United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
Eastern Washington Field Office
11103 East Montgomery Drive
Spokane Valley, Washington 99206

In Reply Refer To:
01EWFW00-2015-F-0610

Memorandum

To: Chief, Division of Consultation and Conservation Planning, Ecological Services, Portland, Oregon

From: Supervisor, Eastern Washington Fish and Wildlife Office, Spokane, Washington

Subject: Biological Opinion and Conference Opinion addressing Service Approval of a General Conservation Plan for Multiple Species in Douglas County, Washington

This memorandum transmits the U.S. Fish and Wildlife Service's (Service or USFWS) Biological Opinion and Conference Opinion (collectively, Opinion) based on our review of the Service's proposed approval of the Douglas County Multiple Species General Conservation Plan (MSGCP) covering agriculture lands in Douglas County, Washington. The term of the MSGCP is 50 years. The Opinion responds to your April 22, 2015, memorandum requesting formal consultation with this office. A general conservation plan facilitates an efficient process and comprehensive analytical basis for future issuance of Endangered Species Act section 10 incidental take permits (ITPs) for specific actions that meet the standards of the MSGCP. The attached Opinion was prepared pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA).

The MSGCP addresses three unlisted and one listed covered species. The listed species is the endangered Columbia Basin distinct population segment of the pygmy rabbit (*Brachylagus idahoensis*). The attached Opinion includes determinations that the proposed action is not likely to jeopardize the continued existence of the Columbia Basin pygmy rabbit or any of the other three covered species. The Opinion is based on information provided in the draft MSGCP, the draft Environmental Assessment for this action, and other sources of information cited herein. A complete decision record of this consultation is on file at the Service's Eastern Washington Field Office in Spokane, Washington.

If you have any questions or concerns regarding this matter, please contact me or Michelle Eames at (509) 893-8010.

Attachment

Endangered Species Act - Section 7 Consultation

BIOLOGICAL OPINION
and
CONFERENCE OPINION

U.S. Fish and Wildlife Service Reference:
01EWFW00-2015-F-0610

For the

Future Issuance of Multiple

Section 10(a)(1)(B) Incidental Take Permits

Under the

Douglas County Multiple-Species General Conservation Plan

Douglas County, Washington

Federal Action Agency:

U.S. Fish and Wildlife Service

Conducted By:

U.S. Fish and Wildlife Service
Washington Fish and Wildlife Office

for Patricia Cole
Eric V. Rickerson, State Supervisor
Washington Fish and Wildlife Office

8/28/2015
Date

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LIST OF ACRONYMS AND ABBREVIATIONS USED

Act	Endangered Species Act
ALI	Arid Lands Initiative
AMMP	Adaptive Management and Monitoring Plan
BCA	Boardman Conservation Area
BLM	Bureau of Land Management
BMP	Best Management Practices
BNWSTF	Boardman Naval Weapons Systems Training Facility
CAP	Conservation Action Planning
CBPR	Columbia Basin Pygmy Rabbit
CFR	Code of Federal Regulations
CICG	Climate Impacts Group
CO	Conference Opinion
CO_2	Carbon Dioxide
County	Douglas County
COT Report	Conservation Objectives Team Report
COT	Conservation Objectives Team
CP	Conservation Practices
CRP	Conservation Reserve Program
DPS	Distinct Population Segment
EA	Environmental Assessment
ESA	Endangered Species Act of 1973, as amended (16 U.S.C. l531 *et seq.*)
EWFO	Eastern Washington Field Office
EQIP	Environmental Quality Incentives Program
FCCD	Foster Creek Conservation District
FR	Federal Register
Gap data	Data from Washington Gap Analysis Project
GCP	General Conservation Plan
GIS	Geographic Information System
ha	Hectare
HCP	Habitat Conservation Plan
HCA	Habitat Conservation Area (TNC, BLM, and WDFW lands)
HSI	Habitat Suitability Index
IPCC	Intergovernmental Panel on Climate Change
ITP	Incidental Take Permit
km^2	square kilometers
MSCCAA	Multi Species CCAA with Three Mile Farms and others
MSGCP	Douglas County Multiple Species General Conservation Plan
NMFS	National Marine Fisheries Service
NRCS	Natural Resource Conservation Service
NWF	National Wildlife Federation
ODFW	Oregon Department of Fish and Wildlife
Opinion	Biological Opinion and Conference Opinion
PAC	Priority Area for Conservation

PCE	Primary Constituent Element
RMS	Resource Management Plans
SAFE	State Acres for Wildlife Enhancement
Service	U.S. Fish and Wildlife Service
SGI	Sage Grouse Initiative
SHA	Safe Harbor Agreement
SMU	Sage-grouse Management Unit
TNC	The Nature Conservancy
WAFWA	Western Association of Fish and Wildlife Agencies
WDFW	Washington Department of Fish and Wildlife
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WHCWG	Washington Wildlife Habitat Connectivity Working Group
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington State Department of Ecology
YTC	Yakima Training Center

INTRODUCTION

This document represents the U.S. Fish and Wildlife Service's (Service), biological opinion and conference opinion (collectively, Opinion) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA) on the proposed approval of the Douglas County Multiple-Species General Conservation Plan (MSGCP). The term of the MSGCP is 50 years. The MSGCP formalizes actions resulting in "good stewardship" of private agriculture and ranching lands and conservation of covered species in Douglas County, Washington. The good stewardship measures are added to a County baseline condition which includes protected or managed habitats on Washington Department of Fish and Wildlife (WDFW), Bureau of Land Management (BLM), and The Nature Conservancy (TNC) lands in the County. The MSGCP facilitates an efficient process and comprehensive analytical basis for future issuance of Endangered Species Act section 10 incidental take permits (ITPs) for specific actions that meet the standards of the MSGCP. The Service's Pacific Regional Office memorandum requesting formal consultation on the proposed action was received on April 22, 2015.

The Opinion is based on information provided in the draft MSGCP, the draft Environmental Assessment for this action, and other sources of information cited herein. A complete decision record of this consultation is on file at the Service's Eastern Washington Field Office in Spokane, Washington.

The MSGCP addresses potential incidental take of four covered species of which only the Columbia Basin distinct population segment of the pygmy rabbit (*Brachylagus idahoensis*) (CBPR) is listed at this time. The three unlisted covered species are the Greater sage-grouse (*Centrocercus urophasianus*), Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*), and the Washington ground squirrel (*Spermophilus washingtoni=Urocitellus washingtoni*).

The Service shall issue individual incidental take permits under the MSGCP if the following criteria are met in accordance with 16 U.S.C. §1539(a)(2)(A):

1. The taking will be incidental. All taking of listed wildlife species as detailed in the HCP must be incidental to otherwise lawful activities and not the purpose of such activities.
2. The applicant will, to the maximum extent practicable, minimize and mitigate the impact of such taking. Under this criterion, the USFWS will determine whether the mitigation program the applicant proposes in the HCP meets statutory requirements.
3. The applicant will ensure adequate funding for the HCP. Funding sources and levels proposed by the applicant must be adequate to meet the purposes of the HCP.
4. The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild. This criterion involves the effects of the project on the likelihood of survival and recovery of affected species.
5. The applicant will ensure that other measures that the USFWS may require as being necessary or appropriate will be provided. This criterion gives the USFWS flexibility to require additional measures as a condition of the permit as necessary or appropriate among many different proposals affecting many different species.

The bull trout (*Salvelinus confluentus*), designated critical habitat for the bull trout, gray wolf (*Canis lupus*), and Ute Ladies' tresses (a plant-*Spiranthes diluvialis*), may occur in the project area, but the effects to those species are expected to be insignificant or discountable, and they are addressed through the informal consultation process (see Concurrences section below).

CONSULTATION HISTORY

Since 1999 the Service has provided technical and policy assistance to the Foster Creek Conservation District, the South Douglas Conservation District, consultants, and stakeholders in development of the MSGCP. During development, preliminary drafts were distributed to the Service for review and comments. The WDFW, TNC, BLM, the Natural Resource Conservation Service (NRCS), and other entities were involved in MSGCP development and reviewed early versions of the MSGCP (for more detail on development of the MSGCP, see Appendix C in the MSGCP). Earlier versions of the MSGCP included different permit issuance processes, and more covered species. The final version is a programmatic HCP (also known as a General Conservation Plan; GCP) and it provides coverage for four species.

The Service published a Notice of Availability of the draft MSGCP in the Federal Register (79 (220):68289) on November 14, 2014. A 60-day public comment period ended on January 13, 2015. The Service and Foster Creek Conservation District (FCCD) prepared a final MSGCP and EA in May 2015. The Chief of the Service's Division of Consultation and Habitat Conservation Planning in Portland, Oregon, requested formal consultation on the proposed issuance of future permits on April 22, 2015.

This BO is based on the final 2015 MSGCP and EA, and several years of discussion and negotiations with the FCCD and other stakeholders. A complete record of this MSGCP and BO is on file in the Service's Eastern Washington Fish and Wildlife Office in Spokane, Washington.

CONCURRENCES

The proposed action is described in more detail in the Description of the Proposed Action section of the biological opinion, below. In summary, a General Conservation Plan (GCP) is a type of programmatic habitat conservation plan (HCP) under which multiple Section 10 permits can be issued. The MSGCP covers many agricultural activities in Douglas County, Washington, including dryland farming, ranching, and limited irrigated farming. This MSGCP provides land management guidance for protecting four federally listed and unlisted wildlife species (covered species) over approximate 879,000 acres of private lands for the next 50 years. For individual applicants, the Douglas County MSGCP will ensure development of farm plans and GCP site plans that provide Best Management Practices (BMPs) to minimize and mitigate the effects to covered species. BMPs include NRCS conservation practices (such as erosion measures), activity-specific measures (such as livestock grazing standards), and species-specific measures (such as disturbance restrictions around sage-grouse leks).

Bull Trout

Status

The Columbia River Distinct Population Segment of the bull trout was listed as threatened by the USFWS under the ESA in 1998, and the coterminous United States population of the bull trout (*Salvelinus confluentus*) was listed as threatened on November 1, 1999 (64 FR 58910). A Draft Bull Trout Recovery Plan was published in 2002 (USFWS 2002). The Service published a Revised Draft Recovery Plan for the Coterminous U.S. Population of Bull Trout on Sept. 4, 2014. The Revised Draft Recovery Plan updates the recovery criteria proposed in the 2002 and 2004 draft recovery plans to focus on effective management of threats to bull trout, and de-emphasizes achieving targeted population numbers of adult bull trout in specific areas. Draft recovery unit implementation plans were published on June 4, 2015.

Bull trout occur in British Columbia, Washington, Idaho, Western Montana, Oregon, and Northern Nevada. Bull trout have complex life histories (Cavender 1978), and two life-history forms in eastern Washington: resident and migratory. Anadromous life-history forms are also found nearer the Pacific Coast. Resident bull trout use small headwater streams and remain there during their entire life. Migrants also use tributary streams for several years, then migrate into larger rivers or lakes, and return to tributary streams to spawn. Bull trout typically spawn during fall, when water temperatures decrease to 41-48°F. Bull trout eat terrestrial and aquatic insects, zooplankton, mysids (a type of small crustacean), and other fish species. Competition with introduced fish may cause reductions in bull trout populations. Introduced trout species offer significant competition in some streams and lakes. Brook trout use some of the same habitat for spawning and feeding, making hybridization a problem, particularly with isolated populations of resident bull trout.

Life History and Habitat

Bull trout have more specific habitat requirements than other salmonids (Reiman and McIntyre 1993). Migrants live part of their life in many types of river systems and/or lakes; however, spawning, rearing, and resident fish mostly occur in small to large tributary streams. They prefer areas of channel and hydrologic stability to support the low temperatures, clean gravels, complex cover, and habitat diversity required for spawning and rearing. Changes in habitat conditions that increase water temperature or decrease water quality and channel complexity may favor competing species.

Baseline

Migratory bull trout exist in the Columbia River with possible foraging, migration, or overwintering use in connecting reaches of lower Foster Creek, and lower Rock Island Creek. Within the action area, bull trout are known to use the mainstem Columbia River for foraging, migration, and overwintering habitat, and therefore may use the lower reaches of Foster Creek and Rock Island Creek opportunistically for foraging when temperatures are hospitable. There are no spawning or rearing habitats in Foster Creek, Rock Island Creek, or anywhere else in Douglas County. Covered Activities primarily occur in the upland areas. Irrigation activities from the Columbia River are not covered, while irrigation from groundwater or surface water in areas without bull trout may be covered. Within drainages to Foster Creek and Rock Island

Creek where salmonids, including bull trout, may be seasonally present, BMPs implemented into Farm Plans will reduce sedimentation, limit access to streambanks, and minimize water quality impacts to most streams within the action area.

In general, agricultural production has the potential to largely impact both terrestrial and aquatic habitats. Dryland farming can significantly alter runoff and erosion rates to streams, as well as impact functions of riparian areas. Grazing can result in vegetation changes, habitat alterations, and increased sediment to streams. Both dryland and irrigated farming require lands to be cleared of native vegetation, increase sedimentation in nearby waterbodies, and introduce pesticides, herbicides, and nutrients to aquatic systems. Irrigation of agricultural lands can reduce water quantity within streams, affecting stream temperatures and reducing habitat availability to fish. Ranching has similar impacts to aquatic habitats from loss of riparian buffers and vegetation, increased sedimentation, and water quality impacts from livestock waste. Under the MSGCP, dryland farming, grazing, and irrigated farming will continue. Therefore, bull trout within the action area may be affected by the implementation of the MSGCP. However, BMPs and Conservation Practices will be implemented to minimize the potential for impacts to listed aquatic species. Covered Activities include actions related to irrigation from ground water sources and from surface water sources only on portions of creeks, tributaries, and lakes where those portions of the water bodies do not contain anadromous salmon, steelhead, or bull trout. Covered Activities do not include irrigation water obtained from the mainstem Columbia River, or water piped into Douglas County from the Wenatchee River. Pesticide use is also not a covered activity. Therefore, the agricultural activities with higher likelihood of adversely affecting bull trout in Douglas County are not Covered Activities.

The challenge with this MSGCP is that it is a programmatic approach, and we don't know which farmers/ranchers will join, how many farmers/ranchers will join, or where their enrolled property will occur on the ground. There may be only a few farmers/ranchers, or there may be as much of 50 percent of the potentially covered agriculture land. For the Applicants who apply for and receive permits, effects from ongoing farming and ranching activities will be minimized. To minimize impacts to waterbodies, Applicant's Farm Plans and GCP Site Plans will address cropping design, vegetative treatments, and erosion control practices to improve soil quality and reduce soil loss. The MSGCP farm and site planning process will include range management practices, such as adequate fencing and herd management strategies to minimize access to streams and riparian areas. Proper grazing management will improve riparian vegetative communities within areas that are currently degraded. Farm Plans will also address forage improvement and protection, erosion control practices, and prescribed grazing to develop the proper tools for comprehensive animal management. Implementation of BMPs is expected to reduce indirect sediment and hydrologic effects to bull trout habitats.

Surface water and groundwater quantity is not likely to change, as irrigation from the Columbia River or the Wenatchee River is not a covered activity, and other irrigation that is covered by the MSGCP is likely to continue in similar locations and amounts as currently used. Most existing water rights within Douglas County are from groundwater and spring sources (Ecology 2015). The BOR holds the primary surface water right in the region. Limitations by BOR to release water withdrawals on pending applications will reduce the potential for new withdrawals in the action area. Currently, there are few (two) applications for water withdrawals in the Foster or

Rock Island Creek drainages, where bull trout may be impacted by changes to instream flows (Ecology 2015). Irrigation water from streams and rivers at locations where salmonids are present (i.e.: below the barriers on Rock Island or Foster Creek) are not Covered Activities under the MSGCP. Furthermore, the MSGCP includes requirements to monitor Conservation Reserve Program (CRP) and State Acres for Wildlife Enhancement (SAFE) and other similar Farm Bill program lands across the County. While these land quantities could decrease by as much as 10 percent or more, if they can't be brought up above the 10 percent level within two years this will trigger an evaluation of the continued adequacy of the MSGCP, and in the worst case could result in revoked permits. There is a similar requirement to monitor quantities of TNC, WDFW, and BLM lands; however, these lands are likely to continue to be maintained in natural habitats. Because of these requirements, coupled with the BMPs implemented on potential Applicants lands, there are unlikely to be large scale conversions of habitat in Douglas County under the MSGCP. On enrolled lands terrestrial habitats are likely to improve, resulting in less erosion and better buffers to sediment movement. Implementation of the MSGCP may have minor benefits bull trout within the action area. As applicants sign up for coverage under the MSGCP, reduced erosion, improved soil conditions, reduced access to streams and improved riparian buffers will occur.

In summary, the proposed action may affect bull trout because agricultural practices increase sedimentation, erosion, and riparian vegetation loss; agricultural practices reduce water quality and habitat and bull trout may be exposed to the effects of these activities in the Columbia River and infrequently in the lower reaches of Foster and Rock Island Creeks below natural barriers at RM 1.02 and RM 0.52 respectively. However, the proposed action is not likely to adversely affect bull trout because: 1) most streams within the action area and where Covered Activities are most likely to occur do not support bull trout, 2) irrigation withdrawals covered by the MSGCP will only occur from ground waters or surface water in locations where bull trout do not occur; 3) implemented BMPs on covered lands will reduce erosion, sedimentation, and water quality impacts with either indirect or direct effects to streams containing bull trout. Therefore, effects to the bull trout are likely to be insignificant, and the Service concurs that the action is not likely to adversely affect the bull trout.

Bull Trout Critical Habitat

In 2005, the USFWS designated final bull trout critical habitat (70 FR 56212 [September 26, 2005]), and in 2010 the USFWS revised critical habitat for the bull trout (75 FR 2270 [January 14 2010]). The revision included critical habitat for forage, migration, and overwintering in the mainstem of the Columbia River along the boundary of Douglas County and up-stream to Chief Joseph dam. The effects to each Primary Constituent Element (PCE) are described below.

1. Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.

> Only the mainstem Columbia River is designated as critical habitat in Douglas County, and irrigation from the Columbia River is not a covered activity. While some limited irrigation from ground water and surface water in will be covered under the MSGCP, the indirect effects to this PCE in the Columbia River will be so small as to be insignificant.

2. Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

The proposed action would have no effect on migration habitats in the Columbia River.

3. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

The proposed action would have no effect on the food base in the Columbia River.

4. Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.

It is possible that a farmer on the Columbia River may join the MSGCP, but it is unlikely since most of the farming along the Columbia River is irrigated farming from the Columbia River that would not be a covered activity. Nonetheless, if a non-irrigating farmer or rancher joined the MSGCP, implementation of BMPs for riparian areas (See Appendix E of MSGCP, p. E-8) would reduce the effects to PCE 4 to an insignificant level.

5. Water temperatures ranging from 2 °C to 15 °C (36 °F to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

The proposed action will have no effect on water temperatures in the Columbia River.

6. In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.

There are no spawning or rearing areas in Douglas County as a result of the proposed action; therefore there would be no effect to this PCE.

7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.

There will be no change to the natural hydrograph of the Columbia River as a result of the proposed action; therefore there will be no effect to this PCE.

8. Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

> There may be effects to water quality due to Covered Activities under the MSGCP through agricultural practices and sediment movement and transport. To minimize impacts to waterbodies, Applicant's Farm Plans and GCP Site Plans will address cropping design, vegetative treatments, and erosion control practices to improve soil quality and reduce soil loss. The MSGCP farm and site planning process will include range management practices, such as adequate fencing and herd management strategies to minimize access to streams and riparian areas. Proper grazing management will improve riparian vegetative communities within areas that are currently degraded. Farm Plans will also address forage improvement and protection, erosion control practices, and prescribed grazing to develop the proper tools for comprehensive animal management. Implementation of BMPs is expected to reduce indirect sediment and hydrologic effects to bull trout habitats. Therefore, the proposed action will have insignificant or beneficial effects on water quality in the Columbia River because implemented BMPs on covered lands will reduce erosion, sedimentation, and water quality impacts.

9. Sufficiently low levels of occurrence of non-native predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

> There will be no change in the occurrence of non-native predators in the Columbia River as a result of the proposed action.

For the reasons listed above, the Service concurs that the proposed action may affect, but is not likely to adversely affect, designated critical habitat for the bull trout.

Ute Ladies'-tresses (*Spiranthes diluvialis*)

This Federally threatened plant is known from 8 states: Nevada, Utah, Colorado, Idaho, Nebraska, Wyoming, Montana, and Washington. Within Washington, it is known to occur in north- central Washington in Okanogan and Chelan Counties (Camp and Gamon 2011, p. 342), including one site near the Columbia River in Chelan County, across from Douglas County. Ute Ladies' tresses occurs in low-elevation intermountain valley plains with meandered wetland complexes; and in temporarily inundated wet meadow zones and swales with stable subsurface moisture and relatively low vegetation cover. Because the plant is most likely to occur in wetland complexes on the edge of the Columbia River and in habitats that are unlikely to be changed by the Covered Activities addressed in the MSGCP, the Service concurs that the issuance of a section 10(a)(1)(B) permit for the MSGCP is "not likely to adversely affect" the Ute ladies' tresses.

Gray Wolf (*Canis lupus*)

Wolves were classified as an endangered species in Washington under the provisions of the Endangered Species Act (ESA) in 1973. In Washington, the gray wolf is federally listed as

endangered in most of the State, but those individuals and packs in eastern Washington that are part of the Northern Rocky Mountain DPS of the gray wolf have been delisted. Gray wolves that occur in Washington west of the centerline of Highway 97 and Highway 17 north of Mesa, and that portion of Washington west of the centerline of Highway 395 south of Mesa are federally listed as endangered, and the USFWS has lead management authority (Figure Z). The gray wolf was classified as endangered by Washington State law in 1980. The WDFW has lead management authority for the gray wolf elsewhere within the State where it is not federally listed.

Figure 1. Federally Endangered and Delisted Gray Wolf Areas in Washington.
(From Martorello and Simek 2015, in litt, p. 6)

The USFWS recently proposed to delist the gray wolf nationwide (June 13, 2013, Federal Register; 78 FR 35663-35719) except for the Mexican wolf, which would remain endangered as a subspecies (*Canis lupus baileyi*).

The WDFW developed a Wolf Conservation and Management Plan (Washington Wolf Plan; Wiles et al. 2011, entire) for Washington State with the assistance of a 17-member advisory citizen Wolf Working Group. After public review and peer review, the Washington Wolf Plan was adopted by the Washington Fish and Wildlife Commission in 2011. The plan guides recovery of wolves as they naturally re-establish a sustainable population across the state, and authorizes management tools to address conflicts with livestock and other wildlife. All aspects

of the Washington Wolf Plan are in effect where wolves were removed from federal protection in May 2011 (including the northeast end of Douglas County). In the rest of Washington (and much of Douglas County), portions of the Washington Wolf Plan that are consistent with federal law are in effect, until or unless wolves are delisted under the ESA. The Service and WDFW will continue to coordinate on gray wolf management within the listed portion of Washington.

The Washington Wolf Plan (Wiles et al. 2011) establishes a delisting objective of 15 breeding pairs of wolves that are present in the state for at least three years, with certain regional distribution objectives. A variety of conservation strategies and management tools will be implemented under the Washington Wolf Plan while gray wolves remain state-listed in Washington. These are outlined in Chapter 12 of the Washington Wolf Plan, with strategies and tasks identified. They include: (1) develop and implement a program to monitor the population status, trends, and conservation and management needs of wolves in Washington; (2) protect wolves from sources of mortality and disturbance at den sites; (3) translocate wolves within Washington, if needed, to help achieve recovery objectives; (4) develop and implement a comprehensive program to manage wolf-livestock conflicts in cooperation with livestock producers; (5) manage ungulate populations and habitats in Washington to provide an adequate prey base for wolves and to maintain harvest opportunities for hunters; (6) manage wolf-human interactions to reduce human safety concerns, prevent habituation of wild wolves, decrease the risk of conflicts between domestic dogs and wolves, and to build awareness of the risks posed by wolf hybrids and pet wolves; (7) maintain and restore habitat connectivity for wolves in Washington; (8) manage conflicts between wolves and state and federal listed/candidate species; (9) develop and implement a comprehensive outreach and education program; (10) coordinate and cooperate with public agencies, landowners, tribes, and nongovernmental organizations to help achieve wolf conservation and management objectives; and, (11) conduct research on wolf biology, conservation, and management in Washington.

Gray wolves are habitat generalists in that they can use a wide array of habitat types. However, there are a several biological and behavioral characteristics of the gray wolf that largely dictate where populations can persist successfully. Based on these characteristics, key components of gray wolf habitat that appear consistent across the diversity of landscapes inhabited by listed and delisted gray wolves include the following: (1) a sufficient year-round prey base of ungulates and alternate prey; (2) suitable and somewhat secluded denning and rendezvous sites; and (3) sufficient space with minimal exposure to humans (USFWS 1987, pg. 7). The gray wolf appears to be most vulnerable to human disturbance in and around denning and rendezvous sites (USFWS 1987, pg. 73). The gray wolf is most susceptible to human-caused mortality in habitats that are highly influenced by humans and have insufficient cover. Wolves typically den in the spring and, after a natal period, will use rendezvous sites to meet and care for young. These sites are typically far from human disturbance.

Oakleaf et al. (2006; WDFW 2011 p. 50) looked at potential wolf habitat in Idaho, Montana, and Wyoming, relative to roads accessible to two-wheel and four-wheel vehicles, topography (slope and elevation), land ownership, relative ungulate density, cattle and sheep density, vegetation characteristics, and human density. From that analysis, they concluded, and the Service (73 FR 10514-10560) concurred, that the four primary factors related to wolf occupancy and persistence were: 1) forest cover, 2) human population density, 3) elk density, and 4)

domestic sheep density. Higher forest cover and elk density increased the probability of occupancy and persistence, whereas higher human and sheep densities decreased the probability of occupancy and persistence. Based on observations and experience from Idaho, Montana, and Wyoming during the past 20 years (Bangs et al. 2004, USFWS et al. 2011) the types of habitat not suitable for wolves include non-forested rangeland and croplands associated with intensive agricultural use (Wiles et al. p. 54). This unsuitability is due to high rates of wolf mortality, high densities of livestock compared to wild ungulates, repeated conflict with livestock, local cultural intolerance of large predators, and wolf behavioral characteristics that make them vulnerable to human-caused mortality in open landscapes (73 FR10514-10560).

