarily in east-central NV, with small portions extending into Utah (Ibapah and Hamlin Valley)	Has the largest numbers in MZ III (concentrated in NV); Slightly declining population trends and portions of this population are considered at risk (FWS 2013, pp. 73-75)	Small Population Size, Fire, Conifers, Invasive Weeds, Energy Development, Mining, Infrastructure, Free-roaming Equids, Recreation, Localized Overgrazing
<b>Northeast Interior Utah</b>	Consists of two management areas (Strawberry Valley and Carbon) in central Utah	Both management areas have small numbers of birds and are considered at risk (FWS 2013, p. 71).	Small Population Size, Fire, Conifers, Invasive Weeds, Energy Development, Mining, Infrastructure, Recreation
<b>South-central Utah</b>	Located in south-central Utah and is the largest UT population in MZ III. Divided into 3 management areas: Parker Mountain, Panguitch, and Bald Hills	Population trends are stable to increasing (Garton et al. 2011, pp. 332-333).	Fire, Conifers, Invasive Weeds, Infrastructure, Recreation, Agricultural Conversion, Energy Development, Small Population Size, Mining, Urbanization, Free-roaming Equids
<b>Emery</b>	High elevation isolated population in central Utah	Estimated 30 males on leks in 2011, considered at risk due to small population size (FWS 2013, p. 71)	Small Population Size, Fire, Conifers, Invasive Weeds, Energy Development, Mining, Infrastructure, Recreation
<b>Northwest Interior</b>	Isolated area in northwest central NV	Lek count data suggest less than 500 birds within 2 subpopulations. Population considered at high risk (FWS 2013, p. 73)	Small Population Size, Fire, Invasive Weeds, Mining, Infrastructure, Localized Overgrazing, Free-roaming Equids, Recreation

<b>Sheeprock</b>	Isolated population in north-central Utah	102 males estimated from lek counts in 2011 and is considered stable with potential for growth (FWS 2013, p. 71)	Small Population Size, Fire, Energy Development, Mining, Free-Roaming Equids
<b>Quinn Canyon Range</b>	Isolated population in southeastern NV with very little sagebrush cover	Only 2 to 3 leks have been identified and populations are considered at risk (FWS 2013, p. 75)	Small Population Size, Fire, Conifers, Invasive Weeds, Localized Overgrazing, Free-roaming Equids, Recreation, Infrastructure

## MZ IV – SNAKE RIVER PLAIN

The management zone includes sage-grouse in parts of Montana, Utah, Nevada and Oregon, but most of the birds occur in Idaho (Garton et al. 2011, p. 340). It is one of the largest areas of connected sage-grouse habitats and supports the largest population of sage-grouse outside of MZ II (30.2% of total birds; FWS 2013, p. 75). Primary threats in this MZ are fire and invasive annual grasses.

<b>Populations</b>	<b>Description</b>	<b>Status in 2010</b>	<b>Primary Threats (FWS 2013)</b>
<b>Baker</b>	This population occurs in eastern OR and is the smallest population completely contained within state borders (FWS 2013, pp. 75-76)	Long-term population trends have been stable but lack of connectivity with other populations puts the population at risk. Much of the habitat in this population is unused due to topography (FWS 2013, p. 76)	Small Population Size, Sagebrush Elimination, Agricultural Conversion, Fire, Invasive weeds, Mining
<b>East Central Idaho</b>	This population lies between the Snake River in ID and the WY border (Garton et al. 2013, p. 346). A large part of this population is in private	Lek count information is limited due to land ownership patterns and difficult access during the spring. Numbers are low	Small Population Size, Agricultural Conversion, Conifers, Energy Development, Infrastructure, Localized

	and state ownership	and Garton et al. 2011 (p. 347) estimated a low probability of persistence.	Overgrazing,
<b>Southwest Montana</b>	This population is in SW MT and some sub-populations seasonally migrate to ID. Some of this area is in conservation agreements (FWS 2013, p. 77).	Population numbers and minimal threats to habitat suggest this population is at low risk (FWS 2013, p. 77).	Invasive Weeds, Localized Overgrazing
<b>Salmon-Snake-Beaverhead</b>	This population is primarily located in central and eastern ID and extends into SW MT (Garton et al. 2011, p. 347; FWS 2013, p. 77)	This population is considered stable to increasing (FWS 2013, p. 77).	Fire, Invasive Weeds, Energy Development, Localized Overgrazing, Free-roaming Equids
<b>Belt Mountains</b>	This is a small isolated population in west central MT, and is separated by at least 50 mi from other populations (FWS 2013, p. 77).	Population numbers are low due to past habitat conversion and is considered at risk (FWS 2013, p. 78).	Small Population Size, Agricultural Conversion, Invasive Weeds, Localized Overgrazing
<b>Weiser</b>	Small population in western ID and isolated due to surrounding non-habitat (FWS 2013, p. 78). The population has a high proportion of private lands.	There are 14 occupied leks within the population and the population is considered at risk (FWS 2013, p. 78).	Small Population Size, Invasive Weeds, Energy Development, Localized Overgrazing
<b>Northern Great Basin</b>	Large population that straddles several state borders and includes birds in OR, ID, NV and UT. This area is predominately under public ownership (FWS 2013, p. 78).	Long-term population trend analysis is considered stable to increasing (FWS 2013, p. 78), but long-term projections suggest that carrying capacity will decline (Garton et al. 2011, p. 350).	Fire, Conifers, Invasive Weeds, Infrastructure, Localized Overgrazing, Recreation, Urbanization, Agricultural Conversion, Mining,
<b>Sawtooth</b>	Small, isolated population in central ID.	No active leks known; site of previous translocations. Is considered at high risk (FWS 2013, p. 80).	Small Population Size, Infrastructure, Localized Overgrazing

## MZ V – NORTHERN GREAT BASIN

The management zone includes sage-grouse in parts of Oregon, Nevada and California (Garton et al. 2011, p. 351). The BLM is the primary landowner. This MZ is home to 7.4% of the population range-wide, and is considered part of a stronghold of birds in combination with the Snake River Plain to the east (FWS 2013, p. 80). Primary threats in this MZ include habitat loss due to fire, invasive annual grasses, and conifers.

