APPENDICES

APPENDIX 1.1: DESCRIPTION OF GREATER SAGE-GROUSE MANAGEMENT ZONES.

MZ I – NORTHERN GREAT PLAINS

Management Zone I is within the Great Plains floristic province and encompasses the northeastern distribution of sage-grouse (Figure 1-4). This MZ has 12.4 percent of the birds across the range. This MZ has a high percentage of private lands (Service 2013, p. 63). The COT report (Service 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 (Service 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.

Comment [LW 1]: Do we also 'Service' here as well or 'FWS' for citations?

Table A1.1-1. Population descriptions for MZ I.

Population	Description	Status in 2010	Primary Threats (Service 2013)
Dakotas	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
Northern Montana	Large population north of Missouri River in north central Montana, southeast Alberta, and southwest Saskatchewan; separated from adjacent populations by 20 km and Missouri River	Minimum male count of 2,700 (Garton *et al.* 2011, p.?), projected low risk of extirpation.	Energy Development, Localized Overgrazing, Infrastructure, Localized Agricultural Conversion,
Powder River Basin	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
Yellowstone watershed (MT)	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 percent; Figure 1-4). This MZ contains five separate populations, but is dominated by the expansive Wyoming Basin population. Primary threats identified in the COT report (Service 2013, pp. 17–19) for this MZ include habitat loss, fragmentation, and degradation as a result of energy development with its associated infrastructure.

Table A1.1-2. Population descriptions for MZ II.

Population	Description	Status in 2010	Primary Threats (Service 2013)
Eagle–South Routt (CO)	Small population north of the Colorado River separated from adjacent populations by 20–30 km and topography.	Proportion of active leks and male attendance declining, long-term persistence unlikely (Garton *et al.* 2011, p. 316).	Urbanization, Agricultural Conversion, Small Population Size, Invasive Weeds, Infrastructure, Localized Overgrazing, Small Population Size
Middle Park (CO)	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
Laramie (WY)	Small isolated population southwest of Laramie, Wyoming.	Five leks know, only one routinely occupied.	Small Population Size, Fire, Conifers, Invasive Weeds, Energy Development, Infrastructure, Localized Overgrazing, Recreation, Urbanization
Jackson Hole (WY)	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 (Service 2013, p. 67).	Small Population Size, Invasive Weeds, Recreation
Wyoming basin	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 (Figure 1-4). 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.

Table A1.1-3. Population descriptions for MZ III.

Populations	Description	Status in 2010	Primary Threats (Service 2013)
Southern Great Basin	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 (Service 2013, pp. 73-75)	Small Population Size, Fire, Conifers, Invasive Weeds, Energy Development, Mining, Infrastructure, Free-roaming Equids, Recreation, Localized Overgrazing
Northeast Interior Utah	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 (Service 2013, p. 71).	Small Population Size, Fire, Conifers, Invasive Weeds, Energy Development, Mining, Infrastructure, Recreation
South-central Utah	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
Emery (UT)	High elevation isolated population in central Utah	Estimated 30 males on leks in 2011, considered at risk due to small population size (Service 2013, p. 71)	Small Population Size, Fire, Conifers, Invasive Weeds, Energy Development, Mining, Infrastructure, Recreation
Northwest Interior (NV)	Isolated area in northwest central NV	Lek count data suggest less than 500 birds within 2 subpopulations. Population considered at high risk (Service 2013, p. 73)	Small Population Size, Fire, Invasive Weeds, Mining, Infrastructure, Localized Overgrazing, Free-roaming Equids, Recreation
Sheeprock	Isolated population in north-central Utah	102 males estimated from lek counts in 2011 and is considered stable with potential for growth (Service 2013, p. 71)	Small Population Size, Fire, Energy Development, Mining, Free-Roaming Equids

Quinn Canyon Range	Isolated population in southeastern NV with very little sagebrush cover	Only 2 to 3 leks have been identified and populations are considered at risk (Service 2013, p. 75)	Small Population Size, Fire, Conifers, Invasive Weeds, Localized Overgrazing, Free-roaming Equids, Recreation, Infrastructure

MZ IV – SNAKE RIVER PLAIN

The MZ 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 percent of total birds; Figure 1-4). Primary threats in this MZ are fire and invasive annual grasses.