Wolves are expected to persist in habitats with abundant ungulates, lower livestock use, and few potential human conflicts. These locations include national forests, national parks, wilderness areas, national recreation areas, designated roadless areas on public lands, and areas with low densities of open roads. Wolves will likely follow their prey to lower elevations during the winter in some areas. Wiles and others (2011, pp. 51-54) summarized five models that display that the best habitats for gray wolf in Washington; the models varied in in approach, data layers that were used, and in predictions of amounts of potentially suitable wolf habitat in the state, but most were consistent in predicting suitable habitat in northeastern Washington, the Blue Mountains, the Cascade Mountains, and the Olympic Peninsula; and most were consistent in not expecting suitable wolf habitat in the drier parts of the Columbia Basin in Washington. This does not mean that they could not occur in areas such as the Columbia Basin, but they are unlikely to persist and breed (Wiles et al. 2011, p. 54). Consequently, although a few wolves could potentially occupy the intensive agriculture areas in the Columbia Basin in Washington as the species expands its range within the state, the likelihood of them persisting and establishing a viable breeding population in the action area is low (Wiles et al. 2011, p. 54). Transient or dispersing wolves may move through Douglas County but established packs are unlikely to occur.

The Federally endangered gray wolf was historically found in Douglas County, but by the 1930's, the species had largely been extirpated in Washington State. The line separating the endangered and un-listed portion of the wolf in Washington runs through Douglas County; the northeast end of the County is within the unlisted area (Figure Z, above). Although reported infrequently from adjacent areas and from within Douglas County, there are no confirmed packs of wolves currently in the County (Figure 1).

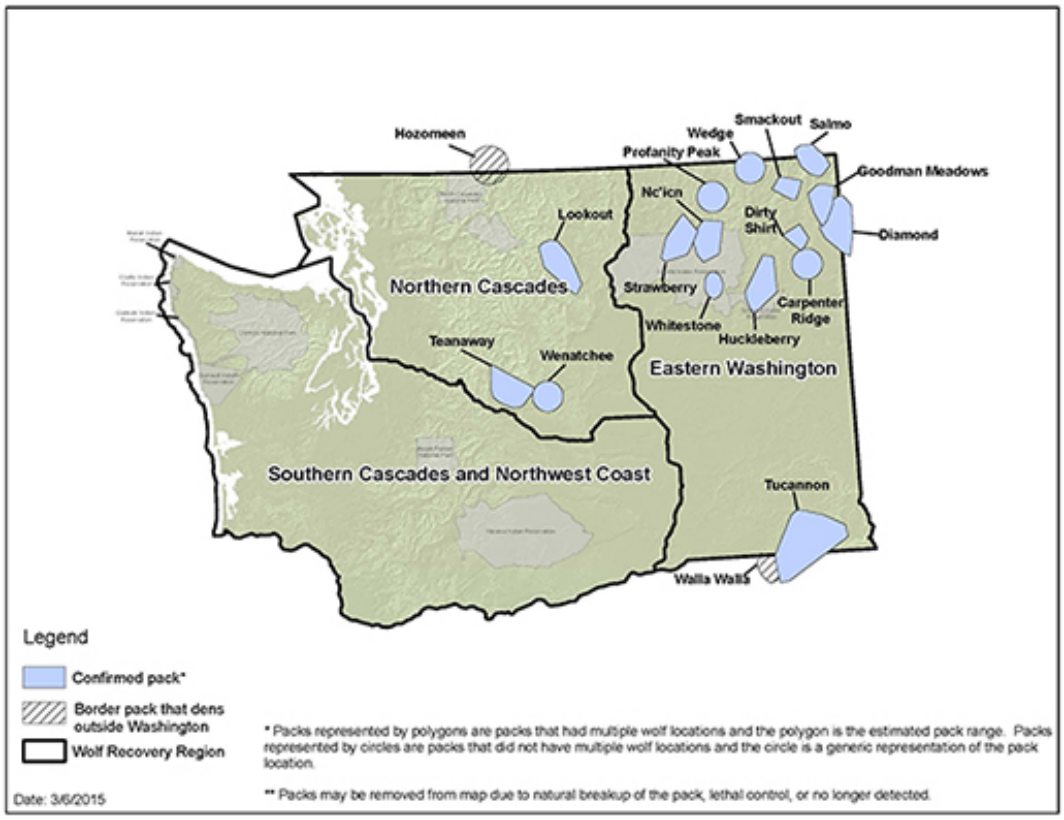

Figure 2. Known wolf packs and pack territories in Washington as of March 6, 2015. (http://wdfw.wa.gov/conservation/gray_wolf/).

The Service conducted a formal section 7 consultation (USFWS 2014) with Wildlife Services, Animal and Plant Health Inspection Service, U.S. Department of Agriculture on various animal damage and animal control activities in Washington. The proposed action included some activities which may cause adverse effects to gray wolves, such as: 1) control efforts aimed at other predators (such as coyotes, bears or cougars) resulting in indirect effects to the gray wolf (for example through injury), and 2) control efforts aimed specifically at federally listed wolves including hazing, capturing or relocating gray wolves either for collection of biological information on the species (such as radio-tracking) or due to the need to respond to repeated livestock depredation events.

As described in Wiles et al (2011 pp. 72-76), wolves in other states have depredated on cattle, sheep, other livestock, and guarding/herding dogs. However, even with significant increases in wolf populations, losses to wolves are small in relation to livestock numbers. Many factors influence depredation rates on livestock, including distribution of wolf home ranges, dens, and rendezvous sites; pack size; abundance of natural prey and livestock; vegetative cover, time of year, livestock management methods, the use of non-lethal and lethal deterrents, pasture size; and proximity to roads, dwellings, and other human presence. Not all wolf packs depredate on livestock, and it is difficult to predict where and when depredations by wolves will occur (Wiles et al 2011 p. 73; USFWS et al 2011).

Wolf populations are likely to expand during the 50-year duration of the MSGCP, and individuals may disperse through Douglas County. However, there are few areas with minimal human presence that will provide secluded areas and cover for den or rendezvous sites. Some prey, such as deer, and a few moose are present, but not concentrated sources of prey to support gray wolves year-round. Therefore, while gray wolves may disperse through Douglas County, they are unlikely to den in the County, and the best potential habitat for wolves in Washington is in areas outside of Douglas County (Wiles et al 2011 p. 51-54). If depredations occur in the non-listed area of Douglas County, the WDFW will work with the landowner to implement management tools consistent with the Washington Wolf Plan (Wiles et al. 2011). If depredations occur in the listed area of Douglas County, WDFW, the Service, and other cooperators such as Wildlife Services will work together to implement non-lethal management tools to reduce the likelihood of future depredations.

As stated above, endangered wolf populations may expand during the 50-year duration of the MSGCP, and individuals may disperse through Douglas County, but there are few areas with minimal human presence that provide secluded areas and cover for den or rendezvous sites. Some prey, such as deer, and a few moose are present, but not concentrated sources of prey to support gray wolves year-round. Therefore, while gray wolves may disperse through Douglas County, they are unlikely to den in the County, and the best habitat for wolves in Washington over the long term is predicted to be outside Douglas County (Wiles et al. 2011, pp. 51-54).

Gray wolves will sometimes prey on livestock, including cattle and sheep, but the likelihood of this occurring will be the same whether or not permits are issued under the MSGCP. The MSGCP may change how livestock are grazed through implementation of Best Management Practices including livestock management and grazing standards but implementation of the MSGCP and issuance of future permits is not expected to change the presence of livestock or the likelihood of livestock depredation by wolves in Douglas County.

Dispersing gray wolves are very mobile and unlikely to be disturbed or harmed from ongoing farming activity. The effects of permit issuance in Douglas County are anticipated to be insignificant. Gray wolf denning and rendezvous sites are unlikely to be exposed to activities conducted under the MSGCP. Therefore, the Service concurs that the issuance of future section 10(a)(1)(B) permits under the MSGCP is “not likely to adversely affect” the gray wolf.

BIOLOGICAL OPINION COLUMBIA BASIN PYGMY RABBIT

DESCRIPTION OF THE PROPOSED ACTION

The federal action is the issuance of future section 10(a)(1)(B) permits for the Douglas County Multiple-Species General Conservation Plan. Under the MSGCP, private agricultural lands in Douglas County would be managed to maintain or improve healthy functioning ecosystems while providing for agricultural production. This is a programmatic approach, and individual farmers or ranchers may join the MSGCP voluntarily. If the MSGCP is approved as meeting the issuance criteria, individual applicants will work with the FCCD to develop a Farm Plan. A site-specific Farm Plan and GCP site plan will be completed by the Applicant, their appointee, or the FCCD. The FCCD and the Service will review the Farm Plan/site plan to ensure consistency

with the MSGCP. The Farm Plan/site plan will provide a description of on-going and planned agricultural activities for included lands, and will be very similar to a NRCS Conservation Plan. The Farm Plans/site plans will include Best Management Practices (BMPs), starting with NRCS Conservation Practices (typically general good stewardship practices, listed in the MSGCP Appendix E, Table E-2), and then adding additional land-use-specific measures or species-specific measures in certain situations, as needed based on Covered Activities and site-specific conditions.

Appendix E of the MSGCP describes additional measures (see Appendix E of MSGCP for detail) to be applied to all covered agriculture activities, including measures addressing the following land use categories and activities:

- riparian areas
- wildfire management,
- recreation use,
- maintenance of habitat remnants, and
- pest management and weed management.

Additional measures to be applied to dryland agriculture include measures addressing the following topics:

- conversion of conservation cover to active farming, and
- erosion.

Additional measures to be applied to rangeland agriculture include measures addressing the following topics:

- grazing guidelines,
- riparian use, and
- watering sites, supplement sites, and livestock concentrations.

Additional measures to be applied to irrigated agriculture include measures addressing the following topics:

- adjacent habitat,
- lead-contaminated soils, and
- food attractants to wildlife.

Species-specific measures will be addressed during farm planning based on occupancy, habitat types present, soil depths, and locations in the County. These measures are listed in detail in Table E-3 (Appendix E of MSGCP) and include measures such 1) notification prior to converting CRP lands to allow the opportunity to move pygmy rabbits or Washington ground squirrels, 2) minimizing perches for predators, 3) minimizing fence clearing zones, 4) implementing seasonal restrictions for habitat conversion activities, 5) implementing additional grazing prescriptions, 6) implementing timing restrictions around leks, and other measures.

Implementation of these Farm Plans/site plans, coupled with the ongoing management of WDFW, BLM, and TNC lands in Douglas County (and expectations associated with CRP/SAFE acres), should result in improved habitats for the covered species over the term of the MSGCP. After Farm Plans are developed and approved by FCCD, the Applicant will apply for a permit,

and once public comment is received and consistency with the MSGCP and related decision documents is ensured, the Service will issue a Section 10 permit to the Applicant/Permittee. The proposed term of the MSGCP is 50 years. Individual permits issued under the MSGCP would be for 50 years or less, depending on when an Applicant applies for a permit. The FCCD commits to implementation and monitoring tasks as described in Chapter 4 and Appendix I of the MSGCP.

Lands Covered by the MSGCP

The MSGCP includes most agricultural lands in Douglas County, Washington, including dryland farming, ranching, and limited irrigated agriculture. Irrigated agriculture only includes actions related to irrigation from ground water sources and from surface water sources on portions of creeks, tributaries, and lakes where those portions of the water bodies do not contain anadromous salmonids or bull trout. Covered Activities do not include irrigated farming from irrigation water obtained from the mainstem Columbia River, or from piped water from the Wenatchee River. The MSGCP does not cover activities on private non-agricultural land within Douglas County (~148,761 acres or 60,202 hectares [ha]) and does not cover activities on Federal land or most other publicly owned land (~140,131 acres or 56,909 ha). The MSGCP may cover activities on non-federal lands leased for agricultural production to private operators (such as often occurs with Washington Department of Natural Resources land). Participation in the MSGCP is voluntary.

Because the MSGCP is a programmatic HCP, it is difficult to predict the specific location of future applicant land in Douglas County, and how many applicants will apply. The FCCD has recently worked with landowners in Douglas County to sign up for a voluntary conservation plan program with NRCS. The FCCD views this as a first step for farmers/ranchers who are potentially interested in developing a Farm Plan and GCP Site Plan and applying for a permit under the MSGCP. The FCCD estimates that about 160 landowners in Douglas County have non-orchard farming ground with activities that potentially fit the MSGCP, and so far 80-90 producers have signed up for the voluntary conservation plan program (Jon Merz, FCCD, in litt., April 2, 2015). Therefore, approximately 50 percent of the eligible landowners are showing initial interest in the MSGCP.

Working from information in United States Department of Agriculture (USDA) (2009), we calculate that there may be as many as 333 non-orchard farms in Douglas County, with an average size of 2,607 acres. The total non-orchard farm acres in Douglas County are estimated to be 868,217 (calculated from data in USDA 2009). Fifty percent is 434,108 acres. We also have information to break the acreage potentially enrolled in the MSGCP into farm type or habitat types. Douglas County supports approximately 539,531 acres (218,340 ha) of harvested cropland according to the Census on Agriculture (USDA 2009). Fifty percent of that acreage is 269,766 acres of crop land. We also determined that there are approximately 413,805 acres of shrub-steppe (shrubland, steppe and savanna systems based on 2010 Washington Gap data). Fifty percent of the shrub-steppe habitat would be 206,903 acres (83,730 ha) of habitat. The cropland estimate and shrub-steppe estimates do not add up to the total non-orchard farms due to different methods and sources used to develop the acreage estimates.

Approach to Conservation Lands (such as Conservation Reserve Program (CRP), State Acres for Wildlife Enhancement (SAFE), or similar lands)

The CRP offers annual rental payments and cost-share assistance to farmers to establish long-term conservation covers (e.g., grass and shrubs) on eligible land, as opposed to the typical winter wheat/ fallow rotation that involves harvesting and replanting. This is a multiple-use federally funded program designed to conserve soil and water and to provide wildlife habitat. Contracts are for a minimum of 10 years and a maximum of 15 years. The SAFE program is a type of CRP with contract lengths of 15 years. SAFE is focused on habitat enhancement for targeted species, and in Douglas County SAFE acres are targeted for greater sage-grouse and Columbian sharp-tailed grouse. The CRP and SAFE programs are Farm Bill programs administered by the Farm Service Agency, with the Natural Resource Conservation Service providing assistance. The Federal government pays a fixed dollar amount per acre to the farmer to keep that ground out of production, but maintained with an adequate cover crop and controlled for noxious weeds.

Acres enrolled in CRP and SAFE programs are important for the conservation of covered species in Douglas County. CRP and SAFE acres may change during the life of the MSGCP, and those changes may affect covered species. Over time, the acres may increase and decrease The Service expects that if conservation contracts such as CRP or other similar programs are not renewed, farmers enrolled in the MSGCP will agree to enroll in other available conservation programs. If no such programs are available, we expect that farmers will attempt to maintain the lands in conservation cover. However, CRP/SAFE acres may be farmed in the future. Due to their importance, the MSGCP requires that CRP/SAFE and other conservation acres be monitored across the County over time. Changed Circumstances #2 in Chapter 4 of the MSGCP states that FCCD will monitor to determine if there is a decrease of 10 percent or more of conservation contract acres or similarly protected acres (approximate starting point of 119,072 acres (48,186 ha) enrolled in CRP and 63,000 acres (25,495 ha) in SAFE for a total of 182,072 acres (73,681 ha) in June 2013), and whether additional acres to get above the 10 percent trigger can be protected within 2 years. The FCCD will prepare an assessment of the habitat changes, including lost habitat values, and would determine if mitigation of the lost habitats can be gained through existing programs or new programs, or through changes to farm plans or other conservation efforts. At that point, an analysis of loss and gain of Habitat Suitability Index (HSI)-acre values will be considered, and if acre quantities or HSI-acre quantities (see Appendix G in MSGCP) cannot be regained to get above the 10 percent trigger point, then the Service must revisit the MSGCP to determine if it still meets Section 10 issuance criteria and, if not, how and whether it can be revised. If it cannot be revised, then permits may be revoked.

CRP and SAFE acres in Douglas County may dip below a 10 percent change from June 30, 2013 numbers (182,072 acres) (as described in changed circumstances in the MSGCP) and stay at that point for as much as two years while the FCCD and other partners evaluate how to come up above the 10 percent change point. We assume that CRP acres may dip below 10 percent within a 2-year period, up to 6 times (based on estimated CRP contract renewal points, and

assuming 10-year renewal periods) during the 50-year term of the MSGCP. The following bullets describe the quantity and frequency of potential conversion.

- Total CRP /SAFE acres in the County as of June 2013 equals 182,072 acres (73,681 ha)
- Total farm acres in the County equals 883,094 acres (357,375 ha)(USDA 2009)
- Non-orchard farms in the County equals 868,217 acres (351,354 ha) (total farms minus 14,877 acres (6,020 ha) orchards)
- Total CRP SAFE acres in the County (182,072 acres)/ total non-orchard farm acres (868,278 acres (351318 ha)) equals 21 percent CRP/SAFE
- Per changed circumstances, CRP/ SAFE can drop below 10 percent of current levels for 2 year duration. Contract renewal points occur at years 2018, 2026, 2021, and we assume at 10-year renewal points thereafter, for a total of 6 times during the 50-year term of the MSGCP.
- 10 percent of 182,072 acres (73,681 ha) equals 18,207 acres (7,368 ha)
- Assuming up to half of the acreage is signed onto the MSGCP; 9,104 acres (3684 ha) of CRP/ SAFE may be converted and be associated with injury or mortality at 6 different 2-year periods during the life of the MSGCP.

Based on these assumptions and calculations, 9,104 acres of CRP/ SAFE may be converted and at 6 different occasions during the life of the MSGCP, for an estimated total of 54,612 acres (22,101 ha) of CRP/SAFE conversion over 50 years.

Approach to Other Reserved Lands

Only private agricultural lands of willing landowners are covered by the MSGCP but lands managed by other entities including WDFW, The Nature Conservancy, and the Bureau of Land Management, also benefit covered species in Douglas County. For the purposes of the MSGCP, these other reserved lands are referred to as "habitat conservation areas" (HCAs). Monitoring requirements described in Chapter 4 of the MSGCP ensure evaluation of changes to the HCA lands. While it is likely that these lands will continue with similar management, or may increase in size over time, the MSGCP includes a "changed circumstance" requirement (Chapter 4, Changed Circumstances #7). This changed circumstance requirement states that if there is a decrease of 10 percent or more in total HCA acres (2013 starting point of 92,002 acres (37,231 ha) BLM, TNC, and WDFW lands), then additional measures should be implemented to make up for the habitat quality or quantity loss. If the lost acres cannot be mitigated through additional quantity or quality protections, then the USFWS must revisit whether the MSGCP still meets issuance criteria and, if not, how and whether it can be revised, or whether Permits must be revoked.

Monitoring and Adaptive Management

The MSGCP includes adaptive management and monitoring plans to gauge the effectiveness of the MSGCP, to retain the ability to implement additional or alternative conservation measures, and to deal with changed or unforeseen circumstances. These are described in Chapter 4 of the MSGCP. Periodic monitoring and review at both the site-specific and county-wide level will be used to evaluate management objectives and techniques to better achieve MSGCP goals. The

monitoring process includes a county-wide HSI modeling effort that is also discussed in Chapter 4 of the MSGCP, and described in more detail in Appendix G of the MSGCP.

Covered Species

Table 1. Covered Species
(MSGCP 2015)

SPECIES	SCIENTIFIC NAME	STATUS
Columbia Basin DPS Pygmy Rabbit	*Brachylagus idahoensis*	Federal Endangered; State Endangered
Greater Sage-Grouse	*Centrocercus urophasianus*	Federal Candidate; State Threatened
Columbian Sharp-tailed Grouse	*Tympanuchus phasianellus columbianus*	Federal Species of Concern; State Threatened
Washington Ground Squirrel	*Urocitellus washingtoni*	Federal Candidate; State Candidate

Covered Activities

Covered Activities in the MSGCP (Appendix E in MSGCP) are those activities conducted by private landowners within Douglas County in the preparation of soil for crop production, the cultivation of crops, and the production and culture of animal products and fiber for human consumption, feed and/or sale as articles of trade or commerce. Covered activities include dryland, rangeland, and limited irrigated agriculture. Covered Activities include actions related to irrigation from ground water sources and from surface water sources only on portions of creeks, tributaries, and lakes where those portions of the water bodies do not contain anadromous salmon, steelhead, or bull trout. Covered Activities do not include agricultural activities reliant on irrigation water obtained from the mainstem Columbia River or on water piped into Douglas County from the Wenatchee River.

It is generally our policy (per Region 1 memorandum of July 27, 1998) to not cover pesticide or herbicide applications under section 10(a)(1)(B) Permits. Exceptions were made for those HCPs that addressed this topic and were submitted to us before July 27, 1998, or if the applicant could provide sufficient detail to fully evaluate the impacts of the pesticides and herbicides on the covered species. Pesticide or herbicide use is not a proposed covered activity under the MSGCP. Nonetheless, voluntary measures to minimize effects from pesticides are provided in Appendix E of the MSGCP.

Conservation Measures

The MSGCP requires development of farm plans which are the same or similar to NRCS Resource Management Plans (RMS) or Conservation Plan, and adds additional measures (described in a GCP site plan) as needed for certain agriculture activities and for certain species or habitat types. The farm planning process and Best Management Practices (BMPs) are described in Chapter 3 and Appendix E of the MSGCP. BMPs are general in nature and are actions that benefit the covered species and habitat in general, and include Conservation Practices, and additional land-use and species-specific measures. Conservation Practices (CPs) are specific guidelines of the NRCS, such as Contour Buffer Strips. Other BMPs include land-use measures (such as "maintain remnant patches of shrub-steppe) and species-specific measures (such as "schedule essential spring-time agricultural activities near sage grouse leks to occur early or the late in the day"). The CPs, land use specific measures, and species-specific measures are described in detail in Appendix E of the MSGCP.

Summary of the MSGCP Process

The MSGCP will be a programmatic HCP. If the MSGCP is approved, individual voluntary applicants will work with the FCCD or other entity to develop a Farm Plan. Each site-specific Farm Plan will be completed by the Applicant, their appointee, or the FCCD. Farm plans and GCP site plans that spell out the Covered Activities and BMPs will be a required component of individual ITP applications.

Implementation of the MSGCP includes the following steps (excerpted from Appendix E in MSGCP):

1. Develop a Farm Plan using the RMS or similar process (see below, and Appendix H), and use the GCP Site Plan Checklist (Appendix B). An existing farm plan, including one developed under the Sage Grouse Initiative may be used as a starting point.
2. Determine conservation practices to implement in the Farm Plan (Appendix E). Farm Plans and CPs result in improved habitats, but many species need additional site-specific measures to minimize effects.
3. As appropriate based on activities, ranges, and habitats, implement additional measures by land-use categories (Appendix E, Table E-2) and species (Appendix E, Table E-3). To determine the need for species-specific measures, review species range maps and any known location data for Covered Species (Appendix D).
4. FCCD will review the Farm Plan and GCP Site Plan to ensure consistency with the MSGCP; the USFWS may also provide technical review and assistance, then the applicant will apply for a Section 10 permit.
5. The USFWS will notice applications in the Federal Register, and request public comments during a 30-day public comment period. After consideration of public comments, and if consistency with the MSGCP and related decision documents is assured, the USFWS will issue a Section 10 permit to the Applicants.
6. Applicants/Permittees implement the plan.
7. FCCD and the Applicants/Permittees monitor, per Chapter 4 and the HSI process in Appendix G.

8. BMPs, Farm Plans, GCP Site Plans, and/or Permits may be modified over time as expected in the AMMP.

We made certain assumptions regarding implementation of the proposed action:

Assumption One: We do not know how many farmers/ranchers will sign on to the MSGCP. Based on early assessments of interest, we assume that as many as 50 percent of the eligible landowners will enroll in the MSGCP.

Assumption Two: As habitat quality improves, covered species numbers will also improve. Habitat is the part of the species' conservation need that farmers/ranchers have the ability to address. Where covered species need additional hands-on management (like the CBPR recovery efforts), farmers/ranchers can cooperate, but the management will typically be done by others (WDFW, Service, etc.). Of the farmers/ranchers who sign up, we assume that if they are currently good land stewards, their shrub-steppe habitats will be maintained, and where there is room for improvement, their shrub-steppe habitats will improve over time with better farm-planning and implementation of BMPs.

Assumption Three: Although we don't know how many farmers/ranchers will join the MSGCP, based on an initial interest of Douglas County farmers/ranchers, we assume 80 or more applicants may join the MSGCP, which may cover 50 percent or more of the eligible agriculture acres in Douglas County. Twenty percent would include about 173,643 acres (70,270 ha), and 50 percent would include 434,108 acres (175,677 ha) (these acreage quantities are based on non-orchard farms, but the actual number of orchards that may join the MSGCP is likely to be small).

Assumption four: The percentage of agriculture acres in Douglas County likely will decrease over time due to increased urbanization. In particular, there are development pressures to convert orchards along the Columbia River into residential properties. However, most orchards are not covered under the MSGCP and the development will likely not change the conservation benefits prescribed through implementation of the MSGCP.

Assumption five: CRP and SAFE acres may change during the life of the MSGCP, and those changes may affect covered species. Over time, the acres may fluctuate as program funding changes, or as agricultural economics shift. The MSGCP expects that those acres in Douglas County may drop below a 10 percent change threshold based on June 30, 2013, numbers (182,072 acres [73,681 ha]) (as described in changed circumstances in the MSGCP) and stay at that point for as long as 2 years while the FCCD and other partners evaluate how to come up above the 10 percent change threshold. We assume that CRP/SAFE acres may dip below 10 percent within a 2-year period, up to 6 times (based on estimated CRP contract renewal points, and assuming 10-year renewal periods) during the 50-year term of the MSGCP. We assume that even if CRP contracts are not renewed for all acres, not all farmers would immediately begin cropping those acres.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 **CFR §** 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment. The Action Area extends throughout Douglas County (Figure 1-1 in MSGCP), unless otherwise noted.

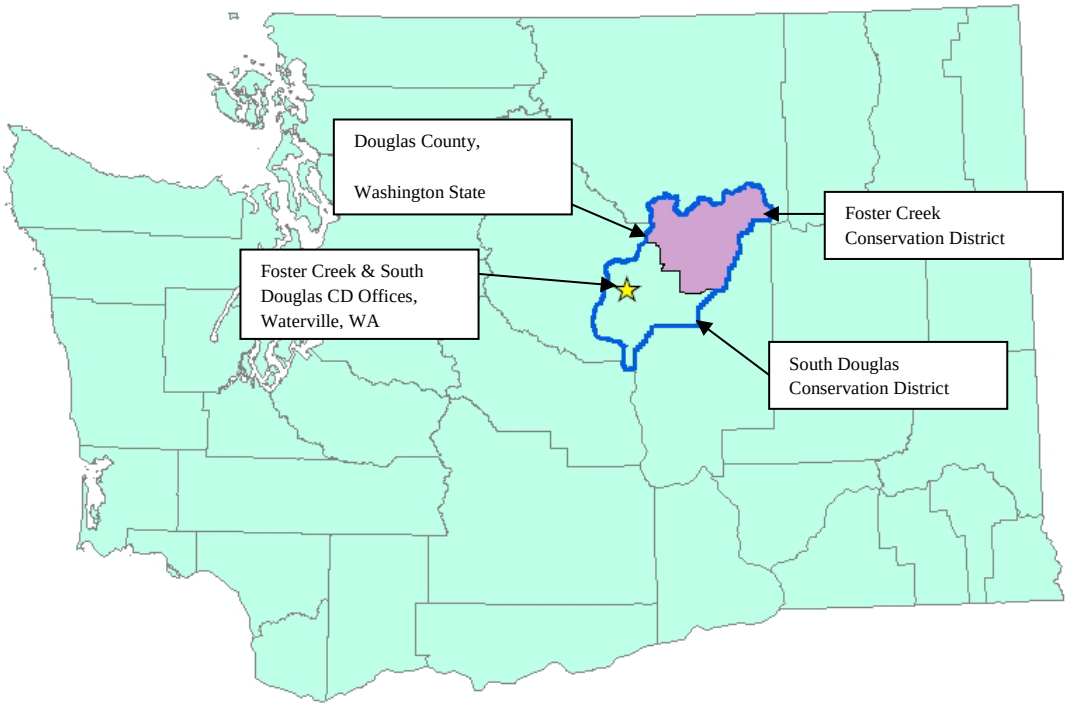

Figure 3. Action Area.
(From MSGCP Figure 1-1)

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATIONS

In accordance with policy and regulation, the jeopardy analysis in this Biological Opinion relies on four components: (1) the *Status of the Species*, which evaluates the range-wide condition for each species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of each species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent

activities on the species name; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the species' current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of *both* the survival and recovery of the species in the wild.