Populations	Description	Status in 2010	Primary Threats (FWS 2013)
<b>Central Oregon</b>	Population in central OR separated by distance and topography from other populations (Garton et al. 2011, p. 351).	Population has been declining since 1980 and population predictions suggest low persistence. However, recent work by SGI will help with reversing the declines (FWS 2013, p. 81).	Fire, Conifers, Invasive Weeds, Mining, Localized Overgrazing
<b>Klamath</b>	Small population that straddles the OR/CA state borders (FWS 2013, p. 81).	Small numbers of leks and birds are still present but the population is at risk for extirpation without continued augmentation (FWS 2013, pp. 81-82).	Small Population Size, Fire, Conifer, Invasive Weeds
<b>Warm Springs Valley</b>	This is a small isolated population in NV, north of the Bi-State DPS (FWS 2013, p. 82).	Only 2 confirmed active leks known, and there may be connectivity to the western Great Basin population to the north. This population is considered at risk (FWS 2013, p. 82).	Small Population Size, Agricultural Conversion, Fire, Conifers, Invasive Weeds, Energy Development, Infrastructure, Localized Overgrazing, Free-roaming Equids, Recreation, Urbanization
<b>Western Great Basin</b>	This population occurs in southeastern OR, northeastern CA and northwestern NV. It	Likely the most resilient population in the MZ, but concerns persist for the CA and NV portions of this	Fire, Conifers, Invasive Weeds, Localized Overgrazing, Free-roaming Equids

	contains expanses of intact sagebrush habitat (FWS 2013, p. 82).	population. The population is considered potentially at risk (FWS 2013, pp. 84-85).	
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## MZ VI - COLUMBIA BASIN

Management Zone VI is contained entirely within Washington State and is comprised of 4 populations. Two of the populations were extirpated, but sage-grouse have been re-introduced within the last decade with uncertain long-term success (FWS 2013, pp. 86-87). This MZ has 0.6% of the total sage-grouse population. The State of Washington has an active recovery program for sage-grouse, which is listed under state laws. Primary threats to this MZ is small population sizes and agricultural conversion).

Populations	Description	Status in 2010	Primary Threats (FWS 2013)
<b>Moses Coulee</b>	Located in north-central Washington and is separated by distance and topography from other populations in the state (Garton et al. 2011, p. 358)	Population has been stable for past 30 years but is still considered at risk (FWS 2013, p. 86). Long-term models predict extirpation (Garton et al. 2011, p. 360).	Small Population Size, Sagebrush Elimination, Agricultural Conversion, Invasive Weeds, Energy Development, Infrastructure, Localized Overgrazing, Recreation, Urbanization
<b>Crab Creek</b>	Isolated population located in northeast central Washington.	Population extirpated; translocation occurred in 2008 and birds are still persisting. Long-term success is unknown (FWS 2013, p. 87)	Small Population Size, Sagebrush Elimination, Agricultural Conversion, Fire, Invasive Weeds, Energy Development, Infrastructure, Localized Overgrazing, Recreation



<b>Yakama Indian Nation</b>	Isolated population in southwest central Montana	Population extirpated; translocations between 2006–2008 had poor success. Population at risk (FWS 2013, p. 86)	Small Population Size, Fire, Invasive Weeds, Energy Development, Infrastructure, Localized Overgrazing, Recreation, Free-roaming Equids
<b>Yakima Training Center</b>	Population in south-central Washington, separated from other populations by Columbia River (Garton et al. 2011, p. 360). Most of population occurs on public land.	Total number of males counted in 2011 = 72. Due to intensive human use of the area population growth is not anticipated, and the population is at risk (FWS 2013, p. 87)	Small Population Size, Fire, Invasive Weeds, Infrastructure, Localized Overgrazing, Recreation

## MZ VII – COLORADO PLATEAU

This MZ is located in NW Colorado and consists of two populations. It contains 0.3% of the range-wide population. This MZ has no known connectivity with UT to the west, but appears to have some linkage to MZ II to the north. The primary concern for this MZ is the isolated nature of the populations and energy development (FWS 2013, pp. 87-88).

<b>Populations</b>	<b>Description</b>	<b>Status in 2010</b>	<b>Primary Threats (FWS 2013)</b>
<b>Parachute-Piceance-Roan Basin</b>	Population in western CO located within the Piceance Basin.	Population fluctuates similarly to larger populations in CO. Is considered to be at high risk due to small population size (FWS 2013, p. 88)	Small Population Size, Fire, Conifers, Energy Development, Mining, Infrastructure, Localized Overgrazing, Free-roaming Equids
<b>Meeker-White River</b>	Population in western Colorado, northeast of the Parachute-Piceance-Roan Basin	Small population with one known lek. Lek attendance has been declining (FWS 2013, p. 88).	Small Population Size, Sagebrush Elimination, Agricultural Conversion, Fire, Energy Development, Mining, Infrastructure,

			Localized Overgrazing, Urbanization
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