Table A1.1-4. Population descriptions for MZ IV.

Populations	Description	Status in 2010	Primary Threats (Service 2013)
Baker (OR)	This population occurs in eastern OR and is the smallest population completely contained within state borders (Service 2013, pp. 75-76)	Long-term population trends have been stable but lack of connectivity with other populations puts population at risk. Much of the habitat in this population is unused due to topography (Service 2013, p. 76)	Small Population Size, Sagebrush Elimination, Agricultural Conversion, Fire, Invasive weeds, Mining
East Central Idaho	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 and state ownership	Lek count information is limited due to land ownership patterns and difficult access during the spring. Numbers are low and Garton *et al.* 2011 (p. 347) estimated a low probability of persistence.	Small Population Size, Agricultural Conversion, Conifers, Energy Development, Infrastructure, Localized Overgrazing,
Southwest Montana	Located in SW MT and some sub-populations seasonally migrate to ID. Some of this area is in conservation agreements (Service 2013, p. 77).	Population numbers and minimal threats to habitat suggest this population is at low risk (Service 2013, p. 77).	Invasive Weeds, Localized Overgrazing
Salmon-Snake-Beaverhead	This population is primarily located in central and eastern ID and extends into SW MT (Garton *et al.* 2011, p. 347; Service 2013, p, 77)	This population is considered stable to increasing (Service 2013, p. 77).	Fire, Invasive Weeds, Energy Development, Localized Overgrazing, Free-roaming Equids
Belt Mountains	Small isolated population in west central MT, separated from other population by at least 50 mi (Service 2013, p. 77).	Population numbers are low due to past habitat conversion and is considered at risk (Service 2013, p. 78).	Small Population Size, Agricultural Conversion, Invasive Weeds, Localized Overgrazing

Weiser (ID)	Small population in western ID and isolated due to surrounding non-habitat (Service 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 (Service 2013, p. 78).	Small Population Size, Invasive Weeds, Energy Development, Localized Overgrazing
Northern Great Basin	Large population that straddles several state borders and includes birds in OR, ID, NV and UT. This area is predominately under public ownership (Service 2013, p. 78).	Long-term population trend analysis is considered stable to increasing (Service 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,
Sawtooth (ID)	Small, isolated population in central ID.	No active leks known; site of previous translocations. Is considered at high risk (Service 2013, p. 80).	Small Population Size, Infrastructure, Localized Overgrazing

MZ V – NORTHERN GREAT BASIN

The MZ 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 percent of the population rangewide (Figure 1-4), and is considered part of a stronghold of birds in combination with the Snake River Plain to the east (Service 2013, p. 80). Primary threats in this MZ include habitat loss due to fire, invasive annual grasses, and conifers.

Table A1.1-5. Population descriptions for MZ V.

Populations	Description	Status in 2010	Primary Threats (Service 2013)
Central Oregon (OR)	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 (Service 2013, p. 81).	Fire, Conifers, Invasive Weeds, Mining, Localized Overgrazing
Klamath	Small population that straddles the OR/CA state borders (Service 2013, p. 81).	Small numbers of leks and birds are still present but the population is at risk for extirpation without continued augmentation (Service 2013, pp. 81-82).	Small Population Size, Fire, Conifer, Invasive Weeds

Warm Springs Valley (NV)	This is a small isolated population in NV, north of the Bi-State DPS (Service 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 (Service 2013, p. 82).	Small Population Size, Agricultural Conversion, Fire, Conifers, Invasive Weeds, Energy Development, Infrastructure, Localized Overgrazing, Free-roaming Equids, Recreation, Urbanization
Western Great Basin	This population occurs in southeastern OR, northeastern CA and northwestern NV. It contains expanses of intact sagebrush habitat (Service 2013, p. 82).	Likely the most resilient population in the MZ, but concerns persist for the CA and NV portions of this population. The population is considered potentially at risk (Service 2013, pp. 84-85).	Fire, Conifers, Invasive Weeds, Localized Overgrazing, Free-roaming Equids

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 (Service 2013, pp. 86–87). This MZ has 0.6 percent of the total sage-grouse population (Figure 1-4). The State of Washington has an active recovery program for sage-grouse, which is listed under state laws (pp. X–X). Primary threats to this MZ is small population sizes and agricultural conversion.