The jeopardy analysis in this Biological Opinion places an emphasis on consideration of the range-wide survival and recovery needs of each species and the role of the action area in the survival and recovery of the species. It is within this context that we evaluate the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

When critical habitat is designated for a listed species, the Service must also address "Adverse Modification." However, critical habitat has not been designated for any of the covered species; therefore critical habitat is not addressed.

STATUS OF THE SPECIES

The Status of the Species is discussed for each species separately, in the biological opinion and conference opinion sections below.

ENVIRONMENTAL BASELINE: General, for all Covered Species

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress.

In this section we will give a general overview of the environmental baseline and habitats in Douglas County. More detail relevant to each covered species is provided in the species-specific environmental baseline sections of the biological opinion and conference report below.

Douglas County Land Use

The total land area of Douglas County is approximately 1,183,414 acres (or 478,910 ha). Currently, 1,027,628 acres (415,866 ha) of land are privately owned. Agricultural lands total 883,094 acres (357,375 ha), of which 539,531 (218,340 ha) were classified as harvested cropland. In Douglas County there are about 955 farms with an average size of 925 acres (374 ha) (USDA 2009). Production in the County is split as follows: 60 percent dryland agriculture, 37 percent rangeland, and 3 percent irrigated agriculture (USDA 2009).

Dryland Agriculture

Dryland crop farming takes up a large part of Douglas County's land particularly on the Waterville Plateau. The 539,531 acres (218340 ha) of harvested cropland are probably mostly dryland farms; according to the Census on Agriculture (USDA 2009) 157,898 acres (63,899 ha) are in wheat production, 4,291 acres (1,736 ha) are in barley and oat production. The predominant crop is winter wheat grown in a fallow rotation. Every other year, the ground sits idle in order to increase moisture and mineral/nutrient content of the soil. Consequently, dryland farms in the County tend to be large. Acreage in active production (not in fallow rotation) changes from year to year depending on precipitation and field rotation.

Rangeland/Ranching

There were over 12,000 head of livestock in Douglas County in 2007 (USDA 2009). Rangeland activity is primarily beef cattle production consisting of cow/calf operations, with calves being born in early spring and weaned in October and November. Because of soil types and climate, a portion of the land in Douglas County is not suitable for dryland crop production, but is adequate for rangeland grazing. The largest concentrations of rangeland areas are typically located at the fringes of the Waterville Plateau, immediately adjacent to basalt cliff breaks.

Irrigated Lands

There are 14,551 acres (5888 ha) in orchards in the County (USDA 2009), and 4,099 acres (1,658 ha) are in forage production that is likely irrigated. The predominant agriculture activity along portions of the Columbia River corridor is irrigated tree-fruit production. The availability of irrigation water adjacent to the Columbia River along with sandy well-drained soils and long warm growing seasons support orchards. Irrigated agriculture extends up into Moses Coulee as well, where along with orchards, alfalfa, hay and other forage are produced.

Conservation Reserve Program (CRP) and State Acres for Wildlife Enhancement (SAFE)

As of 30 June 2013, 182,072 acres (73,681 ha) were enrolled in CRP or similar programs within Douglas County (Figure 2-4 in MSGCP). This included approximately 63,000 acres (25,495 ha) enrolled in the U. S. Department of Agriculture SAFE program that are managed as conservation cover specifically designed for greater sage-grouse and Columbian sharp-tailed grouse (WHCWG, 2012, Ch. 2). These acreages vary by year and depend on program funding and signup opportunities. Typical cover crops are crested wheatgrass, tall wheatgrass, Sherman big bluestem, rye grasses or alfalfa.

Habitat Conservation Areas

As described in the MSGCP, Habitat Conservation Areas (HCAs) in Douglas County (87,250 acres [35,308 ha] of BLM, TNC, and WDFW lands) include multiple-use areas or wildlife-emphasis areas owned and/or managed by Federal agencies (mostly BLM), WDFW, and TNC. The HCAs occur in scattered parcels and larger blocks within Douglas County (Figure 3-2 in the MSGCP) and are generally managed to reduce or eliminate potential threats to biological resources. In some instances, compatible grazing or other agricultural activities may occur. While these lands will not be covered by an ESA Section 10 permit, they will be an integral part of this MSGCP as they provide blocks of habitat managed for the benefit of native wildlife in Douglas County. WDFW, TNC, and BLM agree to cooperate and provide technical assistance during MSGCP implementation as described in a Memorandum of Understanding (Appendix A).

Other lands in Douglas County

Up through the late 1960s, five large hydroelectric dams (Grand Coulee, Chief Joseph, AZ Wells, Rocky Reach, and Rock Island dams) were constructed on the Columbia River within the reaches that serve as part of the western and northern boundaries for Douglas County. These dams create several reservoirs that provide electrical power and irrigation opportunities along the Columbia River.

Irrigated orchards primarily lie in close proximity to the Columbia River. Many of the species in the riparian buffer vegetation along the Columbia River in Douglas County are non-native species. Some wetland or riparian habitat has been created and is supported by subsurface water flows from irrigated orchards.

There are five incorporated communities and a portion of the town of Coulee Dam in Douglas County. Bridgeport, East Wenatchee, and Rock Island are in the lowland areas, and Douglas County; Mansfield and Waterville are on the plateau. In addition there are the historical settlement areas of Withrow, Douglas, Orondo, and the Palisades (Douglas County 1995). Rural portions of the County have experienced recent residential and recreational growth. Residential development tends to be associated with recreational amenities like golf courses, or with the Columbia River corridor due to water-related recreational activities and view sites.

Habitat Loss and Fragmentation

Many of the land uses described above result in habitat loss and fragmentation that has impacted covered species in Douglas County; those impacts are continuing. Dobler et al. (1996) explained that habitat loss coupled with extreme fragmentation magnifies the effects of habitat loss on wildlife. Shrub-steppe wildlife species are adapted to expansive landscapes of steppe and shrub-steppe communities. Fragmentation and conversion may subject the wildlife species to adverse population pressures, including:

- Isolation of breeding populations;
- Competition from similar species associated with other, now adjacent, habitats;
- Increased avian nest predation by generalist predators;
- Increased avian nest loss through parasitism by brown-headed cowbirds;
- Increased predation on mammal species;

- Increased predation on birds of all life stages by avian predators and domestic animals from an increase in the number and extent of access roads;
- Additional power lines and fences may provide perching posts for avian predators and increase their sight radius in which to locate prey. Fragmentation of habitat into smaller areas increases the impact of pesticides and pollutants due to an "edge effect";
- Fragmentation also increases the number and/or extent of fence lines which increases the likelihood of collisions, resulting in direct and indirect mortality; and,;
- Species fecundity is affected by increased stress brought about by increased noise, loss of cover and increased activity. Noise, in particular, is often increased by lack of cover as noise attenuates at different rates through vegetation, depending upon the amount and density of cover.

Some fragmentation impacts in Douglas County may have been somewhat ameliorated by the soil and habitat conditions. Shallow lithosol (rocky) areas have protected some native habitats, in part because they were difficult or impossible to farm. The BLM, WDFW, and The Nature Conservancy, have worked, and continue to work to conserve natural habitats in and around Douglas County. Also, careful stewardship of some grazing lands may have maintained natural habitats. CRP also provides cover and some natural vegetation. All this added together likely reduces the degree of fragmentation, and allows shrub-steppe species and other covered species to continue to persist in Douglas County.

Wildfire is common in Douglas County, and there have been several recent fires, including the Crane Road fire which burned about 8,500 acres in August 2012 (http://www.khq.com/story/19174858/700-acre-bursh-fire-in-douglas-county) and the Leahy and Barker Canyon Complex fires in 2013 that burned 18,000 acres and 73,000 acres respectively (http://inciweb.nwcg.gov/incident/3262/). Depending on the size and the fire behavior, fires may cause loss of shrub-steppe habitat, may increase the amount of invasive weeds, and in some instance may have a delayed benefit to shrub-steppe habitat by decreasing large woody sagebrush and increasing diversity of forbs.

Climate change is a component of the environmental baseline and includes ongoing and projected changes in climate. The terms "climate" and "climate change" are defined by the Intergovernmental Panel on Climate Change (IPCC). "Climate" refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007, p. 78). The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007, p. 78). Climate change is discussed in more detail under Effects of the Action.

The Wildlife Habitat Connectivity Working Group (WHCWG) modeled habitats and linkages important for an array of wildlife species across the Columbia Plateau (WHCWG, 2012, p. 21). These Columbia Plateau results, based on spatially explicit connectivity data, lend themselves to multiple uses, including essential decision making for conservation-based wildlife planning. Douglas County lies within the area analyzed by the WHCWG, and the connectivity and linkage information is useful for the MSGCP analysis. The effort included an assessment of Landscape

Integrity Core Areas (WHCWG, 2012, p. 56). The WHCWG identified 113 core areas in the Columbia Plateau Ecoregion. The largest core areas in Washington within the Columbia Plateau Ecoregion, were associated with Department of Defense lands (Yakima Training Center), the Hanford Arid Lands Ecological Reserve (part of the Hanford Site), the Yakama Reservation, and WDFW wildlife areas; smaller core areas were distributed in the central and western portions of the Columbia Plateau Ecoregion, including areas within Douglas County. Few core areas were identified in the eastern portion of the Columbia Plateau (e.g., Lincoln and Whitman counties), due in part to the extensive agricultural conversion of the deep tillable soils associated with the Palouse Prairie. Soil conditions in the western half of the ecoregion, including areas within Douglas County are less uniform and include significant areas with shallow, rocky soils (which are less amenable to farming), resulting in large areas remaining in native shrub-steppe habitat.

The WHCWG (2012, p. 64) also looked at a composite "upland network" that analyzed the combined networks of seven species closely associated with upland shrub-steppe habitat: sharp-tailed grouse, greater sage-grouse, Townsend's ground squirrel, Washington ground squirrel, white-tailed jackrabbit, black-tailed jackrabbit, and least chipmunk. The upland network is strongly focused in the western half of the ecoregion. Based on this analysis, Douglas County provides important habitat concentration areas and linkages for several covered species including the sharp-tailed grouse (WHCWG 2012, p. 66), the greater sage-grouse (WHCWG 2012, p. 66), and Washington ground squirrel (WHCWG 2012, p. 68).

The WHCWG (2012, p. 90) displays a noticeable pattern highlighted by areas important to four or more focal species: the crescent-shaped block of loosely connected lands in central Washington that the group referred to as the "Backbone" (WHCWG 2012, p. 90), from the Horse Heaven Hills in the south, all the way to the Okanogan Valley in the north. This pattern reoccurred in the landscape integrity results, and was consistent with the results obtained in the earlier statewide connectivity analysis (WHCWG 2012). A group of landscape integrity core areas and relatively wide linkages between them in the western portion of the Columbia Plateau provide a significant contrast to the smaller core areas and longer and narrower linkages in the eastern portion of the Columbia Plateau. This result indicates that the crescent of habitat observed for multiple focal species results from a relatively low amount of agricultural conversion and low human footprint throughout the area. This "Backbone" region contains the largest remaining blocks of native vegetation, and is therefore the centerpiece of a connected Columbia Plateau (WHCWG 2012, p. 99), see Figure 2.

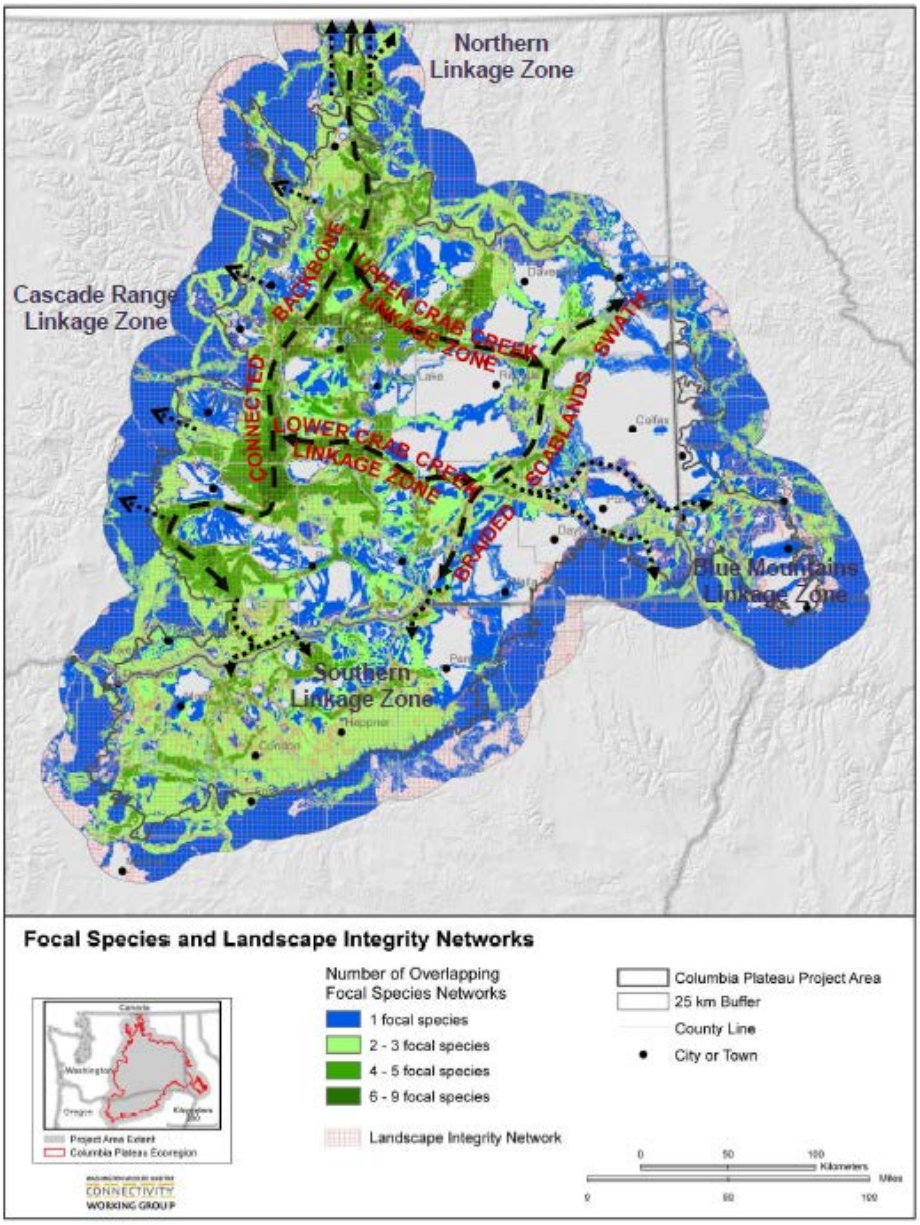

Figure 4. Focal Species and Landscape Integrity Networks.
(From WHCWG 2012, Figure 4.5 p. 101)

EFFECTS OF THE ACTION: General Effects Common to All Covered Species from Covered Activities and Implementation of the MSGCP

There are many general effects that apply to all four covered species and especially to their habitats. These general effects are described below. Species-specific effects are analyzed later in the biological opinion and conference opinion.

General Effects From all Covered Agriculture Activities

Shrub-steppe wildlife are adapted to expansive landscapes of steppe and shrub-steppe communities. Current shrub-steppe conditions in the Columbia Basin are already greatly altered from those existing prior to European-American entry into the area. Wooten (2003, p. 14) estimated that only 46.3 percent of previously existing shrub-steppe habitat remains in the Columbia Basin. Ninety-eight percent of this habitat loss (or 52.06 percent of the original acreage) is attributable to farm and ranch development (Wooten 2003, p. 14). The primary impacts associated with the Covered Activities are related to 1) habitat loss and degradation and 2) noise and disturbance. These are addressed below.

Habitat Loss and Degradation

Farming and ranching activities result in vegetative cover that is dramatically different than occurs naturally; there is intermittent land disturbance by equipment; and wildlife species may be displaced either temporarily or for longer terms. Farming activities reduce quantity and quality of habitat, and smaller blocs of habitat magnify the "edge effect" with regard to many variables, including water quality, predation, and availability of nesting and nursery habitat.

Conversion of native habitats to either dryland or irrigated farming continues to destroy and fragment remaining habitats. Conversion to agriculture also reduces the habitat complexity and diversity required by many species. Using bobwhite quail as an indicator, Terhune (et al. 2009, p. 245) found that variety (complexity) of habitat within plots was necessary to maximize use; area alone was not sufficient to produce a population increase.

Conversion to farming may also facilitate predation by enabling predators to enter blocks of habitat more easily (Tewksbury et al. 2002; Connolly et al. 2004, pp. 1-2; Vander Haegen and Walker 1999; Van der Haegen et al. 2002; Connelly et al. 2004, pp. 7-23). Increases in predation may also be facilitated through simple edge effects (Tewksbury et al. 2002; Connolly et al. 2004, pp. 1-2).

Species dependent on shrub-steppe generally need large patches of relatively undisturbed shrub-steppe plant species, including big, stiff, and three-tip sage species. Habitats for shrub-steppe dependent species within the project area have been maintained partly due to patches of difficult-to-farm-fragments that provide habitat, partly through the implementation of the CRP, and partly through maintenance of larger blocks of shrub-steppe habitats managed by WDFW, BLM, and TNC (HCAs). The goal of the MSGCP is to continue further development and protection of high quality shrub-steppe habitat, particularly among existing dryland and range agricultural

operations. Desirable patches of shrub-steppe have emerged and are maturing on these CRP lands. Other CRP parcels act more as grasslands.

On Permittees' land, farming and ranching activities will continue together with implemented BMPs, and the suitability of remaining habitat fragments will improve over time. Implementing the BMPs will improve the quality of existing shrub-steppe habitat and riparian habitats. Certain key habitats, such as sage-grouse leks, will be protected with timing restrictions to minimize disturbance.

It is unknown how many landowners will join the MSGCP. Therefore, habitats on enrolled lands are expected to improve, but the degree of improvement is difficult to predict.

The following specific BMPs address habitat loss or degradation (Appendix E MSGCP):

"All Agricultural Uses

Riparian Areas

1. Increase variety of native tree/shrub species and age classes within riparian areas. Develop riparian habitat with age class variety, plant species variety, and age diversity of shrub and tree canopy layers. Possible management practices:
    a. Implement rotation and deferred grazing strategies within riparian areas that produce a diversity of age, species, and life forms within riparian habitat areas, resulting in a properly functioning condition. Deferred and rotation grazing systems that provide extended periods of rest are needed to produce appropriate vegetation age classes when they are missing.
    b. Use fencing to control livestock use periods.
    c. Monitor herbicide applications.
    d. Avoid overspray of herbicides within riparian areas.
2. Manage existing riparian habitat to allow it to reach its full site potential and function.
3. Restore range riparian habitat to support Covered Species.
4. Protect springs, seeps, and wet meadows within and adjacent to sagebrush stands from over-grazing.
5. Manage lands to provide good water quality and riparian conditions in seeps, wetlands, springs, creeks, rivers, lakes.
6. Maintain snags or potential snags, including large old cottonwoods, in riparian areas.
7. Maintain riparian flood plain and associated shrub habitat.
8. Avoid cutting or removing willows or other species important for sharp-tailed grouse wintering, including water birch, hawthorn, serviceberry, chokecherry, etc.
9. Consider removing exotic white poplar (*Populus alba*) where it is crowding out water birch and other native riparian species (Stinson and Schroeder 2012, p. 53).

Wildfire Management

1. Develop fire management plans with local fire districts.
2. Manage mechanical firebreaks and backfires to minimize impacts to Covered Species and supporting habitats.

3. Along with local fire districts, identify habitats that need special consideration during wildfire control and discuss special control techniques. Identify areas where fire control is not a critical issue.
4. Use mechanical firebreaks and backfires to minimize the adverse effects of wildfire control on critical habitats.
5. Group land units into control, limited control, and minimal wildfire control areas.

Maintain Remnants

1. Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants."

Noise and Disturbance Impacts from General Farming, Ranching, and other Activities

Noise from agriculture activities can impact covered species, although the degree of effects from disturbance is not well known or predictable for all of the species. Generally, noise disturbance can interfere with vital behavior (i.e., breeding) in mammals and birds. Some species will adjust their behavior to constant noise and others will be effectively excluded from an area (EPA 1978, p. 17, Federal Highway Administration 2004, p. 10).

Activities such as mowing, plowing, burning, disking, harrowing, and rock removal may cause noise, mortality (see preceding paragraph), induced flight or other avoidance behavior, or nest abandonment (see noise impacts above). Other activities that may cause a disruption in vital behavior patterns include typical farm activities such as seeding and harvesting, storing of crops (which may cause attractive nuisances for species like invasive rodents or birds), transportation of crops and equipment, and irrigation (construction, operation and maintenance).

Relevant disturbance buffers for farming or ranching activities are discussed in the species-specific section and conference reports where applicable. The following specific BMPs address noise and disturbance from recreation on farm or ranch land (Appendix E MSGCP):

"Recreational Use: Non-Agricultural Motorized Vehicle Use, Hunting, Fishing, Wildlife Viewing

1. Restrict recreational use during critical mating, nesting, and brood-rearing periods, especially near sharp-tailed grouse leks (March 1 to June 30) and sage-grouse leks (February 1 to June 30).
2. Ensure proper use of gates and other livestock management devices.
3. Minimize motorized access.
4. Consider potential impacts on wildlife, site habitat features, ranch operations and quality of life before permitting hunting and recreation. Educate visitors about limits, rules, and cautions needed to make sure their land use has minimum impact on habitat, wildlife resources, forage production, and ranch operation.
5. Minimize visitor vehicle traffic on ranch roads to prevent noxious weed introduction.
6. Develop educational information about Covered Species that Applicants/Permittees can share with hunters.
7. Washington ground squirrels are a protected species under state law and should not be subjected to recreational shooting by the landowner or the public. In situations where the

landowner believes that the squirrels pose a threat to crops, the landowner should contact USFWS and/or WDFW to discuss non-lethal options for resolving the problem."

General Effects from Dryland Farming

Dryland farming includes about 60 percent of Douglas County. Dryland crop fields are tilled at least annually, preventing natural habitats from developing and maintaining the fragmentation of natural habitats in Douglas County. Haying, mowing, and seeding have been shown to result in both direct mortality and loss of the habitat complexity necessary for successful breeding for many species (Kantrud 1981; Whitmore 1981; Kantrud and Kologiski 1982; Patterson and Best, 1996; Delisle and Savidge, 1997; Powell 2008 all as cited in Savignac et al. 2011, p. 14). Foster Creek Conservation District, WDFW, and others developed a habitat suitability model (Chapter 3 and Appendix G of the MSGCP), and evaluated potential changes over time (at year 10 and year 50) for the MSGCP. This model is discussed in more detail under each species analysis in the biological opinion/conference report. In general, habitat suitability is expected to improve over time, but, again, the degree of improvement will depend on how many farmers/ranchers sign up.

As described previously, species dependent on shrub-steppe generally need large patches of relatively undisturbed shrub-steppe plant species, including big, stiff, and three-tip sage species, and dryland farming in particular impacts shrub-steppe in Douglas County. Many remnants of shrub-steppe habitat remain in Douglas County due to patches of difficult-to-farm land. Many dryland farmers also have lands enrolled in the CRP, and some of the CRP provides habitat for covered species. Although CRP fields have historically been planted to a variety of non-native grasses, more recently an increasing number of fields have been planted to native grasses, forbs, and native arid-land shrubs. Moreover, native shrubs (particularly big sage) seed-in from adjacent shrub-steppe vegetation. Desirable patches of shrub-steppe have emerged and are maturing on these CRP lands. Other CRP parcels act more as grasslands. Vanderhaegen et al. (2004) explored the use of CRP by wildlife. Columbian sharp-tailed grouse and the greater sage-grouse are known to occur in CRP fields, but neither Washington ground squirrel nor CBPR were trapped there by researchers (Vanderhaegen et al. 2004, p. 21). Potential effects from the CRP are discussed in more detail in the species-specific sections that follow.

Douglas County CRP signups may change depending on the Farm Bill. Douglas County's current CRP acreage cap is 25 percent of the agricultural land in the County, rather than the previous exemption of up to 33 percent prior to 2009. To further enhance and broaden the CRP program, NRCS has implemented the Environmental Quality Incentives Program (EQIP) in eleven western states, including Washington. EQIP uses a three-year contract to preserve former CRP lands in their current protected condition (NRCS 2010). EQIP includes Working Lands for Wildlife and the Sage Grouse Initiative that improves sagebrush habitat and restores or enhances rangelands. In addition to EQIP, NRCS has also implemented the SAFE program which involves 10- to 15-year contracts to protect and enhance important wildlife habitat in agricultural areas (NRCS 2010, http://www.wa.nrcs.usda.gov/news/Footprints/Summer10/Sage_Grouse.html). Within 12 hours of introduction, all available contracts had been applied for in Douglas County.

Implementation of the MSGCP will further supplement the CRP and newer SAFE program by continuing to improve habitat, and by adjusting for the loss of shrub-steppe through protection of similar habitats.

The MSGCP includes "changed circumstances" measures that require monitoring to ensure that if CRP/SAFE acres in the County decrease by 10 percent, and additional similar lands cannot be protected within 2 years, then the FCCD, FWS, and potentially others will reconvene to revisit the MSGCP. The MSGCP also includes "changed circumstances" that require monitoring of the quantities of HCAs, and if those acres decrease by 10 percent then the FCCD, FWS, and potentially others will reconvene to revisit the MSGCP. However, based on BLM, TNC, and WDFW policy directions (see Chapter 3 in MSGCP), decreases in those conservation areas are unlikely to occur. These changed circumstances measures are key to ensure that the landscapes that support the covered species will not decrease dramatically without our notice, and provide an avenue to address those decreases.

Under the MSGCP Farm Plans will be developed and include CPs, additional measures for certain activities, and additional species-specific measures. Activity-specific measures to address dryland farming are as follows (Appendix E MSGCP):

"Dryland Agriculture:

Conversion of Conservation Cover to Active Farming

1. If CRP/SAFE or other conservation contracts cannot be maintained due to program changes, enroll these conservation lands into other Federal Farm Bill conservation program such as Grassland Reserve Program (GRP), Agriculture Conservation Easement Program, or other similar Federal, State, or other similar programs if available.
2. Maintain original remnant patches of shrub-steppe within CRP/SAFE fields when converting back to crops.
3. To minimize the disturbance to Covered Species using CRP/SAFE, ensure that conversion does not occur within species-specific timing restrictions in Table E-3.

Erosion

1. Farm plans/GCP Site Plans will include erosion control measures to reduce sheet, rill and gully erosion at field edges by trapping sediment and reducing surface runoff."

General Effects from Irrigated Farming

Irrigated agriculture includes only about 3 percent of the County and, as described in the proposed action, only part of that acreage is covered under the MSGCP. Impacts to covered species habitats from irrigated agriculture are similar to those from dryland agriculture. Irrigated land is maintained in non-native species or tilled at least annually to continue fragmentation impacts.

Under the MSGCP, Farm Plans will be developed and include CPs, additional measures for certain activities, and additional species-specific measures. The following specific BMPs address irrigated agriculture (Appendix E MSGCP):

"Irrigated Agriculture

Adjacent Habitat

- Maintain adjacent non-farmed lands in natural habitats to benefit of Covered Species.

Lead Soils

1. Where lead is present in orchard soils due to past chemical applications, cover, tarp, or otherwise make soil inaccessible to wildlife when significant ground disturbing activities occur (irrigation work, planting, etc.).

Food Attractant

1. Within orchard or other irrigated crops, minimize the attractiveness of the food source to wildlife. As appropriate, use deterrent measures such as reflective materials, noise generators, and barrier netting."

General Effects from Ranching/Grazing

Livestock management requires fencing and water development. Livestock presence coupled with pasture maintenance activities often modify natural habitats such as shrub-steppe, by changing species composition, compacting soils surfaces, modifying soil microflora and fauna and modifying site microclimate.

All covered species may be affected by livestock grazing. These species require high quality shrub-steppe habitat. Sagebrush provides forage and cover habitat throughout the year and the grass-forb understory supports food and cover during spring through fall. On some existing rangelands, plant communities have been altered to the point that they have limited potential for passively returning to natural habitat, even if grazing is totally removed. However, there are areas that contain enough remnant bunch grass and perennial forbs to contribute habitat if grazing pressure is reduced.

In general, grazing impacts can be either beneficial or detrimental, depending on the grazing levels, regimes, species involved and their requirements, and grazing protocols. However, overgrazing can lead to reduced productivity, reduced plant survival and negative changes in community composition (Krausman et al. 2009, p. 15). These effects have different impacts on wildlife depending on timing and utilization of the forage by livestock. In general, light to moderate levels of livestock grazing on steep slopes and in areas distant from water can have relatively little direct or indirect impacts on many shrub-steppe communities. Heavier grazing, as has occurred on lands in Douglas County, tends to increase sagebrush densities and reduce understory native grass densities.

As described in the MSGCP, BMPs will be implemented to ensure good grazing practices to improve shrub-steppe habitat and range conditions. Livestock use of forage and other associated impacts would be managed such that native and desirable plants maintain vigorous growth, produce seed at least every other year, and maintain their abundance and distribution within each pasture to sustain strong forage production and desired habitat features. BMPs and range management practices proposed are all generally accepted practices for good land stewardship.

In some cases, changes in management practices may require the removal of livestock from some pastures, or seasonal rest/rotation, potentially reducing the areas available for grazing, and/or resulting in more productive grazing pastures. Benefits and range improvements will result in enhancement of plant and wildlife habitats, improvements in vegetation succession and plant diversity, and possibly the slowing of degradation of cryptogamic crust, but the degree of improvement will depend on how many Permittees join the MSGCP.

Under the MSGCP Farm Plans will be developed and include CPs, additional measures for certain activities, and additional species-specific measures. The following specific BMPs address rangeland agriculture (Appendix E MSGCP):

"Rangeland Agriculture

Grazing Guidelines

Note: The standard grazing guidelines and species- specific measures below provide prescriptions with the goal of producing or maintaining habitat for covered species' life history needs, including providing for cover, forage, and reproduction habitat. Other alternative grazing rotations or prescriptions might be acceptable, as long as they met similar expectations, including utilization rates, stubble heights, and distribution and timing that encourages plant productivity and vigor, seed production, photosynthesis, recovery and re-growth. Alternative grazing prescriptions may need more stringent monitoring plans that are developed and implemented to ensure that expectations are being met. If expectations are not met, the grazing prescriptions may need to be modified as implementation proceeds.

The following will promote better habitat and encourage plant productivity and vigor, seed production, photosynthesis, recovery and re-growth.

1. Develop a grazing management plan that accounts for the intensity of grazing and the timing of both grazing periods and recovery periods. The plan should include:
2. Graze a pasture no more than once every third year during the critical period for key bunchgrass species (boot stage through seed formation, which is typically May 15 to July 15).
3. Manage utilization to achieve:
    a. No more than 50 percent utilization during the growing season
    b. No more than 60 percent utilization during the dormant season.
4. Maintain a minimum stubble height of 5" at all times on desirable bunchgrasses on average in a pasture. Note that a stubble height of 8" is better than 5" in appropriate growing sites.
5. Manage livestock distribution to minimize overgrazing, especially during drought. Tools such as fencing, the placement of water and salt, and riding can be used.
6. During winter, use one smaller sacrifice area for feeding to minimize impacts to shrub-steppe and other habitats.
7. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals, unless a grazing system is implemented which has a high rest to grazing period ratio which allows for adequate recovery following heavier use.

Riparian Use

1. Allow early spring grazing only in existing riparian pasture and manage access.
2. Exclude use in undisturbed riparian areas.
3. Manage livestock to limit access on riparian areas by controlling length of grazing period and time of year or by utilizing exclusionary practices.
4. Use off-stream watering sites or selective herd management to promote livestock use of uplands.
5. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals, unless a grazing system is implemented which has a high rest to grazing period ratio which allows for adequate recovery following heavier use.

Watering Sites, Supplement Sites, Livestock Concentrations

1. Locate watering facilities away from riparian zones as much as is practicable; ensure escape devices for small wildlife (such as boards or ramps).

2. Ensure that any livestock watering diversions do not restrict fish passage nor impede water volume flow.
3. If a riparian crossing location is the only option, harden crossing and manage access.
4. Locate salt licks away from riparian or wetland areas.
5. Avoid livestock concentrations or travel routes on sensitive areas.
6. Protect sensitive areas, such as riparian habitat, occupied Columbia Basin pygmy rabbit habitat, Washington ground squirrel colonies, greater sage-grouse/Columbian sharp-tailed grouse leks, and rare plant populations from unnecessary impacts caused by livestock concentrations. Possible management practices include:
    a. Locating mineral supplements, water troughs and supplemental feeding sites on shallow, gravelly, or rocky soils or rocky areas away from sensitive areas,
    b. Implementing exclusion fencing.
7. Manage livestock to maintain water quality goals by minimizing concentrated animal use near streams or in upland areas where surface water drains across these sites and carries excess nutrients downslope to surface water.
8. To minimize fertilizer loss to ground water or surface flow, use fertilizers in hay fields at an agronomic level that provides plant benefits, but is not in excess of plant needs.
9. Maintain chemical use on livestock and rangelands at a level that is effective, but not in amounts or in areas that would cause contamination of soil, forage, water, wildlife or habitat."

General Effects of Covered Activities in light of Climate Change

Our analyses under the Endangered Species Act include consideration of ongoing and projected changes in climate. The terms "climate" and "climate change" are defined by the IPCC. "Climate" refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007, p. 78). The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended

period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007, p. 78). Various types of changes in climate can have direct or indirect effects on species. These effects may be positive, neutral, or negative and they may change over time, depending on the species and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19). In our analyses, we use our expert judgment to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

Given that climate change is occurring, we can no longer assume that climate conditions in the future will resemble those in the past. In order for the Service to analyze the effect of the action in light of future climate impacts, we must first determine how far into the foreseeable future we feel we can make projections with a reasonable degree of certainty. Figure 3 shows the predicted increase in mean global temperature for three diverse and equally likely scenarios. This predicted increase is a composite of numerous scenarios. These scenarios are labeled the A2 (high emissions), A1B (moderate emissions), and B1 (low emissions) models. The A2 scenario predicts a 3.4 ^{o}C increase in ambient temperature (with a projected range: 2.0 to 5.4 ^{o}C), the A1B predicts 2.8 ^{o}C increase (with a projected range of 1.7 to 4.4 ^{o}C) and the B1 predicts 1.8 ^{o}C increase (with a projected range of 1.1 to 2.9 ^{o}C) (IPCC 2007, p. 13). Specifically, increases in annual mean temperature for eastern Washington is predicted to be 1.3^{0} C by 2020, 3.28^{0} C by 2040, and 3.1^{0} C by 2080 (WDFW and National Wildlife Federation (NWF), 2011 p. 32). In Figure 3, at about year 2050, these three projections quickly begin to diverge. These predictions become more divergent the further into the future we try to foresee because (1) economic and political impacts and responses are linked to climate change, (2) become harder to predict as more possible variations must be incorporated, and thus, (3) our confidence in the predictions decrease (Hall and Behl 2006, p. 443).

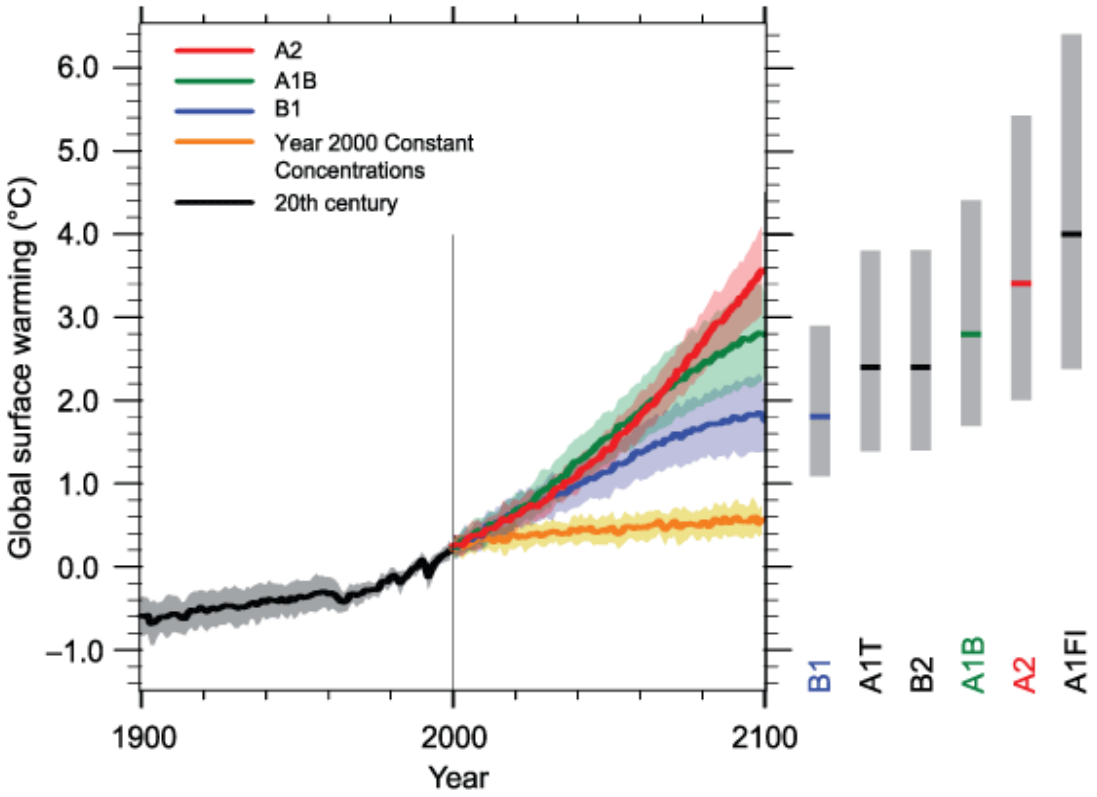

Figure 5. Predicted increases in mean global temperature under A2, A1B, and B1 scenarios. (IPCC 2007, p. 12).

For the Pacific Northwest, the amount and frequency of rainfall is expected to increase, temperatures are expected to increase, and summer droughts will become more frequent. Precipitation is projected to come more in the form of rain rather than snow which will result in decreased groundwater recharge and less spring moisture, due to more run off (CICG 2014, p. 198). Projections show that snowpack, in the form of snow water equivalent will decrease by 27-29 percent statewide by 2020, and up to 53-65 percent by the 2080's (Eisner 2009; WDFW and NWF 2011, p. 23). Several studies indicate, however that precipitation will decrease by only up to 9 percent (Stoelinga et al., *in press*; WDFW and NWF 2011, p. 23).

Climate change, in general, is expected to have three primary impacts on the Project Area and, as a result, influence the effects of the Covered Activities:

- Changes in biological communities consisting of species composition, distribution and community dynamics,
- Changes in ecosystem productivity, and
- Changes in disturbance regimes (both type and frequency of disturbance).

Changes in Biological Communities

Based on climate trend projections by the IPCC (IPCC 2007, p. 12) and the Climates Impact Group of the University of Washington (CICG) (CICG 2014, p. 198), in general, habitats and species will tend to migrate further north or higher in elevation in response to global climate change (Shafer et al. 2001, p. 18; Chambers and Pellant 2008, p. 30). However, migration may not result from heat stress, *per se* but will more likely occur through such mechanisms as competition between species with similar requirements or limitations resulting from unsuitable habitat (Shafer et al. 2001, p. 18; Chambers and Pellant 2008, p. 30).

A net decrease of shrub-steppe habitat in the Project Area will likely result, as the boundaries of shrub-steppe habitat shift northward (Shafer et al. 2001, p. 18; Chambers and Pellant 2008, p. 30). A new phenomenon, non-analogous communities, is expected to arise. A non-analogous community is one wherein the species combination is a new assemblage of species, together with new interactions between species (Williams and Jackson 2007, p. 475). In particular, non-analogous communities are more likely to develop over time in eastern Washington under the A2 scenario (continuation of current increases) (Williams and Jackson 2007, p. 480 and Figure 4). Attempts to predict these new interactions and relationships will further complicate future efforts at habitat management (Williams and Jackson 2007, pp. 475-477).

Climate change is also expected to result in an increase in non-native species, including native species not currently endemic to the Project Area. Increases may be facilitated by alterations in habitat configuration (i.e. edge-effect) (WDFW and NWF 2011, p. 14) and changes in precipitation as well as temperature (WDFW and NWF 2011, p. 29). Current invasive species may even be replaced by entirely new species as temperatures and precipitation change further (WDFW and NWF 2011, p. 35). Further complicating issues is a new emphasis on "assisted migration" (translocation, re-introduction, and relocation) of imperiled species (Marris 2008, p. 112). Little work has been done on the potential impacts the release of these species may have on the current habitat communities (Marris 2008, p. 112).

Changes in Ecosystem Productivity

Changes in temperature and precipitation will also alter the productivity of the shrub-steppe of eastern Washington. As woody vegetation decreases, so will the productivity. Increased fire, as predicted, will result in greater grassland plant cover, which is less productive than woody vegetation (WDFW and NWF 2011, p. 35). Annual grasses will also result in less deep soil carbon storage whereas shallow soil carbon storage may increase, although studies have shown the amount to be insignificant (WDFW and NWF 2011, p. 36).

As temperatures increase, there will likely be a shift away from C_3 (more mesic adapted) to C_4 (more xeric adapted) plants. In general, more sunlight benefits C_4 rather than C_3 plants; C_4 plants are also more drought resistant and more water efficient (WDFW and

NWF 2011, p. 28). Lawler and Mathias (2007, pp. 18 & 20) predict that increased Carbon dioxide (CO_2) will likely have a fertilizing, short-term effect on productivity. This increase in productivity may be offset by carbon sequestration in larger woody plants, such as trees, and by a lowering of productivity caused by longer summer droughts.

Changes in Disturbance Regimes

Climate change is already affecting the frequency and magnitude of fires, especially in the warmer, drier regions of the west. To further complicate our understanding of these effects, the forest that naturally occurred in a particular region may or may not be the same forest that will be responding to the fire regimes of an altered climate (WDFW and NWF 2011, p. 32). However, as stated earlier, the future may well be different than the past and extreme fire events may have a dramatic effect on species, especially in the context of continued habitat loss, simplification and fragmentation of aquatic systems, and the introduction and expansion of exotic species (WDFW and NWF 2011, p. 32).

In the Pacific Northwest, most models predict warmer air temperatures and changes in winter and summer precipitation. Warmer temperatures will lead to more precipitation falling as rain rather than snow. As the snow pack diminishes, stream flow timing (a "temporal shift") will change, and peak flows will likely increase, resulting in increased flood events and, consequently, erosion (WDFW and NWF 2011, p. 52). These changes will be most observable at elevations between 1000 and 3000 feet.

Besides water erosion, wind erosion is also expected to increase. Surface soil will be in equilibrium with air moisture; as shallow soil carbon and soil moisture decrease, surface soil therefore becomes more erodible (WDFW and NWF 2011, p. 54).

It must be noted that our analysis and our predictions are based on currently available information and data, using the best current modeling. There is still a great deal of uncertainty associated with predictions of timing, location, and magnitude of climate change. The changes described above present a broad picture of predicted and possible effects of climate change. Their magnitude will also be dependent on actions taken in political, private, and economic arenas.

As described above, climate change may affect covered species habitat in Douglas County. We believe the limits of our "foreseeable future" condition will occur between 2040 and 2060; therefore, we used year 2050 as an end point of our climate change analysis. We anticipate no substantial differences in habitat, resource management, and land-use will occur before year 2050 among the three climate scenarios. Because short term weather changes such as drought, and longer term climate change are not entirely predictable at local County levels, and because climate change scenarios become less clear after 2050, the MSGCP includes a "changed circumstance" to continue to evaluate weather and climate (#2. Poor Growing Conditions for Rangeland/Pastureland/Shrub-Steppe Due to Unseasonable Weather, Climatic Drought, or Climate Change (MSGCP Ch. 4)) to continue to evaluate and respond to climate and habitat changes . At 10-year increments, or when up to a 3-year duration drought is identified, conservation practices

will be reviewed, and BMPs may be modified to ensure long-term productivity of fields, pastures, and natural habitats. Habitat quality and quantity will be reviewed per the HSI model, and If MSGCP expectations are not being met and cannot be mitigated through additional habitat quantity or quality protections, then the USFWS must revisit whether the MSGCP still meets issuance criteria, and if not, how and whether it can be revised, or whether Permits must be revoked.

Climate change may cause more frequent and larger fires; The MSGCP also includes a changed circumstance (#4; Chapter 4 in MSGCP) to address large wildfires. If fires cause loss of vegetation cover in Douglas County of 20,000 acres or more in one calendar year, farm plans, site plans, and or grazing plans will be modified to facilitate native habitat recovery and structures such as fences will be replaced to allow vegetation recovery. Control of invasive weeds will be implemented until native vegetation re-establishes. The cause of the fire will be reviewed and preventive measures will be developed; and monitoring of the natural regrowth will be implemented, and responses developed through the Adaptive Management/Monitoring Plan process.

Summary of General Effects

- General impacts to shrub-steppe habitats in Douglas County from dryland agriculture, ranching, and irrigated agriculture were discussed previously, and are summarized as follows: Dryland farming will continue to till land and continue to perpetuate a fragmented landscape, resulting in decreased cover and connectivity. Irrigated agriculture will have the same ongoing fragmentation effect.
- Patches of unfarmed habitat fragments are likely to continue, as expected based on the activity-specific BMPs, and habitat on those fragments is likely to improve with implementation of the BMPs.
- TNC, WDFW, and BLM lands are likely to continue in similar amounts and quantities, and changed circumstances measures ensure that if those ownerships do drop by 10 percent or more across the County, the USFWS and FCCD will reconvene to assess the continued adequacy of the MSGCP.
- CRP and SAFE lands are a key component of habitats used by covered species in the County. The mosaic and location of those lands may change over time, but a changed circumstances measure ensures that that if those acres drop by 10 percent or more across the County, and similar acres cannot be protected within 2 years to get above the 10 percent threshold, the FWS and FCCD will reconvene to assess the continued adequacy of the MSGCP.
- Grazing is likely to continue, but BMPs will ensure appropriate grazing management that provides forage and hiding cover for covered species. If grazing pressure is reduced, some habitats that retained remnant bunchgrasses and forbs will naturally improve.
- Under the MSGCP, BMPs will be implemented to ensure good grazing practices to improve shrub-steppe and range conditions. BMPs may change over time.
- Effects from climate change will continue, and include but are not limited to decreases in shrub-steppe habitat, increases in non-native species, and changes in frequency and magnitude of wildfires. The MSGCP has BMPs for fire management that ensure coordination with local fire districts, managing fire breaks to minimize impacts to

covered species, and working with local districts to designate areas for more protection or less protection efforts. Changed Circumstance #2 addresses poor growing conditions for shrub-steppe due to weather, drought, or climate change; and Changed Circumstances #4 addresses wildfire over 20,000 acres cumulatively in a year. Such events require monitoring of natural regrowth, development of an action plan to improve habitat conditions, and potential development of additional BMPs or modification of Farm Plans/GCP site plans to facilitate native habitat recovery.

As described in more detail previously, the general habitat effects are minimized and mitigated through implementation of BMPs and changed circumstances, including but not limited to: maintaining remnant shrub-steppe habitat, maintenance and improvement of shrub-steppe and riparian habitats, wildfire management requirements, minimizing impacts from recreation, maintaining and/or evaluating CRP and SAFE, implementation of grazing prescriptions, and implementation of livestock management requirements.

CUMULATIVE EFFECTS: General

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Future non-federal actions including ongoing conversion of orchards to housing developments, pesticide use, energy development, and farming and ranching activities that are not covered or permitted, s are expected to continue. The effects of these activities are addressed below and include reduced prey and food availability, increased predation risk, direct mortality, fragmentation, and disease. Additional, species-specific effects are addressed in subsequent sections.

Reduced Prey and Food Availability

Farming affects the prey base for birds and mammals as a result of pesticide and herbicide use, which is reasonably certain to continue in the action area. Generally, pesticide and herbicide applications are expected to negatively impact forage habitat for all covered species by decreasing insect levels or vegetation. Decreased vegetation may result in less hiding cover and more vulnerability to predation. However, herbicides used to manage noxious weeds or restore native vegetation can have beneficial effects. Farming, in general, may negatively affect insect abundance and richness (Wickramsinghe et al. 2004, p. 1284). Where we have information on potential toxicity effects to covered species from pesticides or herbicides, they will be addressed in subsequent sections.

Increased Predation Risk

Ongoing conversion of orchards to housing developments, pesticide use, energy development, and farming and ranching activities that are not covered or permitted, may reduce cover, increasing predator advantage (Douglas and Frisina 1993;Krausman et al. 2009, p. 16). Less

ground cover could also increase vulnerability to terrestrial predators while loss of multi-story vegetation may increase vulnerability to avian predation. Residents of Douglas County will continue to have dogs and cats. Domestic cats are widely recognized as predators on native wildlife, especially birds and small rodents (Hawkins 2004, pp. 165-166). The level of predation was "significant" in several studies (Soule 1999 as cited in Hawkins et al. 2004, pp. 166-167). This was found to be especially important in mixed urban-rural areas (Hawkins 2004, pp. 167-168). Feral/domestic cats have been shown to have a strong negative effect on many bird species. In a similar fashion, domestic dogs that have gone wild ("feral dogs") can also impact wildlife populations. One little-studied impact is the effect of feral dogs on wildlife behavior, such as avoidance and flight behavior. Aside from the obvious impact of predation on wildlife numbers, other impacts include avoidance behavior, interference with vital behavior already mentioned as well as gene dilution in wild canines through interbreeding (Bergman et al. 2009, pp. 180-181). Predation or disturbance to covered species by domestic or wild dogs and cats is possible, but is not known to be a major threat to the covered species in Douglas County. Actual households and barns are not Covered Activities under the MSGCP.

Fencing and transmission line construction and maintenance is expected to continue at current levels, or may be increased over time. A permanent increase in predation by avian predators will result from construction of new transmission lines and fences. In areas where the vegetation is low and the terrain relatively flat, power poles provide an attractive hunting and roosting perch, as well as nesting stratum, for many species of raptors and corvids (Steenhof et al. 1993, p. 27; Connelly et al. 2004, pp. 13-2; Vander Haegen et al. 2002, p. 503). Power poles increase a raptor's range of vision by allowing it to sit high off the ground, allow for greater speed during attacks on prey, and serve as territorial markers (Steenhof et al. 1993, p. 275). Raptors may actively seek out power poles in areas where natural perches are limited. For example, within one year of construction of a 372.5 mile (596 km) transmission line in southern Idaho and Oregon, raptors and common ravens began nesting along this stretch (Steenhof et al. 1993, p. 275). Raven counts increased by approximately 200 percent along the Falcon-Gondor transmission line corridor in Nevada within 5 years of construction (Atamian et al. 2007, p. 2). Direct injury or mortality of grouse may also occur from fencing or transmission lines, but that is addressed in subsequent sections.

Energy Development

In eastern Washington, most current energy development is focused on renewable energy, primarily utility scale or commercially viable wind energy. Wind energy is likely to continue to grow nationally and regionally on all types of land ownership, which raises concerns about the long-term impacts of wind energy developments on wildlife (Kunz et al. 2007, p. 315; National Research Council 2007, entire; Arnett et al. 2008, p. 61). The overall impact of wind energy facilities on habitat depends upon the habitat quality and wildlife community prior to facility construction (USFWS 2012b, p. 12). Some of the future energy development projects will have a federal nexus and will require ESA consultation; some will not. The state of Washington has wind power guidelines (2009) that encourage the protection of Priority Habitats and Species, through responsible siting and operational development and conservation at this time; the Service also has voluntary guidelines for siting, construction and operation decisions (USFWS 2012b) that are intended to complement other laws and policy that direct the siting and development of

wind energy projects. Nonetheless, habitat loss or disturbance impacts from future energy development projects in Douglas County may occur. Energy facilities may provide structures that are used by raptors for hunting or by crows or ravens for nesting, and such uses may result in increased predation on covered species.