Table A1.1-6. Population descriptions for MZ VI.

Populations	Description	Status in 2010	Primary Threats (Service 2013)
Moses Coulee (WA)	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 (Service 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
Crab Creek (WA)	Isolated population located in northeast central Washington.	Population extirpated; translocation occurred in 2008 and birds are still persisting. Long-term success is unknown (Service 2013, p. 87)	Small Population Size, Sagebrush Elimination, Agricultural Conversion, Fire, Invasive Weeds, Energy Development, Infrastructure, Localized Overgrazing, Recreation

Yakama Indian Nation (WA)	Isolated population in southwest central Montana	Population extirpated; translocations between 2006–2008 had poor success. Population at risk (Service 2013, p. 86)	Small Population Size, Fire, Invasive Weeds, Energy Development, Infrastructure, Localized Overgrazing, Recreation, Free-roaming Equids
Yakima Training Center (WA)	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 (Service 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 (Figure 1-4). 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 (Service 2013, pp. 87-88).

Table A1.1-7. Population descriptions for MZ VII.

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

APPENDIX 1.2: SUMMARY OF LAND OWNERSHIP BY GREATER SAGE-GROUSE MANAGEMENT ZONE

MZ I – NORTHERN GREAT PLAINS

Management Zone I spans eastern Montana, NE Wyoming, the Dakotas, Alberta, and Saskatchewan and is almost 70 percent in private ownership (Figure A1.2-1). Interspersed among the private lands are a checkerboard of state trust lands. Two large tribal reservations are present in the northern portion of the MZ, Fort Peck and Fort Belknap, making up almost 5 percent of the range of sage-grouse in the MZ; however, these reservations contain only about 0.05 percent of the modeled breeding distribution of sage-grouse within the MZ. BLM lands make up only 15 percent of the range of sage-grouse in the MZ, but accounts for 27 percent of the modeled breeding distribution in the MZ. The Charles M. Russell National Wildlife Refuge borders the Missouri River in this MZ, accounting for approximately 1 percent of the modeled breeding distribution in the MZ.