Other Conservation Efforts

Shrub-steppe habitats are increasingly recognized as important. Such efforts as the Arid Lands Initiative (ALI), the Sage Grouse Initiative (SGI), the Western Association of Fish and Wildlife Agencies, the Washington Sage Grouse Working Group, and the Western Governors Association have all taken an increasing interest in shrub-steppe conservation.

The Arid Lands Initiative was spearheaded by TNC in 2010. It uses the TNC's Conservation Action Planning (CAP) methodology to identify key areas that meet conservation needs and guides conservation groups in focusing efforts. The CAP analyzes habitat linkages, species' key requirements and calls for monitoring of conservation efforts over the long term. Key to ALI's efforts are the efforts of the Washington Wildlife Habitat Connectivity Working Group, largely a cooperative effort by WDFW and the University of Washington (described in greater detail above). This project identifies important components of habitats based by species needs and identifies best and most likely areas to protect and enhance. These efforts in central Washington will likely continue, and be used to guide shrub-steppe conservation in Douglas County and central Washington.

Disease

It is known that zoonotic diseases may affect species populations and lead to extirpation and even extinction (Van Riper et al. 1986; Hochachka and Dhondt 2000, p. 5303). Less noticeable are subtle changes in numbers or range of affected species (Anderson and May 1991 as cited in Hochachka and Dhondt 2000, p. 5303). As suitable or preferred habitat area is reduced, the remaining individuals become more and more crowded into less and less area.

STATUS OF THE SPECIES: Columbia Basin Pygmy Rabbit:

Listing status

In 1990, the pygmy rabbit (*Brachylagus idahoensis*) was listed as a state threatened species by the Washington Wildlife Commission, which reclassified the species as endangered in 1993. Pursuant to the ESA, the USFWS listed the Columbia Basin distinct population segment of the pygmy rabbit as "Endangered" under emergency provisions in 2001 (66 FR 59734) and listed it as "Endangered" in 2003 (68 FR 10388).

Populations and Distribution

The pygmy rabbit utilizes appropriate shrub-steppe habitat across the Great Basin, including portions of California, Nevada, Utah, Wyoming, Idaho, Montana, Oregon, and Washington. The CBPR occurs in Washington and has been genetically isolated from the remainder of the species'

range for at least 10,000 years. Prehistoric climate-induced habitat changes probably account for the isolation of the Washington population. During the first half of the 20th Century, the pygmy rabbit likely occurred in portions of Douglas, Grant, Lincoln, Adams, Franklin, and Benton Counties (WDFW 1995a; USFWS 2012a).

The pygmy rabbit was presumed to be extirpated from Washington by the mid-20th century. However, a small population was discovered in Douglas County in 1987, and by 1997, six small populations were known to exist in Douglas and northern Grant Counties. Between 1997 and 2001, five of the six populations disappeared. Wildfire likely played a role in the disappearance of one of the small populations; others disappeared for unknown reasons. The sole remaining population was located at the state-managed Sagebrush Flat Wildlife Area. However, the Sagebrush Flat population also declined during this period, several animals were removed for captive breeding efforts, and by 2004 no CBPR were documented at the site (Hays 2001; USFWS 2012a).

In the fall of 2000, WDFW began developing captive breeding and reintroduction programs for the CBPR (USFWS 2012a, pp. 12-13). In 2002, 16 of the remaining wild animals were brought into the captive breeding program. Over the first 10 breeding seasons, the average annual growth rate of the captive population was roughly 25 percent, while the number of kits produced each breeding season increased from a low of 19 in 2002 to a high of 275 in 2010. In 2007, 20 captive-bred adult CBPR were released at Sagebrush Flat. These animals experienced very high mortality over the first several weeks following their release, and none were believed to have survived to the spring of 2008. Reintroduction efforts were paused following this initial release effort. In addition, it was determined that the captive breeding program, as originally configured, could not support anticipated reintroduction needs or sufficiently address some of the identified threats to the population.

In 2011, reintroduction efforts for the CBPR were resumed (USFWS 2012a, pp. 12-13). New measures that were implemented for the reintroduction efforts included translocating wild pygmy rabbits from populations outside of the Columbia Basin to include them in the recovery program, and temporarily holding some of the program animals for breeding at the release site in large (up to 11 acre (4 ha) enclosures. Supplementation continued in 2012 and 2013 with translocated pygmy rabbits. The animals have produced over 2,000 kits since the 2011 breeding season, most of which have been released to the wild at Sagebrush Flat Wildlife Area, and releases will occur in 2015 both at Sagebrush Flat and at Beezley Hills (in Grant County) (Russ MacRae, pers.comm. May 6, 2015). Breeding in the wild by captive-bred animals, wild-born kits, and reproduction of fully wild animals have been documented.

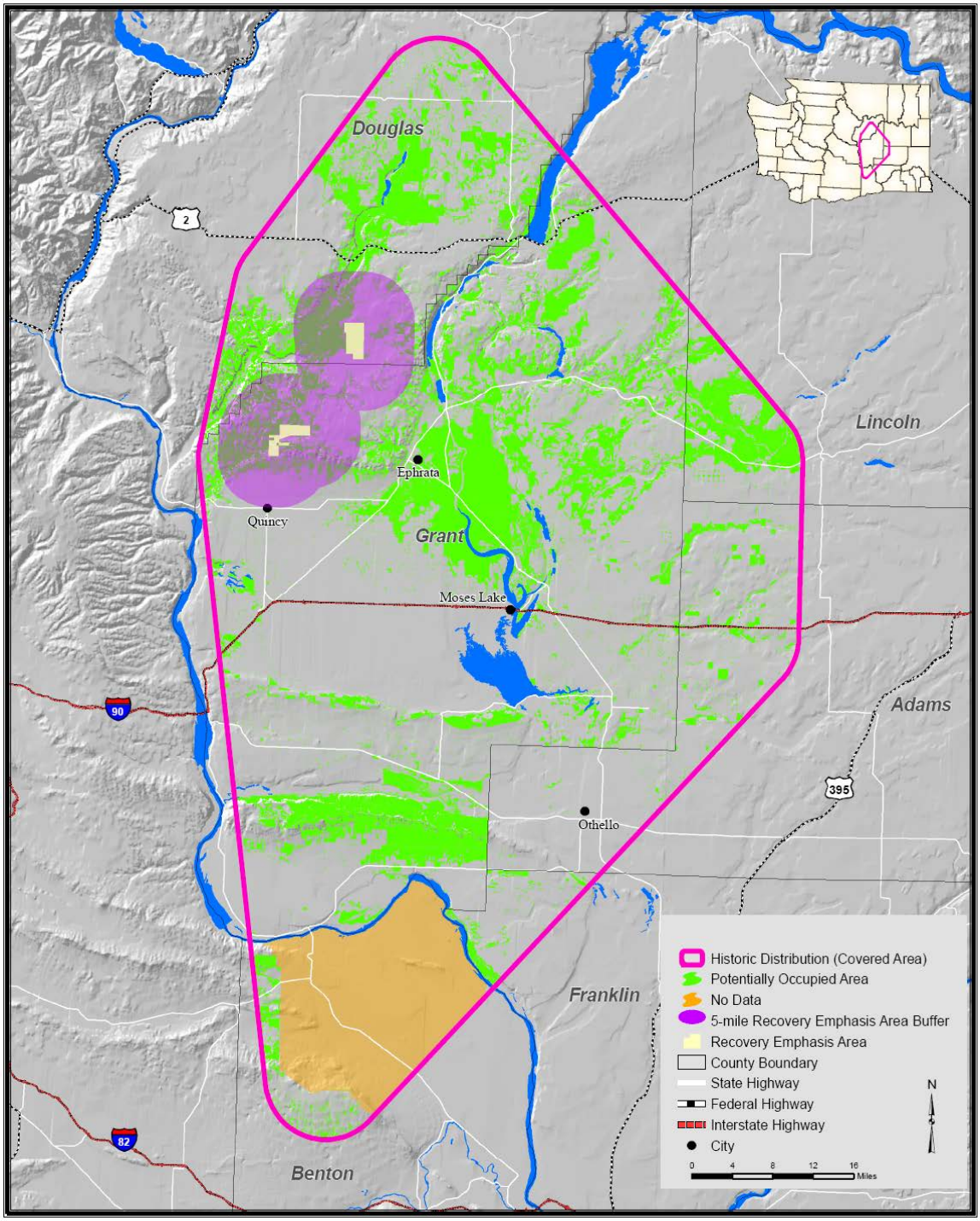

Figure 6. Historic Ranges and Recovery Areas for Columbia Basin Pygmy Rabbit.

The total area of historic range for the CBPR is 2,903,489 acres (1,175,000 ha), and within Douglas County the historic range includes 482,033 acres (195,071 ha). Fifty one percent (244,028 acres (98,754 ha)) of the historic range in Douglas County is shrub-steppe habitat that

could potentially support CBPR (Chris Warren, USFWS, pers. comm. February 20, 2014). CBPR habitat quantities are discussed in more detail in the Environmental Baseline section.

Life History

Pygmy rabbits have relatively small home ranges during winter, remaining within roughly 30 meters (100 feet) of their burrows (Orr 1940; Janson 1946; Katzner and Parker 1997; USFWS 2012a, p. 8), although some snow burrows may extend outward over 100 meters (330 feet) (USFWS 2012a, p. 8). Pygmy rabbits have larger home ranges during spring and summer (Janson 1946; Gahr 1993; USFWS 2012a, p. 8). During the breeding season in Washington, females tend to make relatively short movements within a small core area and have home ranges covering roughly 7 acres (3 ha); while males tend to make longer movements during this period, possibly in response to seeking out estrous females, resulting in home ranges covering roughly 50 acres (20 ha) (Gahr 1993; USFWS 2012a, p. 8). These home range estimates in Washington are considerably larger than for pygmy rabbits in other portions of their historical distribution (WDFW 1995; Katzner and Parker 1997; USFWS 2012a, p. 8).

Recent records from studies in Idaho indicate that juvenile pygmy rabbits often undertake a single, rapid dispersal movement at 6 to 10 weeks of age, and that some juvenile animals may disperse over 10 kilometers (6 miles) during this period (Rachlow and Estes-Zumpf 2005; USFWS 2012a, p. 8). In addition, adult pygmy rabbits may disperse over 7.5 mi (12 kilometers (km)) between their more restricted, seasonal use sites. While these movements are considerably longer than those documented in previous studies (e.g., Green and Flinders 1979; Katzner and Parker 1998; USFWS 2012a, p. 8) there appear to be large differences in the distance individual pygmy rabbits disperse, with many animals remaining relatively sedentary. Reflecting this, median recorded dispersal distances in Idaho were 0.7 miles (1.1 km) and 1.9 miles (3.0 km) for males and females, respectively (Rachlow and Estes-Zumpf 2005; USFWS 2012a, p. 8).

Pygmy rabbits have a lower potential for rapid increase in numbers than other Leporids (rabbits or hares). Pygmy rabbits are capable of breeding during their second spring or summer. In Washington, breeding occurs from January through June. Gestation lasts 22 to 24 days. Young are born in natal burrows constructed by the female shortly before parturition. Litter size ranges from four to eight, and females may produce up to four litters per year (WDFW 1995a; USFWS 2012a, p. 10).

Pygmy rabbit juvenile survival is initially low with up to 50 percent mortality during the first 5 weeks after birth. Starvation and environmental stress account for some mortality while predation is the leading cause of mortality. Predators of CBPRs include coyote (*Canis latrans*), badger (*Taxidea taxus*), long-tailed weasel (*Mustela frenata*), great-horned owl (*Bubo virginianus*), short-eared owl (*Asio flammeus*), northern harrier (*Circus cyaneus*), prairie falcon (*Falco mexicanus*), and golden eagle (*Aquila chrysaetos*) (USFWS 2012a, pp.10-11). Pygmy rabbits maintain a low stance, have a deliberate gait, and are relatively vulnerable in more open areas. They can evade predators by maneuvering through the dense shrub cover of their preferred habitats, often along established trails, or by escaping into their burrows (Bailey 1936; Severaid 1950; Bradfield 1974; USFWS 2012a, pp. 8-9).

Habitat Requirements

CBPR distribution is highly dependent upon the big sagebrush (*Artemisia tridenta*)/bluebunch wheatgrass (*Pseudoroegneria spicata*) habitat type. This habitat type is characterized by four well-defined vegetation layers. The first consists of various shrub species, primarily big sagebrush that are intermixed with a second layer of tall perennial grasses, principally bluebunch wheatgrass. A low-lying layer of perennial and annual grasses and forbs, usually less than 4 inches in height, comprises the third layer. The fourth layer is a thin, fragile, cryptogamic crust, which is located directly on the surface of the soil. Pygmy rabbits are extremely dependent on sagebrush to provide both food and shelter throughout the year (USFWS 2012a). In the winter, sagebrush comprises up to 99 percent of the CBPR's diet. Sagebrush continues to be the most important diet item (51 percent) followed by grasses (39 percent) and forbs (10 percent) in spring and summer (USFWS 2012a). Presence of sagebrush cover is a requisite for pygmy rabbit habitat (WDFW 1995a). In southeastern Idaho, percent cover of sagebrush averaged 46 percent with a mean height of 56 centimeters (Green and Flinders 1980); in Oregon, percent cover of sagebrush averaged 29 percent, mean height 33 inches (84 centimeters) (Weiss and Verts 1984); and in Washington percent cover of sagebrush averaged 33 percent, mean height 31 inches (82 centimeters) (Gahr 1993). In southeastern Idaho, burrow areas were characterized by a significantly higher percent cover of big sagebrush (22 percent), total forbs (7 percent) and total live shrubs (29 percent), while percent soil surface litter was significantly lower than non-burrow areas (Heady 1998; Heady et al. 2001). Additionally, mean height and density of shrubs greater than 20 inches (50 centimeters) was significantly greater at burrow sites than points 16 feet (5 meters) from burrows (Heady 1998; Heady et al. 2001).

In Idaho, the size of winter home ranges may be influenced more by cover than forage availability, as areas occupied by pygmy rabbits generally had significantly more shrubs, greater coverage of shrubs, and taller, wider shrubs than non-use areas (Katzner and Parker 1997). Pygmy rabbits selectively used dense, structurally diverse stands of big sagebrush; these areas also had greater snow accumulation (Katzner and Parker 1997). As total exposed food and vegetative cover decreased because of snow accumulation, pygmy rabbits in Idaho decreased the size of their home range and created extensive subnivean (occurring beneath a layer of snow) burrow systems, presumably to access food resources (Katzner and Parker 1997, Katzner et al. 1997).

The CBPR is considered a shrub-steppe obligate species (WDFW 1995a). Within the shrub-steppe ecosystem, populations are restricted to habitat characterized by deep soil and tall, dense stands of sagebrush (USFWS 2001). Historically, these local-scale habitats were likely uncommon and patchily distributed (WDFW 1995a). In Oregon, sites occupied by pygmy rabbits were typified by significantly greater mean soil depth (51.0 cm), mean soil strength of surface (0.8 kg/cm2), and subsurface horizons (3.8 kg/cm2) than unoccupied sites. Additionally, pygmy rabbits avoided areas with dense stands of cheatgrass (*Bromus tectorum*) (Weiss and Verts 1984).

The pygmy rabbit is one of only two native leporids (hares or rabbits) in North America that digs its own burrows (Green and Flinders 1980a; WDFW 1995; USFWS 2012a, p.9). As such, pygmy rabbits are most often found in areas that contain relatively deep (greater than 20 inches

(51 centimeters)), loose soils of wind-borne or water-borne origin that allow burrowing (WDFW 1995; USFWS 2012a, p. 9). Pygmy rabbits occasionally make use of natural cavities, holes in volcanic rock, rock piles, sand dunes, artificial structures, or burrows abandoned by other species, such as the yellow-bellied marmot (*Marmota flaviventris*) or badger (*Taxidea taxus*) (Green and Flinders 1980; WDFW 1995; USFWS 2012a, p. 9). As a result, pygmy rabbits may occur in areas of shallower, more compact, or sandy soils that support sufficient shrub cover (Bradfield 1974; USFWS 2012a, p. 9). These atypical burrow sites, which are most often adjacent to areas containing dense sagebrush stands and deep soil conditions, may facilitate dispersal behavior and function as corridors between suitable habitats (Katzner and Parker 1998). During winter, pygmy rabbits make extensive use of snow burrows to access sagebrush forage (Bradfield 1974; Katzner and Parker 1997; USFWS 2012a, p. 9) and to provide thermal cover (USFWS 2012a, p. 9).

Pygmy rabbits typically dig their burrows into gentle slopes or mound/inter-mound areas of more level or dissected topography (Wilde 1978; U.S. Department of Agriculture [USDA] 1991; Gahr 1993; USFWS 2012a, p. 9). Burrows frequently have multiple entrances, some of which are concealed at the base of large sagebrush plants (Janson 1946; Wilde 1978; Green 1979; Gahr 1993; USFWS 2012a, p. 9). Otherwise, individual burrows are relatively simple and shallow, often no more than 6.6 feet (2 meters) in length and usually less than 3.3 feet (1 meter) deep with no distinct chambers (Bradfield 1974; Green and Flinders 1980; Gahr 1993; USFWS 2012a, p. 9). The diameter of burrow entrances in Washington averaged 8 inches (19 cm) (Gahr 1993 USFWS 2012a, p. 9). The small, shallow trenches typically found at burrow entrances are referred to as runways.

Pygmy rabbits, especially juveniles, likely use their burrows as protection from predators and inclement weather (Bailey 1936; Bradfield 1974; USFWS 2012a, p. 9). In general, the number of active burrows in an area increases over the summer as the number of juveniles increases. However, the number of active burrows is not directly related to the number of individuals in a given area because some individual pygmy rabbits appear to maintain multiple burrows, while some individual burrows are used by multiple individuals (Gahr 1993; WDFW 1995; USFWS 2012a, p. 9).

Threats

Habitat Loss and degradation including Fire

Abundance and distribution of suitable habitat is the most significant limiting factor for the CBPR. Historically, conversion of shrub-steppe habitat for dryland grain production and intensive grazing led to the greatest loss of habitat. More frequent, intense wildfires have also negatively impacted significant areas of former CBPR habitat, as sagebrush is easily killed by fire (USFWS 2013); one population of pygmy rabbits in Washington was extirpated after a catastrophic fire in 1999 (USFWS 2012a, p. 12). The majority of former CBPR habitat in Washington has been altered to the point that it can no longer support this species (WDFW 1995; USFWS 2012a).

Dry-land and irrigated crop production and development have converted and fragmented large portions of the native shrub-steppe habitats that were historically present within the Columbia Basin (Daubenmire 1988; Franklin and Dyrness 1988; Dobler et al. 1996; WDFW 1995); nearly 60 percent of the original shrub-steppe habitat within the Columbia Basin has been converted to other uses. Much of the remaining shrub-steppe habitat has been degraded and/or fragmented and continues to be affected by fire frequencies, establishment of invasive plant species, recreational activities, and livestock grazing (USFWS 2012a, p. 13-14).

Livestock Grazing

Livestock grazing can have a negative impact on the pygmy rabbit, and the effects may depend on a variety of factors including livestock type, timing and duration of grazing, stocking densities, locations of water or mineral supplement blocks, and other factors that may concentrate livestock use. Impacts to pygmy rabbits may include damage to burrow systems and possible direct mortality to young due to trampling (Rauscher 1997, USFWS 2012a), altered movement and behavioral patterns (Gahr 1993; Siegel 2002; USFWS 2012a), fewer available burrows (Siegel 2002; USFWS 2012a), and decreased quantity and nutritional quality of forage species in grazed areas (Siegel-Thines et al. 2004; USFWS 2012a).

Predation and Mortality

Predation may be a major cause of mortality of CBPRs. Predation is not likely to represent a serious threat to the continued existence of a large, well-distributed population. However, altered, or even natural predation levels, may pose a significant threat to the recovery of CBPRs in Washington, due to the small population size and localized distribution of the CBPR. Several species of birds and mammals prey on CBPRs, including coyote (*Canis latrans*), badger (*Taxidea taxus*), long-tailed weasel (*Mustela frenata*), bobcats (*Felis rufus*), and a variety of avian predators such as great horned owls (*Bubo virginianus*), long-eared owls (*Asio otus*), ferruginous hawks (*Buteo regalis*), northern harriers (*Circus cyaneus*), and common ravens (*Corvus corax*) (Janson 1946; Gashwiler et al. 1960; Green 1978; USFWS 2012a, p. 11; WDFW 1995, p. 6). Raptors and corvids may take advantage of perching or nesting structures, such as power poles, with resultant increases in predation of pygmy rabbits.

Pygmy rabbits are difficult to distinguish from cottontail rabbits (*Sylvilagus spp.*). In areas where pygmy rabbits and cottontail rabbits may both be present, pygmy rabbits may be vulnerable to harvest during legal hunting seasons for cottontails (USFWS 2012a).

Recovery efforts that require trapping, handling, translocation, and/or captivity of CBPRs can result in mortality from several causes, including capture stress, intra-specific fighting, entanglement in traps, and trap predation. The recovery plan describes annual mortality from captive breeding efforts at approximately two percent, and annual mortality from reintroduction efforts at about three percent (USFWS 2012a, p. 16).

Disease

CBPRs can harbor a high parasite load and ticks, fleas, and lice can be disease vectors. Other rabbit species have suffered episodes of plague and tularemia from these vectors (USFWS 2012a, p. 17). No severe disease epidemics have been reported in CBPRs in the wild, and parasites have not been a significant threat to the species. However, several captive CBPRs have died as a result of various diseases, especially coccidiosis and mycobacteriosis. A protozoan (*Eimeria spp.*) causes coccidiosis and can be found in feces and in the soil. The bacterium that causes mycobacteriosis (*Mycobacteium avium*) is found in soil and water and can survive for long time periods. The bacterium can be shed in high numbers in feces and urine.

Skeletal abnormalities were detected in one wild-caught CBPR and a number of captive purebred and intercross progeny (WDFW 2004; USFWS 2012a, p. 13). These abnormalities consist of missing or malformed metacarpal and metatarsal bones of the fore and hind feet, respectively, and may be a result of inbreeding (Green 1935). It is currently unclear whether the condition persists after additional efforts to outcross the CBPR were implemented.

Pesticides

CBPR exposure to agricultural pesticides or herbicides is possible given the extent of agricultural development within the species' range. However the number of CBPR that may be exposed or at risk of exposure is unknown, as are the actual effects of agricultural chemicals on this species.

Other Threats

The extremely low population size and very limited geographic distribution of the CBPR makes it highly susceptible to random environmental events, including the following (USFWS 2012a, p. 20):

1) Sudden changes in food availability or habitat due to wildlife or insect infestations,
2) Random weather events such as severe storms, prolonged drought, and extreme cold spells,
3) Inbreeding,
4) Predation or parasite populations,
5) Disease outbreaks,
6) Low reproductive success, and
7) Wildfires.

The potential reestablishment of the CBPR and its long-term security in the wild are at significant risk due to these influences.

Recovery needs

The CBPR recovery plan (USFWS 2012a) has a phased approach. The three general phases are: 1) removal or abatement of imminent threats to the population and the potentially suitable shrub-steppe habitats in the Columbia Basin; 2) reestablishment of an appropriate number and

distribution of free-ranging subpopulations over the near term; and 3) establishment and protection of a sufficiently resilient, free-ranging population that would be expected to withstand foreseeable long-term threats.

Each recovery emphasis area for the CBPR is designed to contain a sufficient quantity and quality of shrub-steppe habitat currently, or in the future, to support at least 500 individuals to ensure an effective population size and maintain sufficient genetic diversity (Franklin 1980; Soulé 1980, as referenced in USFWS 2012a, p. 38). One or more additional recovery emphasis areas may be identified in the future in eastern Washington.

Recovery objectives in the near term (2012 to 2021) include (USFWS 2012a, pp. 44-45): 1) revising the reintroduction and genetic management plan based on adaptive management; 2) retaining Columbia Basin ancestry in reintroduced CBPRs; 3) maintaining a sufficient number and composition of CBPRs in the partially controlled field-breeding efforts until at least one free-ranging subpopulation is reestablished; 4) establishing subpopulations at two recovery emphasis areas with each having a 5-year average population size of at least 125 individuals; 5) developing appropriate updated estimators for CBPR abundance; 6) as necessary, establishing additional recovery emphasis areas and/or dispersal corridors through appropriate conservation agreements; and 7) developing and implementing appropriate conservation agreements that lead to proactive voluntary conservation efforts with landowners, managers, and other interested parties within the historical distribution of the CBPR.

Recovery actions in the CBPR recovery plan (USFWS 2012a) include:

- Action 1: Manage partially controlled field-breeding for the CBPR.
- Action 2: Survey for, monitor, and assess free-ranging CBPRs.
- Action 3: Reestablish free-ranging CBPR subpopulations within their historical distribution.
- Action 4: Protect free-ranging CBPRs.
- Action 5: Manage habitats at recovery emphasis areas to support stable, self-sustaining subpopulations of free-ranging CBPRs.
- Action 6: Pursue conservation agreements for the CBPR with landowners and managers of intervening properties within the population's historical distribution.
- Action 7: Exchange information with stakeholders and the general public to address concerns and increase support for CBPR recovery efforts.
- Action 8: Secure funding for CBPR recovery efforts.
- Action 9: Revise the Federal Recovery Plan to facilitate implementation of adaptive management measures considered necessary to achieve the phased recovery strategy.

In the longer term (after approximately 2021), the recovery plan expects to increase the size, number, distributions, and security of free-ranging subpopulations of the Columbia Basin pygmy rabbits so that the population may be reclassified as threatened, and ultimately de-listed. The recovery plan describes varying scenarios of distribution and populations of the Columbia Basin pygmy rabbit where reclassification from endangered to threatened may be considered (USFWS 2012a, p. 46):

1. Subpopulations at 2 recovery emphasis areas that each have a 5-year average effective population (animals in a population that actually contribute to reproduction) of at least 375 individuals, and a third recovery emphasis area has been formally established through completion of one or more appropriate conservation agreements and is available for initial reintroduction efforts; or
2. A subpopulation at 1 recovery emphasis area has a 5-year average effective population of at least of 250 individuals, and subpopulations at 2 other recovery emphasis areas each have a 5-year average effective population of at least 125 individuals; or
3. A single subpopulation with a 5-year average effective population of at least of 750 individuals has been reestablished through dispersal and range expansion from one or more recovery emphasis areas, and appropriate conservation agreements have been reached to include the newly occupied habitats within the recovery emphasis area(s) involved and management measures to maintain identified dispersal corridors have been agreed to and implemented.

Implemented Conservation Actions and Recovery Efforts

The CBPR Recovery Team has formally identified two sites as the top priority sites to consider for near-term recovery objectives, including initial reintroduction efforts. One of the "recovery emphasis areas" is located in the central Moses Coulee area of southern Douglas County (the Sagebrush Flat site) and the other is in the Beezley Hills area of northern Grant County. These two sites are actively managed to help conserve the Columbia Basin pygmy rabbit in the wild and represent areas where long-term recovery objectives may be attained (USFWS 2012a, p. 29). WDFW manages the Sagebrush Flat site which totals approximately 3,740 acres (1,514 ha), while TNC and a private landowner manage the site in northern Grant County, which totals approximately 3,390 acres (1,372 ha) (USFWS 2012a, p. 29). The Nature Conservancy and BLM manage additional lands within 5 miles (8 km) of the recovery emphasis areas that total approximately 7,000 acres (2,833 ha) in the broader Moses Coulee area and approximately 12,000 acres (4,856 ha) in the broader Beezley Hills area.

As described previously under populations and distribution, the WDFW developed a captive breeding program beginning in 2000; the first reintroduction efforts of captive-bred CBPRs occurred in 2007, but these animals suffered very high mortality rates and none survived to the spring of 2008 (USFWS 2012a, pp. 24-30). In 2011, the recovery strategy for the CBPR was modified in order to increase the potential for successful population recovery, and included translocations, breeding rabbits in semi-wild conditions on the release site, and releasing juvenile offspring of mixed lineage, and adult wild-caught pygmy rabbits from neighboring states (Becker 2013, USFWS 2012a, p. 30). As of 30 June 2013, more than 200 pygmy rabbit kits had been released into the wild. Winter surveys during December 2012 and January 2013 on more than 2,400 acres on or near the Sagebrush Flat Wildlife Area located approximately 110 active burrows (Becker 2013).

The WDFW continues to coordinate with NRCS on changes to CRP and SAFE acres. For example, in 2013 where mid-term changes to CRP were needed, the WDFW, NRCS, and landowners near Sagebrush Flat developed measures to maintain patches of habitat where CRP fields required mowing and harrowing to provide continued forage and cover for CBPRs. NRCS

and WDFW have a "contribution agreement" to continue similar efforts through 2014, and it is expected that this coordination will continue.

ENVIRONMENTAL BASELINE: Columbia Basin Pygmy Rabbit

A general baseline description, applicable to all covered species, was previously described and is incorporated here by reference. The following discussion adds detail regarding the CBPR.

Conservation Role of the Action Area

Douglas County supports one of the two CBPR "recovery emphasis areas" that have been designated by the recovery team to date. The recovery emphasis area is located in the central Moses Coulee area of southern Douglas County (the Sagebrush Flat site) (USFWS 2012a, p. 29). Introduction, breeding and release activities have occurred at Sagebrush Flat, and are likely to continue in Douglas County, while other efforts at Beezly Hills and other locations in Grant County Continue. These are the areas where CBPR are likely to establish and breed in the wild, making Douglas County very important for the survival and recovery of the CBPR.

Douglas County

Within Douglas County the following acreages are relevant to our effects analysis for the CBPR (Chris Warren pers. comm. February 20, 2014):

- The historic range in Douglas County for CBPR includes 482,033 acres (195,071 ha).
- 244,028 acres (98,754 ha) (51 percent) of the historic range is shrub-steppe habitat that could potentially support pygmy rabbits.
- 61,883 acres (25,022 ha) of the historic range in Douglas County includes Federal, WDFW, and TNC lands that are unlikely to be farmed and/or would not be included as covered lands under the MSGCP, leaving approximately 420,000 acres (169,967 ha) that may have farming or ranching activities.
- Of the 420,000 acres, we assume about ~214,200 acres of shrub-steppe habitat (86,683 ha) (51 percent) of that area within the historic range in Douglas County could support CBPRs if populations increased.

Sagebrush Flat is a recovery emphasis area in Douglas County and includes 3,240 ac (1,311 ha) of deep soil shrub-steppe owned and managed by the WDFW. This area represents the largest block of CBPR habitat in the State (WDFW 2000). There were approximately 200 CBPRs in the general Sagebrush Flat area in Douglas County in 2013. Since then, numbers have increased in Sagebrush Flat and offspring have been released from the enclosures, but the total number of CBPR in Douglas County is not currently known.

Previous Section 7 Consultations and Service Permitting Actions

Following Federal listing of the CBPR in 2001, the Service issued an endangered species recovery permit (TE-050644-0) to WDFW pursuant to section 10(a)(1)(A) of the ESA (USFWS 2003). The recovery permit exempts incidental take of the CBPR resulting from the State's captive breeding and reintroduction programs, and which would otherwise be prohibited by

section 9 of the ESA. The recovery permit, which has been periodically amended since its issuance, includes a requirement for annual reporting and a requirement for development and updating of a Captive Breeding and Genetics Management Plan (WDFW 2010).

The Service and the WDFW signed a CBPR Template Safe Harbor Agreement (SHA; USFWS and WDFW 2006) in October 2006. In exchange for actions that contribute to CBPR recovery on non-Federal lands, participating property owners receive formal assurances that if they fulfill the conditions of the SHA, the Service will not require additional management activities by the participants without their consent. To date, the Service has issued 17 Enhancement of Survival Permits under the SHA, covering management activities on over 120,000 acres (49,000 hectares) of habitat in Douglas and Grant Counties. Permittee responsibilities under the SHA include, but may not be limited to, the following: 1) provide Service, WDFW, or a mutually agreeable third party access and opportunity to conduct surveys for CBPRs; 2) allow Service and WDFW to capture and remove CBPRs from properties being considered for enrollment, as appropriate to help achieve recovery objectives, 3) provide Service and WDFW access to enrolled properties for the term of associated Permits, through a mutually-agreeable notification process, to monitor any CBPRs present, 4) notify Service at least thirty days prior to undertaking any habitat-altering activity that could result in authorized incidental take of CBPRs, and provide the Service and WDFW the opportunity to translocate any affected CBPRs to suitable alternate site(s) prior to implementation of those activities, and 5) immediately notify Service upon finding any dead or accidentally killed CBPRs on enrolled property, or immediately contact an appropriate representative of Service or WDFW for assistance if identification of the specimen is uncertain. Other landowners, such as The Nature Conservancy, have additional responsibilities with the goal of more directly supporting recovery efforts.

The SHA expected that intervening lands (non-Federal and non-WDFW properties outside of recovery emphasis areas), while not actively managed to conserve the CBPR, would nevertheless contribute to recovery efforts. Any such property that could be voluntarily managed to provide a net conservation benefit to the population would be considered eligible for inclusion under the existing SHA for the CBPR. Potential benefits that could be realized on intervening properties include:

- Suitable habitat on intervening properties would be available for use by CBPRs released to recovery emphasis areas.
- Undeveloped habitats on intervening properties would facilitate dispersal of newly released animals and enhance connectivity of recovery emphasis areas and other potentially occupied sites.
- New subpopulations may form on intervening properties through natural expansion.
- Additional purebred CBPRs may be located on intervening properties and managed in place, secured for partially controlled breeding efforts, and/or directly translocated to one or more recovery emphasis areas.
- Monitoring and future collection of biological information (e.g., dispersal, survival, productivity, habitat use) would be improved through cooperative management efforts on intervening properties.

- Research and adaptive management measures could be made more comprehensive if implemented at a broader scale through the inclusion of, and facilitated access to, intervening properties.
- The successful implementation of cooperative, proactive management measures on intervening properties would increase public awareness and support for the CBPR recovery program.

The voluntary management measures that would be expected to provide one or more of the above conservation benefits on intervening non-Federal and non-WDFW properties are identified and documented as specific properties are enrolled under the SHA.

Certain levels of incidental take of CBPRs were allowed in the biological opinion addressing the SHA over the 20-year life of the agreement:

1) For enrolled properties that comprise a recovery emphasis area, the Service anticipated that no more than 5 CBPR (1 percent [of up to 500 individuals in a recovery emphasis area]) would be incidentally taken due to direct injury or mortality (wound or kill); no more than 10 CBPR (2 percent) would be incidentally taken due to activities that may harm or harass; and no more than 25 CBPR (5 percent) would be incidentally taken due to capture efforts in response to future notifications of planned habitat conversions.

2) For enrolled intervening properties, the Service anticipated that no more than 10 CBPR (2 percent) would be incidentally taken due to direct injury of mortality (wound or kill); no more than 25 CBPR (5 percent) would be incidentally taken due to activities that may harm or harass; and no more than 125 CBPR (25 percent) would be incidentally taken due to capture efforts in response to future notifications of planned habitat conversions.

Any capture operations undertaken in response to participants' future notifications of planned habitat conversions would be carried out by qualified personnel under WDFW's existing Federal Recovery Permit (TE050644-3).

Habitat Suitability Index (HSI) model

Appendix D in the MSGCP describes potential CBPR habitats within Douglas County. Historically the CBPR likely burrowed in deep soils and dispersed throughout other shrub-steppe habitats found generally in the south-east half of the County (see figure D2 in Appendix D of the MSGCP).

Foster Creek Conservation District, WDFW, and others developed a habitat model that determined the Habitat Suitability Index (HSI) (Ch.3 and Appendix G of the MSGCP), and evaluated potential changes over time for the MSGCP. The HSI is a model for determining the value of existing habitat by comparing it with an idealized habitat and contains a suite of environmental parameters needed by each species to successfully live and reproduce. For example, the parameters for a species might include foraging areas, migration areas, amount of escape cover, and amount of nesting cover. Values, such as acres or percent cover, for these environmental parameters are assessed for each species to determine a ranking factor for each

area that indicates the relative impact each action has on the species. The HSI values range from 0.0 (no value) to 1.0 (most benefit to the species). In other words, an HSI model evaluates not just quantity of habitat, but also connects a quality value to the habitat. For the pygmy rabbit, the modeling team used a very narrow interpretation of habitat, and the HSI acres are relatively small (Table 2). Because the data in the initial HSI model are becoming dated, the FCCD and others will need to conduct a new run of the same or similar model with current imagery early in MSGCP implementation to illustrate the baseline condition for pygmy rabbit habitat quantity and quality. The model results are also displayed in more detail, including acres for dryland agriculture, rangelands and irrigated agriculture in the MSGCP, in Chapter 3. The HSI information in the MSGCP, below, and later in the opinion, should be used to illustrate predicted habitat improvement trends, but the eventual HSI values may change based on the next habitat modeling evaluation process.

Table 2. Modeled HSI acre and population estimates for the CBPR. (MSGCP, 2015)

COVERED SPECIES	MODELED CONDITION HSI ACRES[1]	EXISTING CONDITION-- ESTIMATED MSGCP SPECIES POPULATIONS (NUMBER OF INDIVIDUALS)[2]
CBPR	6,011 acres (2432 ha)	200

[1] 2005 conditions HSI-Acre values computed from habitat conditions data obtained with satellite imagery.

[2] CBPR existing condition numbers at risk based on a round estimate of individuals after successful reintroduction effects in 2013.

EFFECTS OF THE ACTION: Columbia Basin Pygmy Rabbit

The purpose of the MSGCP is to implement actions on farming and ranching lands in Douglas County that conserve the covered species, including the CBPR. The effects to the species are minimized by implementation of BMPs under farm plans, including CPs and specific land-use measures that result in maintaining and improving habitat. While implementation of BMPs improve habitat, ongoing Covered Activities also have adverse effects to the CBPR and its habitat. The CBPR is affected by general effects to shrub-steppe habitats, as described previously in the general effects section. That discussion is incorporated here by reference. The effects to the CBPR may occur in various locations within the historic range of the CBPR in Douglas County on Permittees' lands over the 50-year duration of the MSGCP.

Early in the development of the MSGCP, the planning team met and discussed the impacts of Covered Activities on covered species in Douglas County. A review matrix was established identifying the relative non-numerical severity or impacts of various activities on each of the MSGCP covered species (MSGCP Table 3-1). The Service added more detail to the review

matrix, and this is included in Appendix B Table 1. As discussed above, and in Appendix B, the MSGCP contains many BMPs and CPs designed to minimize, mitigate and avoid harmful impacts from the Covered Activities. The matrix in appendix B Table 1 lists the measures that will be applied through the MSGCP and individual farm plans and site plans to minimize effects. These effects are discussed in more detail in the following sections. Actual effects will vary with farm location, activity types, and habitat and CBPR distribution and potential habitat on each farm.

Many of the farming and ranching impacts to CBPRs are habitat based, including loss of habitat, continued fragmentation, and changes to habitat quality (positive and negative). There is also the chance of disturbance, injury, or mortality in some instances (Appendix B Table 1). Injury or mortality may occur from impacts to individual CBPRs, indirectly through loss of cover resulting in predation, and breeding and sheltering may be impaired through disturbance or damage to burrows. Injury or mortality could occur through mowing, burning, plowing, brush/beating, predator control, moving and herding livestock in CBPR occupied areas, or through concentrating livestock operations in occupied areas. The injury or mortality could occur from machinery, livestock trampling, or impacts to burrows, especially maternal burrows. The likelihood of killing or injuring a CBPR from these measures is probably small initially, but increases as the exposed population increases. The following BMPs minimize the risk of injury or mortality:

- Provide USFWS and WDFW access to enrolled properties through a mutually-agreeable notification process to survey for and monitor any pygmy rabbits present.
- Notify USFWS at least 30 days prior to undertaking any habitat-altering activity (such as conversion of CRP or SAFE lands) that could result in authorized incidental take of pygmy rabbits. Provide the USFWS and WDFW the opportunity to translocate any affected pygmy rabbits to suitable alternate site(s) prior to implementation of those activities.
- Immediately notify USFWS upon finding any dead or injured pygmy rabbits on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
- Avoid constructing new structures that serve as perches or nest sites for avian predators (e.g., windmills).

Effects Specific to Ranching

As presented in Appendix B, Table 1, ranching activities may adversely affect CBPR as a result of certain livestock grazing and other ranching practices that impact potentially suitable shrub-steppe habitats on enrolled properties. These impacts include adverse effects on the forage and cover requirements of CBPR. In addition, livestock grazing and other ranching-related activities (e.g., herding, transport) may disturb or damage burrow systems of CBPR and, in some cases, could even cause direct injury or mortality of CBPR due to trampling. Finally, various range management activities (e.g., brush beating, prescribed fire) may alter the vegetation characteristics of existing habitats and could potentially make them less suitable or unsuitable for the CBPR. However, there is currently a lack of information regarding the specific effects that livestock grazing and other ranching-related activities may have on the life history requirements of the CBPR (68FR10400). Poorly managed livestock grazing may preclude CBPR use of

habitat, while moderate grazing levels may still decrease forage and require larger home ranges (Gahr 1993). Light or moderate levels of livestock grazing may be compatible with conservation of CBPR but it has not been well studied (68FR10400). Implementation of BMPs including required grazing prescriptions implemented through the MSGCP would minimize the effects to the CBPR through ensuring that cover and forage is provided consistent with the grazing plans.

Such infrastructure maintenance practices as road and trail management, water development, and infrastructure such as fences and fence maintenance, may temporarily reduce habitat quality, or provide perches for avian predators, but the infrastructure can, if implemented to rotate pastures more effectively, result in an improvement of habitat quality. While such practices as grazing rotation, moving and herding stock, distributing water (systems), salt distribution, wintering, confining, calving, feeding and manure management may also result in temporary negative impacts and, possibly, even isolated mortality, implementation of these activities with the measures described below is expected to result in an overall improvement of habitat quality.

In addition to the ranching BMPs described under general effects, the following species-specific measures (Appendix E of MSGCP) add additional minimization measures for ranching (and potentially some farming) activities.

In known occupied habitats:

- Survey fence lines to locate active burrows. Limit clearing of fence line to 8' width by hand or mower. No mowing or brush removal within 30' of a burrow.
- No in-ground posts (metal or wood) within 30' of a burrow. Use rock jacks or figure-4 braces within 30' of a burrow and no posts of any kind within 10' of burrow. Limit activities to late summer and fall (avoid breeding, rearing period, and winter high stress period).
- Utilize Integrated Pest Management practices that consider the range of treatment options (including: biological agents, mechanical, hand pulling, grazing practices).

Effects Specific to Farming (irrigated and dryland)

Certain farming activities (e.g., equipment staging and storage, field access, pest control) on suitable, undeveloped habitats adjacent to crop fields could potentially impact the CBPR as a result of disturbance or damage to burrow systems and direct injury or mortality of individual animals. In addition, it is possible, although considered very unlikely, that farming activities on existing crop fields could directly injure or kill dispersing CBPR. Farming activities may make CBPR more vulnerable to predation due to a lack of cover on these developed lands.

During the MSGCP development process, a group of local biologists considered the effects to covered species from potential loss of some CRP fields in Douglas County (R. Fox et al. 2003 Pers. Comm.). The CBPR previously occupied shrub-steppe habitats over deep soils in Sagebrush Flats, near Jameson Lake, Coyote Canyon, and Lynch Coulee (Grant County). CBPRs were known to use CRP fields adjacent to shrub-steppe habitat at one location in Coyote Canyon. These populations disappeared by 2001. Loss of these populations could be attributed to fires that occurred in areas with burrows or could be related to the general decline in CBPRs that occurred in the 1990s (68 FR 10393). At another site east of Jameson Lake, CBPRs used an

abandoned wheat field that was dominated by big sagebrush with little or no herbaceous understory. At this site burrows were also restricted to the edge of the field near existing shrub-steppe. CRP fields adjacent to shrub-steppe habitat are likely used by CBPRs for travel among subpopulations and foraging sites near burrows, and possibly for burrowing on the edges.

Under the MSGCP, if CRP parcels or other habitats are converted to farming on enrolled lands, the Service would be notified at least 30 days prior to undertaking any habitat-altering activity, to give the Service and/or WDFW the opportunity to move any CBPRs that may be affected by the conversion of habitat. If CRP/SAFE parcels are converted, remnant patches of shrub-steppe within the CRP/SAFE will be maintained and protected from degradation. A process to evaluate and address potential changed circumstances has been built into the MSGCP, and if the CRP/SAFE acres decrease below 10 percent of the starting acres in the County as a whole, and additional lands are not protected within 2 years to go above that 10 percent trigger, then the adequacy of the MSGCP will be revisited, as described previously in the description of the proposed action.

Over time, CRP and SAFE acres fluctuate during the life of the MSGCP, and have both beneficial and negative effects to the CBPR. The MSGCP expects that those acres in Douglas County may dip below a 10 percent change from June 30, 2013 numbers (182,072 acres (73,681 ha)) (as described in changed circumstances in the MSGCP) and stay at that point for as long as two years while the FCCD and other partners evaluate how to come up above the 10 percent change point. We assume that CRP/SAFE acres may dip below 10 percent within 2-year periods, up to 6 times (based on estimated CRP contract renewal points, and assuming 10-year renewal periods) during the 50-year term of the MSGCP. It is assumed that even if CRP contracts are not renewed for all acres, many farmers would not immediately begin cropping those acres.

Effects and HSI analysis

As described under the environment baseline discussion, the FCCD worked with WDFW and NRCS to develop a model of habitat suitability over time. Estimates of HSI-Acres were further defined for the existing conditions and projected out approximately 10 years and 50 years (Table 3; and Table 3-2of the MSGCP). The modeling team predicted that under the MSGCP there would be a gradual increase in habitat units (HSI-Acres); in the initial ten years an increase of 5 percent and 8 percent for the CBPR as a result of BMP implementation under the MSGCP was estimated to occur. This estimate for increasing HSI-Acres is based upon implemented BMPs increasing the quality of the habitat as increased acreage is enrolled in the MSGCP. For CBPR, the modeling team used a narrow description of CBPR habitat that may not include foraging and dispersal habitats. WDFW noted in comments on the draft MSGCP that there is no clear connection between the BMPs and the habitat improvement, and questioned whether the predicted habitat improvements were overly optimistic. The Service agrees that the model can be improved, and expects in general, habitat quality will improve over time, but the degree of improvement will depend on how many farmers/ranchers sign up. Upon implementation of the MSGCP, the FCCD will develop a new HSI model using more recent satellite imagery and methods to determine the starting point of the MSGCP and to track habitat quality trends over time. The HSI acre estimates in the current model display the expected trend over time, but

because the initial model run had a narrow definition of CBPR habitat, and the model was a best case scenario for enrollment; the next model may have differing acre and HSI numbers.

Table 3. Best-case Scenario in Habitat Improvement for Columbia Basin Pygmy Rabbit Habitats (HSI-acres) for the proposed.
(MSGCP (MSGCP Ch.3 Table 3-2)

MSGCP SPECIES	EXISTING CONDITION[1]	MSGCP	
		YR 10	YR 50
CBPR	6,011 ac (2432 ha)	6,311 ac (2553 ha)	6,491 ac (2626 ha)

[1] Existing conditions HSI-Acre values computed from habitat conditions data obtained with 2005 satellite imagery.

Population estimates for CBPR were based on a round estimate of individuals after successful reintroduction effects in 2013. The modeling team assumed that because of conservation activities in part, from the MSGCP, populations of Covered Species on agricultural lands would increase in proportion with HSI-Acres over 50 years.

One way to quantify effects is to make assumptions on habitat and population trends through the HSI model. After developing population estimates for the CBPR of 200 individual CBPR in Douglas County based on a 2013 population estimate (Table 3-2 in the MSGCP), the FCCD (after consultation with the Service, WDFW, and NRCS) determined based on best professional judgment, that up to five percent of the species' population exposed to Covered Activities may be injured, killed, or their breeding, feeding or sheltering would be impaired through habitat impacts. As the habitat improved and the population increased the number of CBPR exposed to those effects would increase. While similar assumptions on effects to populations are sometimes made, the Service notes that the HSI model included a county-wide project area that included both agricultural and non-agricultural lands that provide habitat for MSGCP species, the habitat definition for CBPR was very narrow, the model was developed based on a best case scenario regarding enrollment, and the model used what is now dated information (especially for the CBPR population in Douglas County). While population estimates in the County and HSI-generated population predictions help to display trends over time, the resultant population numbers are likely imprecise. The AMMP expects a new HSI model run at the beginning of MSGCP implementation, and also allows use of a different modeling process in the future, as long as the baseline and changes over time are comparable to the initial HSI model. The Service does not view the current HSI model and resulting estimates as the best way to quantify effects over time, and we present another approach below.

Quantifying Effects over Time

CBPR currently occur in Douglas County in and around Sagebrush Flat, and have the future potential to occur in appropriate habitats within the historic range within the County. As populations increase in the short term, and in the long term (the 50-year term of the MSGCP) as expected based on successful recovery efforts, more CBPR will be

exposed to Covered Activities both in suitable breeding and foraging habitat, and as they disperse through other agriculture lands. In Appendix B, Table 1, we describe Covered Activities and how or whether those activities result in effects, including through injury, mortality, disturbance, vulnerability to increased predation from reduction in cover, impaired breeding from impacts to forage, and impaired breeding from damage to burrows. Not all activities in all locations will result in adverse effects to the CBPR, but over the large area of Douglas County, and given the long duration of the MSGCP, the following activities may result in the following adverse effects:

- Injury or mortality as a result of Covered Activities including: being hit by farming machinery; through increased vulnerability to predators and/or damage to burrows or from mowing, plowing, burning, equipment staging and storage, livestock movement, brush/beating, field preparation, harvesting, or conversion of CRP/SAFE; structures such as fencing that injure or kill CBPR during construction through impacts to burrows, or by providing increased perching substrate for avian predators.
- Significant impairment of essential breeding, feeding, or sheltering behaviors as a result of Covered Activities including: farming activities that perpetuate a fragmented landscape resulting in decreased cover and connectivity; through limited food or cover during mowing, burning, plowing, field prep, crop management, harvesting, or conversion of CRP/SAFE; road management, or trail management that impair connectivity; livestock grazing and other covered activities that removes cover or foraging habitat or increases the vulnerability to predation (although BMPs including grazing standards will help to ameliorate those effects); ranching activities including machinery and range improvement that damage burrows.
- Disturbance as a result of Covered Activities including: noise from machinery, vehicles, livestock movement, or other human activities; however, because we have limited knowledge on the response of CBPR to disturbance, and because it is a prey animal, we assume that CBPR would hide from short-term disturbing activities, and most potential noise-generating Covered Activities are short-term such as mowing, plowing, harvesting, therefore the impact from disturbance may be minor.

CBPR may be injured, killed, and/or have their breeding, feeding, and sheltering behavior significantly impaired from the activities described above and in Appendix B, Table 1, in some locations over the 50-year duration of the MSGCP. The actual impact on CBPR will vary with location and timing of activities, and not all individuals exposed to a particular disturbance or impact will be significantly affected. In other words, adverse effects may occur, such as removal of cover during Covered Activities, but not all will rise to the level of injury or death, or significant impairment of breeding, feeding, or sheltering.

Although we can qualitatively describe adverse effects to the CBPR as above, quantifying those effects is more challenging. One way to evaluate effects is to compare the approximate starting population of CBPR and assume that by year 50 the recovery emphasis area at Sage Brush Flat

in Douglas County is fully occupied. In 2013, the number of CBPR in Douglas County was approximately 200 individuals. The recovery emphasis areas, including Sage Brush Flat in Douglas County, were sized to support 500 individuals. In the status of the species, we discussed the potential population levels and scenarios for CBPR at which downlisting from endangered to threatened may occur (USFWS 2012a, p. 46): 1) subpopulations at two recovery emphasis areas that each have a 5-year average of at least 375 individuals, and a third recovery emphasis area has been formally established through completion of one or more appropriate conservation agreements and is available for initial reintroduction efforts; or 2) a subpopulation at 1 recovery emphasis area has a 5-year average of at least of 250 individuals, and subpopulations at 2 other recovery emphasis areas each have a 5-year average of at least 125 individuals; or 3) a single subpopulation with a 5-year average of at least of 750 individuals that has been reestablished through dispersal and range expansion from one or more recovery emphasis areas, and appropriate conservation agreements have been reached to include the newly occupied habitats within the recovery emphasis area(s) involved and management measures to maintain identified dispersal corridors have been agreed to and implemented. These levels or higher could occur during the life of the MSGCP.

Thus, the number of CBPR individuals that may be expected at Sagebrush Flat and surrounding areas would be 250 to 750 individuals. However it is likely that there will also be animals at Beezly Hills in Grant County, and then 500 animals at Sage Brush Flat could be reasonable to contribute to a downlisting scenario. Most of the individual CBPR would be expected to remain in recovery emphasis areas, and not be exposed to Covered Activities associated with the MSGCP. However, some numbers of individuals may disperse outside, or remain outside the recovery emphasis area, and be exposed to Covered Activities on Permittees' land. Of the rabbits exposed, not all would be adversely affected, in part because the BMPs minimize impacts to the CBPR. Therefore, although we can expect between 250 to 750 individuals in Sage Brush Flat, the numbers of individuals that may be exposed to adverse effects over time from MSGCP Covered Activities is difficult to predict.