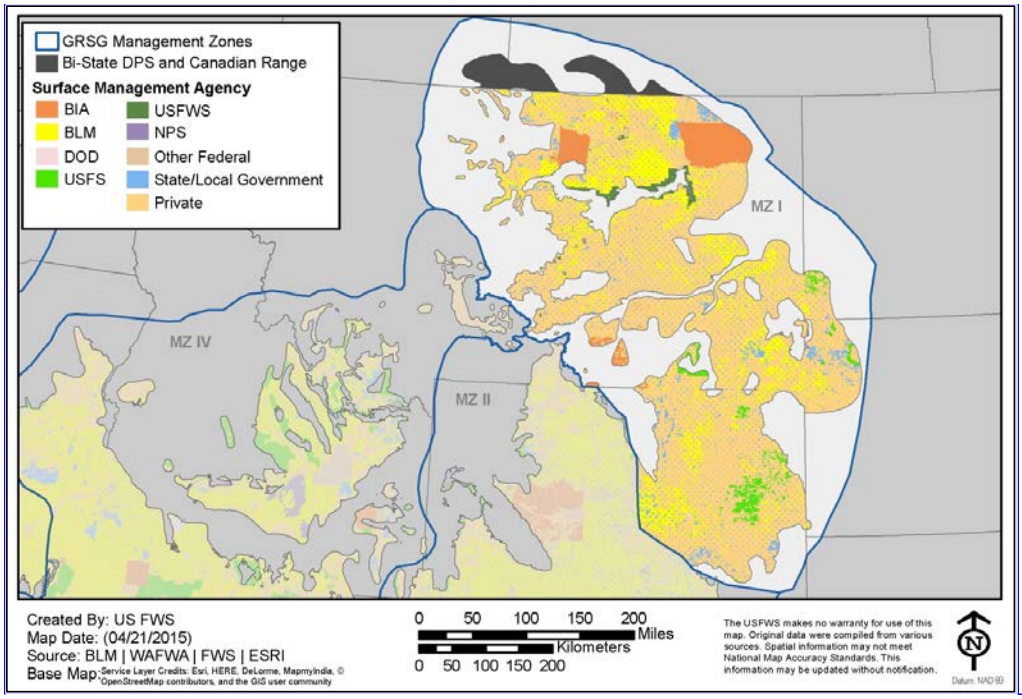

Figure A1.2-1. Surface landownership in Management Zone I.

MZ II – WYOMING BASIN

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MZ II includes central and southwest Wyoming, a small portion of southern Montana, northeast Utah, and northwest Colorado, with almost half of the land owned by BLM (Figure A1.2-2). Private lands predominate on the edges of this MZ and a checkerboard pattern of state trust lands is interspersed with BLM and private ownership. Along the Central Pacific Railroad corridor in southern Wyoming and northeast Utah, an even finer checkerboard pattern of private and BLM land is evident. The Wind River Indian Reservation, in central Wyoming, covers over 3 percent of the range of sage-grouse in the MZ, but encompasses less than 1 percent of the modeled breeding distribution of sage-grouse in the MZ. In west-central Wyoming, land occupied by the isolated Jackson Hole population is predominately within Grand Teton National Park, the Elk National Refuge (managed by the Service), and the Bridger-Teton National Forest.

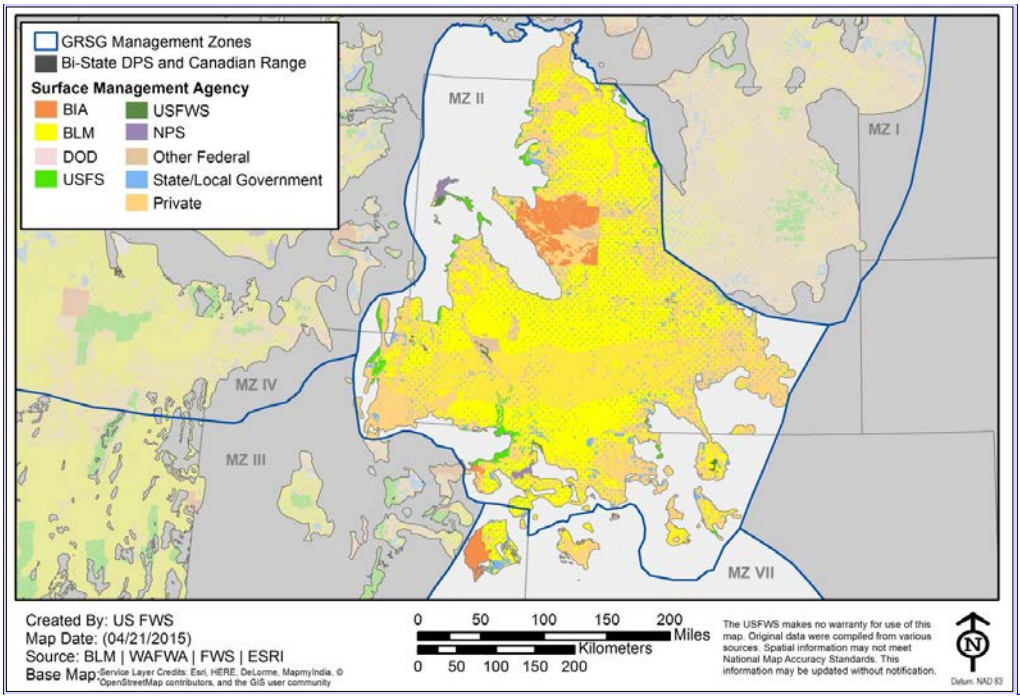

Figure A1.2-2. Surface landownership in Management Zone II and VII.