We can evaluate effects to CBPR associated with the MSGCP by using habitat quantity as a proxy for adverse effects to individuals and assume that activities on all acres have an equal chance of injuring, killing, or impacting individuals. In the proposed action, we described the potential for 50% of the agriculture landowners in Douglas County joining the MSGCP, and included estimates of 50 percent of the shrub-steppe acres, and cropland acres. In the baseline discussion, we determined that there were 482,033 total acres within in the historic range of CBPR in Douglas County, and 214,000 acres of shrub-steppe habitat available for pygmy rabbit use on agriculture lands in Douglas County and within the historical range. Currently the most likely locations for pygmy rabbits in the County are in shrub-steppe habitats at and around the Sage Brush Flat wildlife area, since this is where the initial reintroduction efforts have occurred. CBPR may disperse gradually from Sagebrush Flat and other reintroduction locations and breeding and foraging habitat (i.e.: shrub-steppe) over the life of the MSGCP. We don't know which landowners will sign up for the MSGCP, but estimate up to 50 percent of the shrub-steppe acres in the County will be covered (107,000 acres of potential CBPR habitat). These are the acres where CBPR may occur and be exposed to Covered Activities such as ranching activities within potential breeding habitat.

CBPR may disperse outside of breeding and foraging habitat through agricultural fields or non-shrub-steppe areas. Adult CBPR have been known to disperse as far as 7.5 miles between seasonal-use-sites and juvenile animals disperse up to 6 miles (Rachlow and Estes-Zumpf 2005; USFWS 2012a, p. 8). This dispersal distance outside of shrub-steppe includes most or all of the historic range within Douglas County. Up to 50 percent enrollment of the total acres within the historic range in Douglas County would be 241,017 acres, and subtracting out the 107,000 acre of shrub-steppe habitat leaves us with 134,017 acres of potentially enrolled dryland or irrigated farmland in the MSGCP. This would be the acreage where dispersing CBPR may occur and be exposed to Covered Activities while dispersing that may result in adverse effects to the CBPR. BMPs will minimize the adverse effects to CBPR on these acres, but will not eliminate them.

The most likely potential for injury or mortality of pygmy rabbits would be during or after conversion of CRP/SAFE acres within Douglas County and within the historic range of pygmy rabbit. Conversion activities may directly injure or kill CBPR, may damage burrows so that young are killed breeding is impaired. Conversion of CRP may remove forage and cover that impairs breeding feeding or sheltering of CBPR, and may make the CBPR more vulnerable to predation resulting in increased mortality.

- 182,072 acres of CRP/SAFE divided by 868,278 acres of farms (73681 ha/351379 ha) equals 21 percent CRP/SAFE based on 2013 levels of CRP in Douglas County.
- Within CBPR historic range in Douglas County: 21 percent of 482,033 acres historic range equals 101,227 acres (40,965 ha) CRP/SAFE estimated to occur
- CRP/SAFE can drop below 10% for 2 year duration, equaling 10,123 acres associated with habitat conversion and resultant injury, mortality, or adverse effects if all farmers joined.
- Assume half of acreage joins MSGCP, resulting in 5,061 acres (2048 ha) conversion associated with injury or mortality, at 6 different occasions during the life of the MSGCP.

Based on the above assumptions and calculations, 5,061 acres of CRP/ SAFE may be converted and be associated with injury, mortality, or impaired breeding feeding or sheltering over 6 different occasions during the life of the MSGCP for a total of 30,366 acres of CRP/SAFE conversion over 50 years.

In summary, certain significant adverse effects to the CBPR may occur over the 50-year term of the MSGCP as described above in the effects section, in Chapter 3 in the MSGCP, and in Appendix B, Table 1, of this biological opinion. Douglas County supports one of the two CBPR "recovery emphasis areas" described in the recovery plan (USFWS 2012a), while the second one occurs in nearby Grant County. CBPR that have been established at the two recovery emphasis areas are likely to disperse into other areas of Douglas County, making Douglas County very important for the survival and recovery of the CBPR. Appendix C, Table 1, lists the recommended recovery or conservation strategies for the CBPR that are appropriate for private landowners to address, and how or whether the MSGCP addresses those recommendations. We anticipate that the implementation of BMPs under the MSGCP will temper the adverse effects of covered activities and will facilitate the reproduction, numbers, and distribution of CBPR in Douglas County, and provide a long-term, net benefit for the CBPR and its habitat on a landscape scale.

CUMULATIVE EFFECTS: Columbia Basin Pygmy Rabbit

Cumulative effects for the CBPR are the similar to those already addressed under the general effects discussion above. In summary, the CBPR will be affected by cumulative effects associated with:

- Disease or pathogens,
- More vulnerability to predation from pets, feral cats or dogs, predators using fences or other structures for greater visibility,
- Exposure to pesticides or herbicides or indirect decrease in coverage or forage,
- Energy or windpower development decreasing or removing habitat, and
- Loss or degradation of habitat from development or other activities on private land.

CONCLUSION: Columbia Basin Pygmy Rabbit

The effects of the action include the direct and indirect effects of approval of the MSGCP on the CBPR, together with the effects of other activities that are interrelated or interdependent with this action, that will be added to the environmental baseline. We anticipate that the MSGCP will promote conservation efforts in the context of farm and ranch operations providing a long-term, net benefit for the CBPR and its habitat on a landscape scale. However, it is unlikely that all impacts to habitat and individuals can be avoided and that some adverse significant adverse effects to CBPR will occur. Adverse effects, including those that injure, kill, or impair breeding, feeding, or sheltering of CBPR are described above in the effects section, in Chapter 3 in the MSGCP, and in Appendix B, Table 2, of this conference opinion. These adverse effects may occur over the 50-year term, although the exact location of each impact will depend on the individual incidental take permits. These adverse effects may occur from the Covered Activities that degrade or convert habitat, and result in a low incidence of injury or mortality. As habitats improve and CBPR numbers increase, the likelihood of exposure to these adverse effects will increase.

The Service anticipates that the recovery goals, objectives, and criteria currently identified in the Recovery Plan for the CBPR would be largely met through active management at the recovery emphasis areas and other State and Federal properties potentially contributing to CBPR conservation efforts (USFWS 2012a). Rachlow and Witham (2004) calculated density estimates for pygmy rabbits occupying sites under variable habitat conditions. These estimates ranged from roughly 0.15 to 1.10 pygmy rabbits per acre. Considering these density estimates as an initial approximation of the range in area required by pygmy rabbits, a subpopulation of 500 individuals would require between roughly 500 and 3,300 acres. The two currently identified recovery emphasis areas total 3,740 acres and 3,390 acres and, therefore, are considered of an appropriate size necessary to help meet the recovery objectives and criteria that are currently established for the CBPR (Service 2006b). In Douglas County, a recovery emphasis area occurs at Sage Brush Flat on WDFW land. The recovery emphasis areas are large enough to support 500 CBPRs after successful reintroductions (USFWS 2012a).

Management to support viable subpopulations of CBPR will be emphasized on recovery emphasis areas. Management of lands under the MSGCP will result in improved habitat for CBPR, which will potentially support CBPR and improve connectivity between recovery

emphasis areas. This will be accomplished on enrolled lands through BMPs resulting in appropriate grazing management, maintenance of shrub-steppe fragments, and requiring contacting the Service prior to conversion of habitat. The MSGCP contains several provisions and methods that will allow for changes in conditions, including changed circumstances, and the ability to revise farm plans or BMPs based on new information. The adaptive management and monitoring program will be used to adjust BMPs to reduce impacts to CBPR as much as practicable. The MSGCP addresses, or is consistent with the recovery actions in the CBPR recovery plan (USFWS 2012a) that are most appropriate for private agriculture landowners in Douglas County to address; these measures and the BMPs are listed in Appendix C, Table 1. Initial queries by the FCCD indicate that about 50 percent of likely landowners are showing early interest (Jon Merz, FCCD, in litt., April 2, 2015). The more farmers/ranchers that join the MSGCP, the more the habitat for the CBPR will improve. There are three main reasons that covered species, including the CBPR still exist in Douglas County: 1) there are many fragments and blocks of habitat on private land, because of the shallow and rocky soils that are difficult or impossible to farm, scattered throughout the County, 2) CRP and SAFE acres provide some habitat, cover, and forage for CPBR throughout the County; and 3) there are large blocks of habitat (called HCAs) provided by WDFW, BLM, and TNC that are managed for wildlife or for multiple uses.

In the future, under the MSGCP, currently fragmented habitat will be maintained on enrolled farms. As described in the status of the species, and the effects section, CBPR in Douglas County may occur in CRP habitats. The SAFE program is a component of CRP that further emphasizes habitat for sage-grouse and sharp-tailed grouse, but also benefits other covered species such as the CBPR. The CRP habitat may vary in quantity depending on Farm Bill funding but, under the MSGCP, enrolled farmers are to look for other programs if CRP or SAFE contracts are not renewed, to avoid farming those CRP acres if economically feasible, or if they cannot maintain those acres in conservation cover, CRP will be monitored across the County. If the CRP drops below 10 percent of the 2013 amount, then the FCCD will work with the Service and others to ensure that CRP returns to more than the 10 percent amount within 2 years. If that is not feasible, then the Service will revisit the MSGCP to determine if it still meets Section 10 issuance criteria, and, if not, how and whether it can be revised. If it cannot be revised, then permits may be revoked. Although HCA acres are not expected to decrease, monitoring will occur and, if they do drop by 10 percent across the County, then FCCD and the Service will also reconvene to determine if the MSGCP is working as expected, and if necessary permits may be revoked. Based on the requirement to maintain fragments, and because of the BMPs and changed circumstances addressing CRP/SAFE, and because habitat trends should improve on enrolled lands, the Service expects that habitats will continue to be available to support the survival of the CBPR in Douglas County for the duration of the MSGCP.

For the CBPR, the adverse effects caused by habitat modification, fragmentation, or direct mortality or injury during and after the installation of BMPs are expected to be small, localized, and/or temporary in nature. The BMPs associated with the Covered Activities will minimize and mitigate adverse effects to the CBPR, and the conservation benefits of the MSGCP will benefit the population as a whole. We therefore do not anticipate changes in the number, distribution, or reproduction of the CBPR that will appreciably reduce the likelihood of survival and recovery of the species throughout its listed range. After reviewing the current status of the CBPR, the

environmental baseline for the action area, the effects of the issuance of permits pursuant to the MSGCP, and the cumulative effects, it is the Service's biological opinion that the issuance of a section 10(a)(1)(B) permit for the MSGCP, as proposed, is not likely to jeopardize the continued existence of the CBPR. No critical habitat has been designated for the CBPR; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT: Columbia Basin Pygmy Rabbit

The Douglas County MSGCP conforms to a "framework programmatic action" as defined at 50 CFR 402.02 (80 FR 26832). Pursuant to the authority under 50 CFR 402.14(i)(6) of the implementing regulations for section 7 (80 FR 26832), an incidental take statement is not required at the programmatic level. Under the Douglas County GCP, the Service will issue incidental take permits under the authority of section 10(a)(1)(B) to applicants who commit to comply with the provisions of the plan based on a site-specific site plan, prepared in accordance with the plan, that is submitted to the Service with their permit application. If the permit application is complete and satisfies the statutory permit issuance criteria, the Service will issue a permit authorizing the incidental take of the sage grouse based on the site-specific details provided in the site plan. In response to individual permit applications, the Service will conduct intra-Service section 7 consultation on the proposed permit action as is our customary practice. That consultation will rely on the fact-pattern specifics of the site plan and the analyses and findings presented herein as the basis for section 7(a)(2) determinations.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service recommendations are as follows:

1. Continue to work with partners on all ownerships to conserve and restore shrub-steppe habitats and the species dependent on those habitats.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Washington Fish and Wildlife Office requests notification by the Eastern Washington Fish and Wildlife Office of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation for the CBPR for the issuance of section 10(a)(1)(B) permits consistent with the Douglas County MSGCP outlined in the memo requesting consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law)

and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

CONFERENCE OPINION

The Description of the Proposed Action, Conservation Measures, General Action Area, General Environmental Baseline, Analytical Framework, and General Effects discussions from the preceding biological opinion are incorporated into this conference opinion by reference.

STATUS OF THE SPECIES: Washington Ground Squirrel

Listing Status

The Washington ground squirrel (*Urocitellus washingtoni*) has been a Federal candidate species since 1999 and a State candidate since 1997 (WDFW 2012, p. 140). Federal status has not changed although a 12-month finding is expected in 2015 (79 FR 72462-72497)

Populations and Distribution

The Washington ground squirrel is endemic to the Columbia Plateau, and occurs in Oregon and Washington, south and east of the Columbia River and east of the John Day River (Bailey 1936, Howell 1938; Betts 1990; Verts and Carraway 1998; USFWS 2012c, p. 5). The Washington ground squirrel historically occupied shrub-steppe and grassland habitats across much of the Columbia Plateau in eastern Washington and north-central Oregon (Washington Wildlife Habitat Connectivity Working Group (WHCWG) 2012, p. A.6-2). Higher elevations and somewhat moister conditions associated with the Palouse region and the foothills of the Blue Mountains limited distribution in the east and south, respectively (WHCWG 2012, p. A.6-2). Historical site records exist for the following 10 counties in Washington: Adams, Columbia, Douglas, Franklin, Garfield, Grant, Lincoln, Spokane, Walla Walla, and Whitman (WHCWG 2012, p. A.6-2). In Oregon, historical records occur in Gilliam, Morrow, and Umatilla Counties (Verts and Carraway 1998, p. 202).

In Washington, most of the currently occupied sites occur in Grant, Adams, and Douglas counties, but there are also isolated, scattered sites in Lincoln, Franklin, and Walla Walla counties (WDFW 2012, p. 140). This species occupies sagebrush-steppe and grassland habitat east of the Columbia River. Populations appear to fluctuate widely at the local scale (Finger et al. 2007, p. 1; USFWS 2012c, p. 6). As of 2012, the Washington Natural Heritage Program contained 567 verified Washington ground squirrel polygons (i.e., mapped estimate of areas containing squirrels) and 65 verified point locations in its database, any one of which could constitute an individual, small colony, or large colony. This database does not include all the detections that were made during a 2009-2010 survey in the Odessa area (USFWS 2012c, p.5). Sites that support small numbers of Washington ground squirrels include Foster Coulee and Sagebrush Flat in Douglas County, and also Duffy Creek, Saddle Mountains, and Beezley Hills in other Eastern Washington Counties. The largest sites in Washington occur in the Warden, Moses Coulee (Douglas County), Lind, Soap Lake, and Seep Lakes areas (Finger et al. 2007).

In Oregon, Washington ground squirrels occur in Gilliam, Morrow, and Umatilla counties. The Oregon population is centered largely on the Boardman Naval Weapons Systems Training Facility (BNWSTF) and the adjacent Boardman Conservation Area (BCA). One third of known

Washington ground squirrel sites are in Oregon on the BCA and the BNWSTF. This area is likely the largest contiguous occupied habitat in the entire range of the Washington ground squirrel. A portion of that area is part of the Threemile Canyon Farms Multi Species Candidate Conservation Agreement with Assurance (MSCCAA) that contributes to Washington ground squirrel conservation efforts (USFWS 2012c, p. 3). Washington ground squirrels are also found on private and BLM land west of these properties, on Lindsay Prairie, and on some additional scattered private lands. As of 2012, the Oregon Department of Fish and Wildlife (ODFW) listed 705 Washington ground squirrel sites in its database, any one of which could represent an individual, small colony, or large colony. Fifty-two of these sites were documented between 1938 and 1999, making their current status uncertain. At least 527 of the remaining 653 sites (81 percent) occur on the BCA, BNWSTF, and TNC-managed Lindsay prairie in Oregon.

Habitat and Life History

The Washington ground squirrel is diurnal, semi-fossorial (burrowing), and spends much of the year underground (USFWS 2012c, p. 3). Adults emerge from hibernation between January and early March, depending on elevation and microhabitat conditions (Rickart and Yensen 1991; USFWS 2008, p. 4). Adults return to their burrows by late May to early June, and juveniles return about a month later; estivation (summer dormancy) is thought to transition directly into hibernation (Carlson et al. 1980; Verts and Carraway 1998; USFWS 2008, p. 4).

Washington ground squirrels usually live less than five years and have high annual mortality rates; mortality rates at four Washington study sites between 2005 and 2006 were 66 percent for males and 76 percent for females. Possible causes of mortality included starvation or freezing during estivation/hibernation, predation, disease, and human interference (USFWS 2012c, p. 4).

Little is known about Washington ground squirrel behavior, but Sherman (2000 as referenced in USFWS 2012c, p. 4) indicated that females are exceptionally social, often forming coalitions or groups with up to three other females; while males are more mobile than females (Greene 1999; Delavan 2008; USFWS 2012c, p. 4). Primitive roads were not dispersal barriers, but land in agricultural production does appear to alter dispersal patterns (Klein 2005; USFWS 2012c, p. 4).

Washington ground squirrels inhabit shrub-steppe and grassland habitats (Verts and Carraway 1998; Dobkin and Sauder 2004; USFWS 2012c, p. 4). They also occur in the sandy soils found along ravines, dry river bottoms, and hillsides (Betts 1990; Yensen and Sherman 2003; USFWS 2012c, p. 4)). Colonies tend to be located in areas of deeper, weaker soil containing a low percentage of clay. Their habitat is characterized by deep, loamy soils deposited by the Missoula Floods and shrub-steppe vegetation (Carlson et al. 1980, p. 7). Historically, the Washington ground squirrel was primarily associated with sagebrush (*Artemisia sp.)* and bunchgrass habitats, including bluebunch wheatgrass (*Agropyron spicatum*.), Sandberg's bluegrass (*Poa sanbergeii*), and needle-and-threadgrass (*Hesperostipa comata*) (Carlson et al. 1980, p. 7; Verts and Carraway 1998, p. 202), although cheatgrass (*Bromus tectoru*m) and rabbitbrush (*Chrysothamnus sp*.) have replaced much of the original flora on nonagricultural land. Greene and other's (2009, p. 37) micro-habitat analysis revealed that the majority (64 percent) of the 44 occupied sites were located in habitats dominated by sagebrush. The remaining occupied sites were found in bunchgrass or low shrub vegetation; no squirrels or sign thereof were found

in bitterbrush or annual grass vegetation. It is important to note that, although they did not find squirrels in areas dominated by annual grass vegetation at the micro-habitat scale in this study, squirrels are known to frequently occur in degraded habitats. In two studies, squirrel recruitment was highest in sagebrush, followed by bunchgrass, then low-shrub habitat (Greene 1999, p. 3; Greene et al. 2009, p. 31). Sagebrush habitat may maintain ground squirrel populations because it supports a more stable food source, especially during drought periods (Greene 1999). Sagebrush also provides cover from predators.

Greene and others (2009, p. 39) did not detect significant differences in the type of vegetation present at occupied versus unoccupied Washington ground squirrel sites in sagebrush and bunchgrass communities. Native plants appear important to Washington ground squirrels, with Sandberg bluegrass (*Poa secunda*) playing a key role in their diets (Tarifa and Yensen 2004; as referenced in USFWS 2012c, p. 5). Diverse diets help squirrels acquire sufficient fat and protein for reproduction and survival through estivation and hibernation (USFWS 2012c, p. 5). Cheatgass is considered to be an unstable food source (Vander Haegen et al. 2001, p. 301). In Columbian ground squirrels (*U. columbianus*), survival through hibernation was related to pre-hibernation weight (Murie and Boag 1984, p. 690).

Washington ground squirrels are an important component of the Columbia Basin ecosystem, serving as a prey base for predator food chains, reducing soil compaction, loosening and aerating soils, and increasing the rate of water infiltration into soil. Additionally, they increase soil fertility, bring nutrients from deep soil layers to the surface, increase plant productivity, increase plant diversity by bringing buried seeds near the surface, and increase diversity of microhabitats (Vander Haegen et al. 2001; Yensen and Sherman 2003; USFWS 2012c, p.5). Their burrows are re-used by many species, including snakes, lizards, other ground squirrels, insects, and burrowing owls (Greene 1999; USFWS 2012c, p.4).

Threats

Habitat Loss and Degradation including Fire

Washington ground squirrels and their habitat are impacted by historic and, to a lesser extent, ongoing habitat loss, fragmentation, and modification from a variety of sources. The driving threat to Washington ground squirrels is past, current, and threatened habitat destruction, modification, and curtailment throughout their range (USFWS 2012c, p. 7-11). Most historic habitat is permanently lost (or will require long-term recovery) due to circle irrigation development, tilling, and disking. Overall, approximately 66 percent of the Washington ground squirrel's total former range has been converted to agriculture (Tarifa and Yensen 2004a; USFWS 2012c, p. 7). Historic agricultural development occurred primarily in areas with arable, deep soil; since ground squirrels depend on deep soil (Betts 1990, 1999; Greene 1999; USFWS 2012c, p. 7) this has reduced much of their habitat. Soil disturbance associated with crop production may be the most damaging agricultural activity to squirrels (Howell 1938, p. 5; Greene 1999, p. 49). Changes in soil composition and stratification due to tilling and other soil disturbances may destroy the structure of silt soil-types (e.g., Warden soils) that are important components of the species' habitat (Greene 1999, pp. 43-46). The deep soils characteristic of the

low elevation grassland biome are suitable for Washington ground squirrels and are also favored for wheat cultivation.

Washington Ground Squirrels are very rarely observed in wheat fields and Carlson et al. (1980, p. 9) considered wheat fields to be a dispersal barrier due to little or no vegetation coverage during seasons when fields are harvested or fallow (uncultivated). Morgan and Nugent (1999, pp. 9-10) located a squirrel colony adjacent to an abandoned wheat field that had not been farmed for 9 years prior to their survey. There were freshly excavated burrows extending 131 ft. (40 m) into the field, but as of 2007 colonies had not become established in the wheat field (USFWS 2012c, p.7). There have been some reports of squirrels using lands enrolled in the CRP in Washington by WDFW; however, the extent and field history is unknown.

Agricultural practices such as tilling directly impacts adjacent Washington ground squirrel colonies. Greene (1999, pp. 34, 49) found that Washington ground squirrel density and abundance decreased with higher percentages of bare ground. The WHCWG (2010, p. A.6-10) assigned cultivated, irrigated, non-irrigated, and otherwise disturbed cropland a habitat value of 0.1 (of 1.0 maximum) and a habitat resistance value of 30 (of 100) for Washington ground squirrels, indicating poor permeability for dispersal and reduced habitat quality. Certain practices, such as leaving croplands fallow, negatively affect foraging Washington ground squirrels. Wheat/fallow rotation is the most common and traditional crop production system in the Oregon and Washington Columbia Plateau region. The winter wheat/summer fallow rotation is used in the drier portion of the region, where rainfall is considered inadequate to produce a crop every year (Machado 2004, p. 1). Bare ground may also leave squirrels more vulnerable to predation (Greene 1999, p. 49).

Other sources of habitat destruction and modification include the following: residential and energy (e.g., wind, oil, and gas) development, past and future military activities (i.e., range development), recurrent fire, and conversion of native vegetation to non-native species (which is accelerated by fire, ground disturbance, and intensive grazing) (USFWS 2012c, pp. 10-11).

Cheatgrass can out-compete native bunchgrasses and forbs that comprise Washington ground squirrel diets. While squirrels eat cheatgrass, its nutritional value is questionable and its productivity varies with annual precipitation, making it an unreliable food source. Cheatgrass dominates most shrub-steppe ecosystems in the western United States and occurs in dense, continuous patches. Cheatgrass carries fire well and increases the natural fire hazard, reducing fire recurrence intervals from typical 20 to100 year periods for sagebrush grassland ecosystems to 3 to 5 years for cheatgrass-dominant sites (USFWS 2012c, p. 10). The typical rate of fire spread, intensity, size, and frequency also increases. Increased occurrence of fire earlier in the growing season negatively affects native herbaceous species and frequent fire eliminates native shrubs, forbs, and perennial grasses, thus allowing non-native species to further out-compete native species (Ypsilantis 2003; Yensen et al. 1992; Vander Haegen et al. 2001; USFWS 2012c, pp. 10-11).

Isolation and Lack of Connectivity

Agricultural and other development has led to fragmentation of habitat and isolation of colonies (Betts 1990, 1999). In analyses conducted using capture/recapture techniques, Washington ground squirrels moved only short average maximum distances 85 - 239 m (279 - 784 ft.) between capture points (Carlson et al. 1980; Quade 1994; Greene 1999). Given the lack of substantial dispersal movements, isolation and fragmentation of colonies and habitat can severely affect Washington ground squirrels by limiting genetic exchange and reproduction, exposing small colonies to destruction from unpredictable catastrophic events such as fire or drought, and limiting habitat available for dispersal.

In Washington, there are pockets of higher quality habitat containing known sites within each county of the current range (Sato 2012, p. A.6-13), including areas in Douglas and Grant Counties. Northern Grant County and southern Douglas County contain the Moses Coulee, Beezley Hills, Duffy Creek, Sagebrush Flats, and Black Rock Coulee units of the Washington ground squirrel. These areas contain high quality habitat with known Washington ground squirrel sites. Connectivity habitats between known sites are vulnerable to degradation of habitat, development, and expansion of agriculture. Patches of remnant habitat are more susceptible to the surrounding landscape and external influences (Vander Haegen et al. 2001; USFWS 2012c, p. 13). Isolation and fragmentation of habitat further threatens the Washington ground squirrel by increasing its vulnerability to a variety of natural and manmade factors (Quinn 2004; USFWS 2012c, p. 13). Isolation and fragmentation can severely affect Washington ground squirrels by limiting genetic exchange and reproduction; decreasing genetic diversity; causing genetic drift; exposing small colonies to destruction from unpredictable catastrophic events such as fire, disease, or drought; intensifying the threat of predation; and limiting habitat available for escape if occupied habitat becomes unsuitable (Betts 1990; Wisdom et al. 2000; USFWS 2012c, p. 13). Although isolation may hinder the spread of disease, it limits immigration from adjacent squirrel sites, which reduces the likelihood that colonies would be repopulated if they became extirpated (Betts 1990; USFWS 2012c, p. 13).

Structures such as irrigation canals may further isolate populations and limit the dispersal of Washington ground squirrels. It has been suggested open irrigation canals and reservoirs may be impassable to Washington ground squirrels (Sherman and Shellman Sherman 2010, p. 3; WHCWG 2010, p. A.6-8). There are over 300 mi (483 km) of main canals, about 2,000 mi (3,219 km) of lateral canals, and 3,500 mi (5,633 km) of drains and wasteways in portions of Adams, Franklin, Grant, Lincoln, and Douglas Counties.

Recently, new occupied sites or populations have been documented due to increased survey efforts in areas not previously surveyed while there have also been site vacancies (Betts 1999; Finger et al. 2007; USFWS 2012c, p. 5). It is very likely that additional undocumented sites exist, particularly in unsurveyed areas revealed as higher rated habitat from the habitat quality modeling done by WHCWG (Sato 2012, p. A.6-14).

Livestock Grazing

Excessive grazing by domestic livestock during the late 1800s and early 1900s, along with severe drought, significantly impacted sagebrush ecosystems (Yensen 1981, p. 177; Knick et al. 2003, p. 616). Long-term effects from this overgrazing, including changes in plant communities and soils, persist today (Yensen 1981, entire; Knick et al. 2003, p. 616). Currently, livestock grazing is the most widespread type of land use across the sagebrush biome (Connelly et al. 2004, pp. 7-29); almost all sagebrush areas are managed for livestock grazing (Knick et al. 2003, p. 616). Today most of the habitat patches where the squirrels occur are grazed by cattle or sheep (Sherman and Shellman Sherman 2010, p. 2).