MZ III – SOUTHERN GREAT BASIN

Management Zone III includes portions of Nevada and Utah with 83 percent of the range of sage-grouse in the MZ owned by BLM and USFS (Figure A1.2-3). Private lands in the MZ are limited to checkerboard ownership along the Central Pacific Railroad corridor in northern Nevada, and a few larger blocks of private ownership in northern and eastern Utah. State trust lands are interspersed in a checkerboard pattern with BLM lands in Utah, but not in Nevada. In addition there is a relatively large tract of state trust land in south-central Utah, called Parker Mountain, that provides habitat and population connectivity to one of the largest populations of

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sage-grouse in southern Utah. One of the few DoD facilities that overlap sage-grouse range is located at the southern edge of the MZ in Nevada, but this area contains little modeled sage-grouse breeding habitat. There are also a few tribal reservations in this MZ, but these lands are at the edges of the species' range within the MZ and provide little modeled breeding habitat.

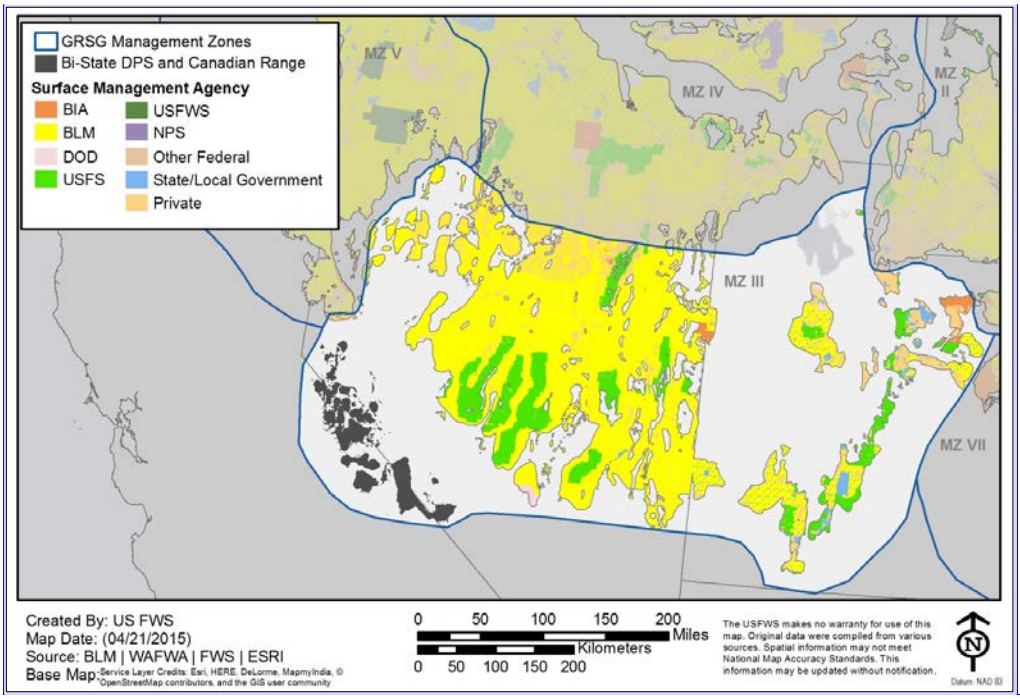

Figure A1.2-3. Surface landownership in Management Zone III.

MZ IV – SNAKE RIVER PLAIN

Management Zone IV spans six states and arguably has the most complex pattern of ownership among the sage-grouse MZs (Figure A1.2-4). Across the MZ, 63 percent of the range of sage-grouse in the MZ and 70 percent of the modeled breeding distribution in the MZ are in Federal ownership. However, the Belt Mountains, in the northeastern corner of the MZ (in Montana) are predominately privately owned, with State trust lands mixed in a checkerboard fashion. Southwest Montana and the Snake-Salmon Beaverhead populations (SW Montana and central Idaho) consist of a matrix of BLM lands mixed with some USFS and private lands with State trust lands checkerboarded throughout; In addition, the Idaho National Energy Laboratory and Craters of the Moon National Preserve and Monument are two large landowners within this portion of the MZ. The area occupied by the relatively isolated Sawtooth population is almost entirely part of the Sawtooth National Recreation Area, owned by the USFS. The East-central Idaho population, at the southeast corner of the MZ is a fragmented mix of private, State, tribal, and USFS lands. The Weiser and Baker populations, located in west-central Idaho and northeast

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Oregon, respectively, are primarily comprised of private ownership mixed with some BLM lands. The largest population in the MZ, the Northern Great Basin population, spans southern Idaho, southeast Oregon, northern Nevada, and northwest Utah; this population is primarily in BLM ownership, with a checkerboard of State ownership in southern Idaho and northwest Utah, and several large tracts of USFS lands. In addition this portion of the MZ also contains the Duck Valley Indian Reservation and a few large blocks of State ownership. The private/Federal checkerboard pattern of ownership along the Central Pacific Railroad corridor is also evident in Northern Nevada and northwest Utah.

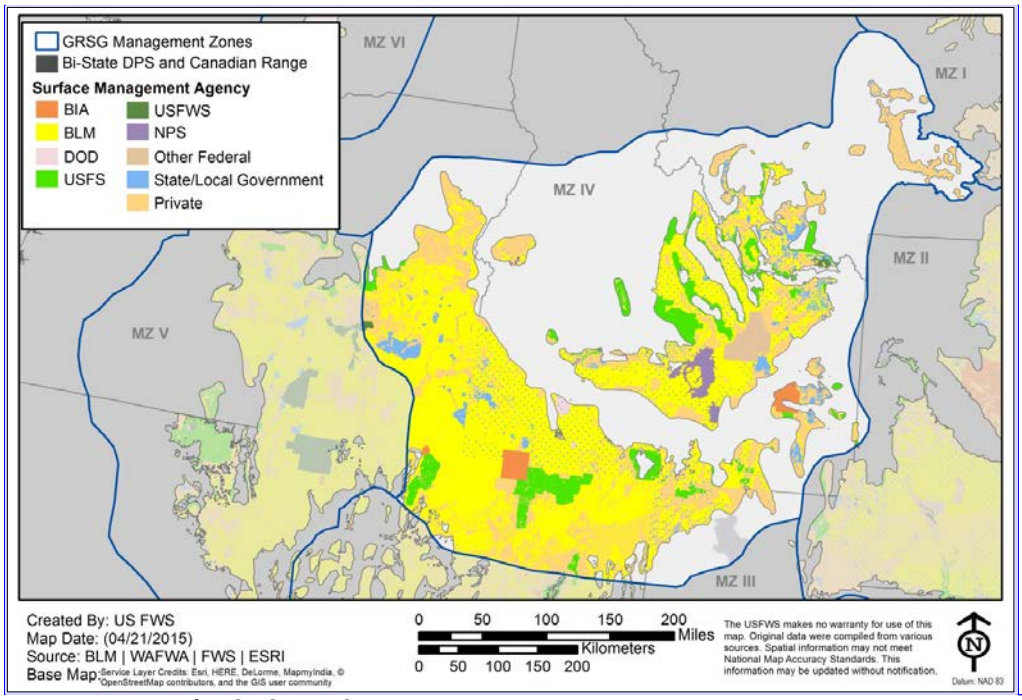

Figure A1.2-4. Surface landownership in Management Zone IV

MZ V – NORTHERN GREAT BASIN

Management Zone IV includes portions of southeast Oregon, northeast California, and northwest Nevada. It consists mostly of BLM and FS ownership, which covers almost 70% of the range of sage-grouse in the MZ and almost 80% of the modeled breeding distribution in the MZ. National Wildlife Refuge lands are an important and central components of this MZ, comprising approximately 5% of the range in the MZ and 9% of the modeled breeding distribution, most of which is due to Sheldon-Hart National Wildlife Refuge Complex. The Modoc National Forest, in northeast California, forms the most contiguous expanse of FS land in the MZ, with a few smaller and more fragmented patches of FS ownership located in Oregon. Private ownership is scattered throughout the MZ, with several large ranches in southeastern Oregon. State and Tribal

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lands collectively comprise less than 4 percent of the range of sage-grouse in the MZ and less than 2 percent of the breeding distribution.

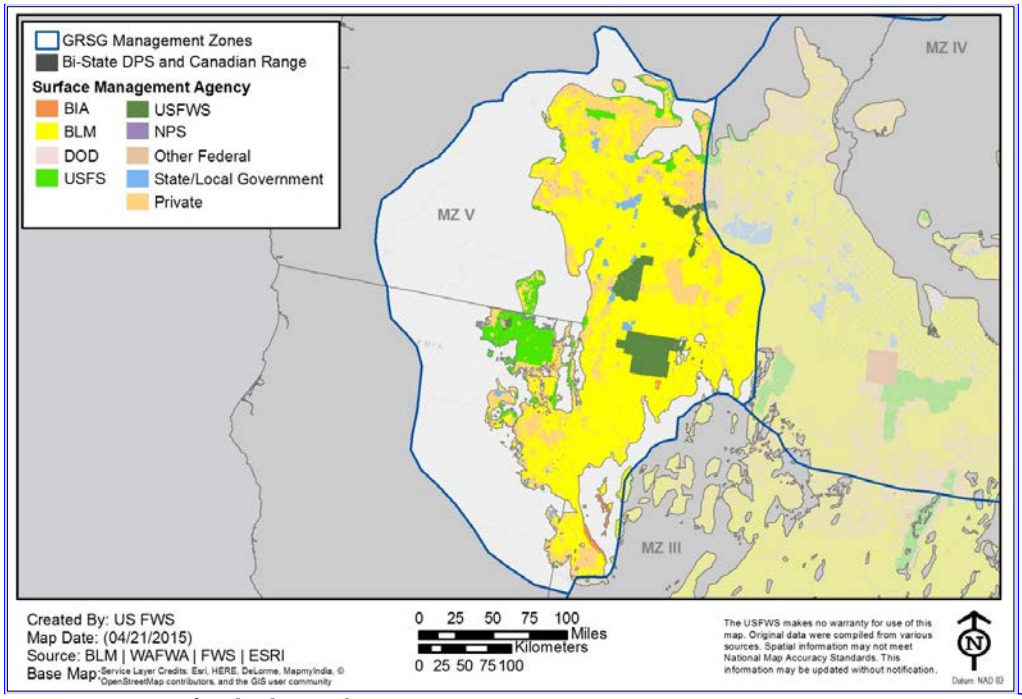

Figure A1.2-5. Surface landownership in Management Zone V.

MZ VI – COLUMBIA BASIN

The range of sage-grouse in MZ VI is entirely within the state of Washington and is comprised of four units. The two northern units are predominately private land, with some state and BLM lands scattered throughout. The southern units consist almost entirely of the Yakima Training Center, owned by DoD, and the Yakima Indian Nation (Figure A1.2-6).

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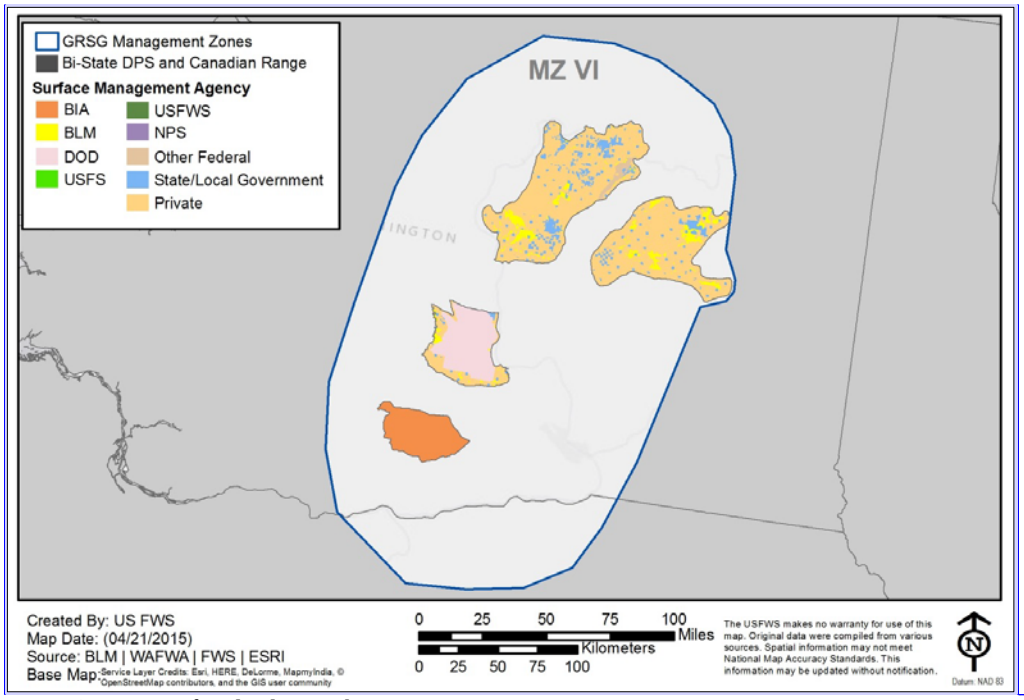

Figure A1.2-6. Surface landownership in Management Zone VI.

MZ VII – COLORADO PLATEAU

Management Zone VII, located in eastern Utah and northwest Colorado, contains only a small amount of the sage-grouse range. In Utah, this MZ is almost entirely in Tribal (Uintah and Ouray Indian Reservation), BLM, and State ownership, whereas in Colorado, the MZ is mostly in private ownership, although BLM also owns some land in this portion of the MZ (Figure A1.2-2). When viewed together, almost 70 percent of the modeled breeding distribution of sage-grouse in this MZ is in private ownership, and almost 20 percent is owned by BLM.

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APPENDIX 22.1: DEFINITIONS OF LAND USE ALLOCATION TERMS USED BY BLM AND FS

Lands and Realty (Land Tenure, ROWs, Solar and Wind)

Open areas: areas available for location of rights-of-ways.
Avoidance areas: areas to be avoided but may be available for location of rights-of- ways with special stipulations.
Exclusion areas: areas which are not available for location of rights-of-ways under any conditions.
Utility corridors: linear areas with the potential for at least one additional facility and thus can be considered a corridor (if not already designated) to minimize adverse environmental impacts and the proliferation of separate right-of-ways.

Fluids (Oil and Gas and Geothermal)

Open: areas open to leasing with minor to no constraints, subject to existing laws and regulations, and formal orders; an the terms and conditions of the standard lease form.
Open with moderate constraints: areas open to leasing subject to moderate constraints. These are areas where it has been determined that moderately restrictive lease stipulations may be required to mitigate impacts. These stipulations include:

- Timing limitations: areas open to leasing but would be closed to surface disturbing activities during identified time frames. This stipulation would not apply to operation and maintenance activities, including associated vehicle travel, unless otherwise specified.
- Controlled Surface Use (CSU): areas that are open to leasing but would require proposals for surface disturbing activities to be authorized only according to the controls or constraints specified.

Open with major constraints: areas open to leasing, subject to major constraints. These are areas where it has been determined that highly restrictive lease stipulations are required to mitigate impacts.

- No Surface Occupancy (NSO): areas open to leasing but surface disturbing activities cannot be conducted on the surface of the land. Access to oil and gas deposits would require horizontal drilling from outside the boundaries of the NSO areas. The NSO areas are avoidance areas for rights of-way; no rights-of-ways would be granted in NSO areas unless there are no feasible alternatives.
- Major constraints could also include areas where overlapping moderate constraints would severely limit development of fluid mineral resources.

Closed: These are areas where it has been determined that other land uses or resource values cannot be adequately protected with even the most restrictive lease stipulations; appropriate protection can be ensured only by closing the lands to leasing.

Non-energy Leasables

Open areas**:** areas open to non-energy leasables (these areas are still subject to mitigation and RMP objectives).
Closed areas**:** areas closed to non-energy leasables due to protection of natural resources within the planning area.

Mineral Materials

Open areas**:** areas open to mineral material disposal (these areas are still subject to mitigation and RMP objectives).

Closed areas**:** areas closed to mineral material disposal due to protection of natural resources within the planning area.