Although grazing is very common across the range of the species, the potential impacts of grazing are not uniform. Cattle grazing can have either negative, neutral, or beneficial effects to Washington ground squirrels, depending upon the timing, duration, and intensity of the grazing and the type of habitat grazed. Grazing can be managed as a compatible land use with squirrels (as opposed to complete habitat conversion) and, at the appropriate intensity, may be a useful tool to limit fuel load (Young and Evans 1978, p. 288; Davies et al. 2009, p. 1542) and therefore help reduce fire severity and occurrence in areas dominated by nonnative plants. In some cases, low levels of grazing may help squirrels detect predators more easily (Carlson et al. 1980, p. 19), but the literature more often points out that the loss of cover can make squirrels more visible to predators (Vander Haegen et al. 2001, p. 301; Greene et al. 2009, pp. 39-40). Heavily grazed habitat can negatively impact Washington ground squirrels by reducing or depleting available forage and cover, especially in years where food is more limiting. Carlson et al. (1980, p. 9) noted that Washington ground squirrels inhabiting grazed areas commenced estivation 2 to 4 weeks earlier than squirrels in undisturbed habitats, which could be problematic if squirrels do not reach sufficient weight before they estivate (p. 9). However, it is unclear whether the grazed areas described by Carlson et al. (1980, p. 9) were lightly or heavily grazed, and it is unknown whether these squirrels survived.

Heavy grazing can disturb soil and cryptogammic crusts (biological soil crusts composed of living organisms, including fungi, lichens, algae, and other organisms), making it easier for invasive weeds to establish (Yensen 1981, entire; Knick et al. 2003, p. 616; Davies et al. 2009a, p. 1542). Invasive weeds are not a preferred or stable food source, and they facilitate recurrent fire. The thresholds among grazing levels that are potentially beneficial or compatible versus incompatible with Washington ground squirrels are unknown.

The impacts of grazing on Washington ground squirrels are not well documented, but impacts have been studied in other similar species. In one 3-year study, the abundance of California ground squirrels did not appear to be impacted with low to moderate levels of cattle grazing (Fehmi et al. 2005, p. 352). However, responses to grazing differ by species, even within ecological guilds and taxonomic groups (Fehmi et al. 2005, p. 353).

While grazing effects on the squirrel have not been well studied, there are numerous studies on the impacts of grazing to sagebrush-steppe habitat and grassland plants. Exclosure studies have demonstrated that domestic livestock grazing reduces water infiltration rates and cover of herbaceous plants and litter, and compacts soils and increases soil erosion (Braun 1998, p. 147;

Dobkin et al. 1998, p. 213). These impacts result in a change in the proportion of shrub, grass, and forb components in the affected area, and an increased invasion of exotic plant species that are less suitable for Washington ground squirrels (Sherman and Shellman Sherman 2010, p. 21; Mack and Thompson 1982, p. 761; Miller and Eddleman 2001, p. 19; Knick et al. 2003, p. 616). However, the changes in plant community structure do not necessarily preclude squirrels from using these habitats.

Although grazing is regularly mentioned as a potential concern for this species (Delavan 2008, p. 17; Sherman and Shellman Sherman 2010, p. 18; WHCWG 2010, p. A.6-4), extensive (widespread) grazing is not synonymous with intensive grazing. Washington ground squirrel populations are known to persist in light to moderately grazed areas (Carlson et al. 1980, pp. 8-9; Greene 1999, pp. 49-50). Although the study by Greene (1999, p. 50) suggested livestock grazing may reduce the suitability of habitat for Washington ground squirrels (i.e., by increasing the amount of bare ground, p. 35), he cautioned against the use of his findings by noting that grazing intensities were extremely variable within the grazed habitats and stated that further studies should examine grazing levels and their effects on abundance before conclusions can be made (1999, p. 50). It is unclear from the report of Carlson et al. (1980, p. 9) what grazing management approach was used at the sites where squirrels were presumed to have commenced estivation early in response to grazing. The grazing levels could be low, moderate, intensive, or a mix of levels as was the case in Greene (1999, p. 50). Furthermore, of the 44 locations known to Carlson et al. (1980, p. 8) in 1979, 26 were located in grazed pastures. This indicates that squirrels can coexist with some grazing management strategies.

Although grazing is the dominant land use in remaining suitable Washington ground squirrel habitat, grazing management varies across the range. Grazing can have negative, neutral, or beneficial effects to Washington ground squirrels depending upon the timing, duration, and intensity of the grazing. Grazing can also be managed as a compatible land use with squirrels. Given the extent of grazing across the range, intensive grazing may occur in occupied squirrel habitat, but the extent is likely to be limited in scope. We anticipate that this species will continue to persist in light and moderately grazed areas as it has in the past.

Predation and Mortality

Predation appears to be a major source of mortality of Washington ground squirrels (Carlson et al. 1980; Betts 1990, 1999; Greene 1999; USFWS 2012c, p. 11). Badgers (*Taxidea taxus*) are a particular threat to small, isolated colonies and may contribute to local extirpations (Betts 1999). Long-tailed weasels (*Mustela frenata*) are frequently observed near colonies (Morgan and Nugent 1999; USFWS 2012c, p. 11), and have been observed hunting and feeding on Washington ground squirrels. The impact of predation is not consistent across all habitats. Vander Haegen et al. (2002, p. 496) found that fragmented shrub-steppe communities in eastern Washington had higher predation rates on artificial bird nests by corvids compared to continuous landscapes. Swainson's hawks (*Buteo swainsoni*) have been observed to spend more time foraging over areas with lower vegetative cover, even though areas of higher vegetative cover contained a higher density of prey (Bechard 1982, p. 158). Therefore, we expect higher predation rates in disturbed areas.

As previously described under General Effects, in areas where the vegetation is low and the terrain relatively flat, power poles provide an attractive hunting and roosting perch, as well as nesting stratum, for many species of raptors and corvids (Steenhof et al. 1993, p. 27; Connelly et al. 2004, p. 13-2; Vander Haegen et al. 2002, p. 503). The increased abundance of raptors and corvids within occupied ground squirrel habitats may result in increased predation.

Ground squirrels are frequently considered pests. The primary mechanisms for squirrel control are poisoning and shooting, other control methods include fumigants and trapping. In Washington (WDFW 2012, p. 12) it is illegal to shoot this species on any land ownerships, however shooting my still occur.

Washington ground squirrels are vulnerable to the following four stressors associated with urban development: land clearing, development, roads and traffic, and the presence of people and their cats (*Felis catus)* and dogs (*Canis lupus familiaris*). Washington ground squirrels appear to tolerate human proximity reasonably well except in situations where persecution, predation by domestic and feral cats and dogs, vehicle collisions, and continuing land development result in excessive mortality (WHCWG 2010, p. A.6-1).

Disease

Ectoparasites (fleas, mites, etc.) are frequently observed on captured Washington ground squirrels, but seldom appear to be problematic to the individual (USFWS 2012c, p. 11), although they may be vectors of disease. Townsend's ground squirrels (*Spermophilus townsendii*) were seriously reduced by an outbreak of sylvatic plague in Washington in 1936 (Betts 1990; USFWS 2012c, p. 11).

Pesticides

Although information regarding the scope and impact of Washington ground squirrel exposure to agricultural chemicals is limited, exposure is possible given the extent of agricultural development within the species' range. The number of Washington ground squirrel populations that may be exposed or at risk of exposure is unknown, as are the actual effects of agricultural chemicals on this species.

Other Threats

Washington ground squirrels may be negatively affected by energy development activities. Impacts can result from direct and indirect habitat loss and fragmentation by roads, wind turbines, transmission lines, noise, and direct human disturbance. In Oregon and Washington, most energy development in the range of Washington ground squirrel is focused on renewable energy, primarily utility scale or commercially viable wind energy. Wind energy is likely to continue to grow nationally and regionally on all types of land ownership, which raises concerns about the long-term impacts of wind energy developments on wildlife (Kunz et al. 2007b, p. 315; National Research Council 2007, entire; Arnett et al. 2008, p. 61). The number of wind power projects is increasing in Washington ground squirrel habitat, although the extent of this impact is not fully understood (USFWS 2012c, p. 9). Projects can negatively impact squirrels by

permanently removing habitat in known areas of suitable habitat adjacent to occupied sites, further fragmenting the species' distribution. While some energy projects are placed on crop land or retired cropland, many sites have been permitted in native shrub-steppe habitat. Recent surveys of proposed wind energy and transmission line sites on Oregon private land have frequently located squirrels, but these colonies are typically avoided when projects are sited. These colonies are generally small and isolated (USFWS 2012c, p. 9), and even when wind farms have avoided directly placing structures on current colonies, they may be still be limiting further dispersal or colony expansion.

Weather has an effect on Washington ground squirrels. Similar to other rodents Washington ground squirrel populations appear to fluctuate locally (Smith and Johnson 1985, Quade 1994). This is partly due to short-term changes in climate conditions. A series of drought years reduced the abundance of Washington ground squirrels in 1994 (Quade 1994). In contrast, above average rainfall preceded a relatively higher abundance of the species (Greene 1999, Klein 2003).

Recovery Needs/ Conservation Strategies

Washington ground squirrels may benefit from the following conservation measures (USFWS 2012c, p. 16-17):

- Maintain remaining areas of suitable habitat and restore degraded habitat using a variety of tools appropriate for site-specific needs (e.g., thinning, mechanical treatment, burning or fire suppression, reseeding and plugging of native species).
- Maintain populations as individual units where possible to prevent loss of genetic variation.
- Create or maintain corridors between occupied sites to facilitate dispersal and genetic exchange among colonies. This may be achieved using widely spaced piles of wood or stones.
- Re-establish normal fire cycles to encourage patchy (versus widespread) fire events. The appropriateness of this measure will depend on the site and methods used. Use of fire without subsequent seeding with natives may increase the amount of cheatgrass and other non-native species.
- Monitor habitat and populations in both Oregon and Washington and survey areas of potential habitat for squirrel sites.
- Fund and carry out research in a variety of areas (e.g., monitoring effects of grazing, disease, herbicides, pesticides, noise, climate fluctuations, or translocation; studying demography, population dynamics, genetic variation, potential female dispersal, effectiveness of vegetation treatments, and potential for re-colonization of vacated sites).
- Use translocation either 1) as a last resort from areas that will be developed, 2) to augment sites experiencing inbreeding depression, or 3) to reintroduce squirrels to unoccupied suitable habitat. This alternative should be used with caution, and its effects should be closely monitored to determine whether it is successful.
- Post, replace, and augment signs and patrol state and Federal property to increase public awareness regarding the species' status and protection where appropriate.
- Encourage the reduction of shooting and poisoning, and enforce prohibition against shooting and poisoning where applicable.
- Increase public education about the species and threats.

- Encourage private landowners, organizations, and government land agencies to monitor and/or provide species protection.
- Explore methods to restore developed areas to native condition and monitor results.
- Combine monitoring or surveying where similar survey efforts are implemented (e.g., pygmy rabbit, sage-grouse, or hawk surveys).
- Develop candidate conservation agreements for the Washington ground squirrel in Washington and Oregon to implement a variety of conservation measures on private and public lands.
- Since terminology of "colonies" and "detections" is not always consistent, conduct a range-wide GIS spatial analysis of all known detections and colonies to inform future range-wide comparisons.

Implemented Conservation Actions and Recovery Efforts

In an effort to increase population numbers and distribution of the Washington ground squirrel, WDFW initiated translocation by live-trapping in areas such as at golf courses (including a golf course near Warden in Grant County) and moving the captured individuals to public lands in Grant, Adams, Douglas, and Lincoln Counties (WDFW 2012, p. 175). Initial results were poor due to high post-release squirrel mortality. Prior to 2010, the translocations utilized "hard releases" which resulted in the squirrels rapidly dispersing away from the release site. Beginning in 2010, squirrels were first released into small enclosures for a period of time prior to release. This greatly increased survival (WDFW 2012, p. 175).

In 2004, a 25-year Multi-Species Candidate Conservation Agreement with Assurances (MSCCAA, David Evans and Associates 2004) was signed by Threemile Canyon Farms, TNC, Portland General Electric (PGE), ODFW, and the Service. The MSCCAA removed the imminent threat of converting a large portion of known habitat at the time to agriculture. It includes commitments from the permittees to implement a number of conservation measures intended to benefit the Washington ground squirrel and three bird species. The Service is working with the BLM and MSCCAA partners to monitor the effectiveness of this agreement. The CCAA covers 95,000 acres in Oregon.

ENVIRONMENTAL BASELINE: Washington Ground Squirrel

A general baseline description, applicable to all covered species, was previously described and is incorporated here by reference.

The Washington ground squirrel occurs in shrub-steppe and grassland habitat in eastern Washington and north-central Oregon (Carlson et al. 1980, pp. 6-7; Verts and Carraway 1998, p. 202; Dobkin and Sauder 2004, pp. 10, 19, 134).

Conservation Role of the Action Area

The WHCWG (2012, p. 64) looked at a composite "upland network" that analyzed the combined networks of seven species closely associated with upland shrub-steppe habitat: sharp-tailed grouse, greater sage-grouse, Townsend's ground squirrel, Washington ground squirrel, white-tailed jackrabbit, black-tailed jackrabbit, and least chipmunk. The upland network is strongly focused in the western half of the ecoregion. Based on this analysis, Douglas County provides important habitat concentration areas and linkages for the Washington ground squirrel (WHCWG 2012, p. 68). Conservation needs in Douglas County include maintaining remaining areas of suitable habitat and restoring degraded habitat, and maintaining populations to prevent loss of genetic variation.

Douglas County Range

Prior to 1978, several active colonies were present throughout Douglas County and surveys in 2002 by BLM employees found squirrels in almost three fourths of the 19 sections surveyed in the southern part of Douglas County (Musser et al. 2002). One active ground squirrel colony was located near Jameson Lake, the area burned in 1999, and, although ground squirrels were likely present in this area prior to the burn they had increased in number during two years after the fire (M. Schroeder personal communication with L. Robb 2003 as referenced in MSGCP).

The current distribution in Douglas County includes the southeastern portion of the County, an area south of Jamison Lake, and the northeastern portion of the County (Figure 5). In 2004, WDFW conducted field surveys of known Washington ground squirrel sites at four locations in Douglas County—Duffy Creek, Foster Creek, Jameson Lake, and Sagebrush Flat Wildlife Area. A total of 44 active sites were recorded: Duffy Creek–21, Foster Creek–3, Jameson Lake–12, and Sagebrush Flats Wildlife Area–8. This compares with a total number of active sites recorded during field surveys in 2001-2003 at the same four areas of 48 active sites (Finger et al. 2007).

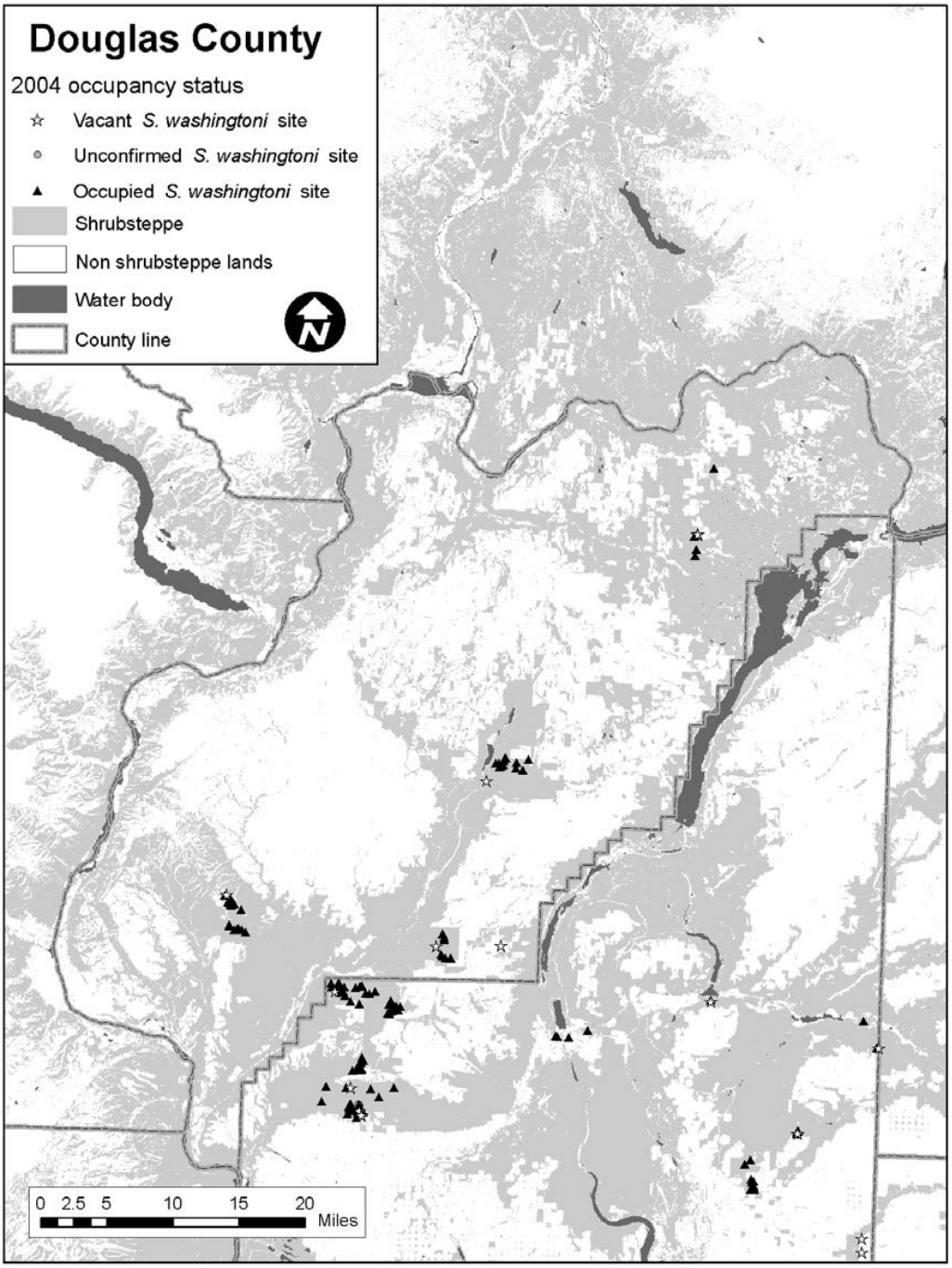

Figure 7. Douglas County populations of the Washington ground squirrel in 2004.

(Finger et al. 2007 p. 12, MSGCP 2015)

We calculated total shrub-steppe in Douglas County, using Washington Gap data (2010), as approximately 413,805 acres (167,460 ha) of shrub-steppe (shrubland, steppe and savanna systems). This is out of a total of 1,183,057 acres (478,766 ha) (~35 percent). While the

Washington ground squirrel currently occurs on in the southeastern and northeastern portions of the County, its historic range likely included most of the County.

Habitat Suitability Index (HSI) model

Appendix D in the MSGCP describes potential Washington ground squirrel habitats within Douglas County. The Washington ground squirrel historically could have burrowed in deep soils and dispersed throughout other shrub-steppe habitats throughout the County (see Figure D3 in Appendix D).

Foster Creek Conservation District, WDFW, and others developed a habitat model that determined the Habitat Suitability Index (HSI) (Ch.3 and Appendix G of the MSGCP), and evaluated potential changes over time for the MSGCP. The HSI is a model for determining the value of existing habitat by comparing it with an idealized habitat and contains a suite of environmental parameters needed by each species to successfully live and reproduce. For example, the parameters for a species might include foraging areas, migration areas, amount of escape cover, and amount of nesting cover. Values, such as acres or percent cover, for these environmental parameters are assessed for each species to determine a ranking factor for each area that indicates the relative impact each action has on the species. The HSI values range from 0.0 (no value) to 1.0 (most benefit to the species). In other words, an HSI model evaluates not just quantity of habitat, but also connects a quality value to the habitat. Because the data in the initial HSI model is becoming dated, the FCCD and others will need to conduct a new run of the same or similar model with current imagery early in MSGCP implementation to establish the starting point for covered species habitat quantity and quality. The model results, including acres for dryland agriculture, rangelands and irrigated agriculture in Douglas County, are also displayed in Chapter 3. The HSI information in the MSGCP, below in Table 4, and later in the conference opinion, should be used to illustrate predicted habitat improvement trends, but the eventual HSI values will likely change based on the next habitat modeling evaluation process.

Table 4. Modeled HSI acre and population estimates for the Washington Ground Squirrel. (MSGCP, 2015)

COVERED SPECIES	MODELED CONDITION HSI ACRES[1]	EXISTING CONDITION-- ESTIMATED MSGCP SPECIES POPULATIONS (NUMBER OF INDIVIDUALS)[2]
Washington Ground Squirrel	37,930 acres (15349 ha)	215

[1] 2005 conditions HSI-Acre values computed from habitat conditions data obtained with satellite imagery.

[2]Estimated species population at risk is calculated by multiplying the quantity of HSI-Acres required for one individual of each species by the quantity of HSI-Acres in the entire County (Schroeder, WDFW, personal communication as referenced in MSGCP)

EFFECTS OF THE ACTION: Washington Ground Squirrel

The purpose of the MSGCP is to implement action on farming and ranching lands in Douglas County that conserve the covered species, including the Washington ground squirrel. The effects to the species are minimized by implementation of BMPs under farm plans, including CPs and specific land-use measures that result in maintaining and improving habitat. While implementation of BMPs improve habitat, ongoing Covered Activities also have adverse effects to the Washington ground squirrel and its habitat. The Washington ground squirrel is affected by general effects to shrub-steppe habitats, as described previously in the general effects section. That discussion is incorporated here by reference. The effects to the Washington ground squirrel may occur in various locations in Douglas County on Permittees' lands over the 50-year duration of the MSGCP.

In addition to the climate change effects described under general effects, individual Washington ground squirrels are likely to be affected directly from climate change due to temperature increases which will shift various life history strategies. This is especially true for hibernation patterns in ground squirrels, which are dictated by temperature cycles. Changes to these cycles can have a profound influence on the population. Inouye and Barr (2007, p. 1) studied hibernation patterns over a period of approximately 30 years in least chipmunks (*Tamius minimus*), golden-mantled ground squirrels (*Spermophilus lateralis*), and yellow-bellied marmots (*Marmota flaviventris*). Findings were that all three emerged earlier than they had between 1974 and 1976 (about 32 years earlier) with marmots emerging about 28 days earlier, chipmunks approximately 10 days earlier and ground squirrels approximately nine days earlier. While the changing emergence trend has shown consistently the same rate over the years for marmots, chipmunks and ground squirrels, emergence trend was later for the first two decades before rapidly reversing to earlier in 1999. Dates for ground squirrel sightings are significantly negatively correlated with average April temperature and positively correlated with the first date

of bare ground. Inouye and Barr (2007, p. 1) stated that these alterations in ground squirrel behavior may be related to regional climate change that has altered winter snowpack or an evolutionary change in behavior. Other components of climate change, such as precipitation changes, can also directly influence ground squirrels. Blois et al. (2008, pp. 602-606) studied California ground squirrels and environmental factors and concluded that the relationship between precipitation and body size was positive (Blois et al. 2008, p. 609). Although precipitation change is less predictable than temperature change in many climate models, it may emerge as the preferred predictor of potential effects (National Research Council 2012, p. 24).

Covered Activities have varying effects on Washington ground squirrel. Early in the development of the MSGCP, the planning team met and discussed the impacts of Covered Activities on covered species in Douglas County. A review matrix was established identifying the relative non-numerical severity or impacts of various activities on each of the MSGCP covered species (MSGCP Table 3-1). The Service added more detail to the review matrix, and this is included in Appendix B, Table 1. As discussed above, and in Appendix B, Table 1, the MSGCP contains many BMPs designed to minimize, mitigate and avoid harmful impacts from the covered actions. The matrix in Appendix B Table 1 lists the measures that will be applied through the MSGCP and individual farm plans to minimize effects. These effects are discussed in more detail in the following sections. Actual effects will vary with farm location, activity types, habitat, and Washington ground squirrel distribution on each farm.

Many of the farming and ranching impacts to Washington ground squirrel are habitat based, including loss of habitat, continued fragmentation, and changes to habitat quality (positive and negative). There is also the chance of disturbance, injury, or mortality in some instances (Appendix B, Table 1). Injury or mortality may occur from impacts to individual Washington ground squirrel, indirectly through loss of cover resulting in predation, and breeding and sheltering may be impaired through disturbance or damage to burrows. Injury or mortality could occur through mowing, burning, plowing, brush/beating, predator control, moving and herding livestock in Washington ground squirrel occupied areas, or by concentrating livestock operations in occupied areas. The injury or mortality could occur from machinery, livestock trampling, or impacts to burrows including maternal burrows. The likelihood of killing or injuring a Washington ground squirrel from these measures is probably small initially, but increases as the exposed population increases. The following BMPs minimize the risk of mortality:

- "Notify USFWS at least 30 days prior to undertaking any habitat-altering activity (such as conversion of CRP or SAFE lands) that could result in authorized incidental take of Washington Ground Squirrels. Provide the USFWS and WDFW the opportunity to translocate any affected Washington Ground Squirrels to suitable alternate site(s) prior to implementation of those activities. USFWS or WDFW staff are unlikely to undertake unplanned translocations of ground squirrels unless a significant population of squirrels is present on the conversion site or the species becomes federally listed.
- Immediately notify USFWS upon finding any dead or injured Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
- Avoid cultivating lands that contain active ground squirrel colonies. If habitat conversion activities or CRP/SAFE takeout must be done, avoid January 21 to June 30.

- Washington ground squirrels are a protected species under state law and should not be subjected to recreational shooting or poisoning by the landowner or the public. In situations where the landowner believes that the squirrels pose a threat to crops, the landowner should contact USFWS and/or WDFW to discuss non-lethal options for resolving the problem.
- Avoid constructing new structures that serve as perches or nest sites for avian predators (e.g., windmills)."

Appendix C, Table 2, compares the conservation strategies appropriate for private landowners to implement for the Washington ground squirrel from the 2012 Candidate Assessment (USFWS 2012c), and lists the BMPs that will be applied to address the recommendations. Based on the analysis of potential threats associated with farming and rangeland management practices, and the suite of BMPs identified to address those threats, we believe the effects to the sage-grouse will be minimized by implementation of BMPs under farm plans, and GCP site plans.

Below, we discuss the effects of the Covered Activities and implementation of the MSGCP by major covered activity types.

Effects Specific to Ranching

As displayed in Appendix B, Table 1, ranching activities adversely impact potentially suitable shrub-steppe habitats on enrolled properties and therefore the forage and cover requirements of Washington ground squirrels, as a result of certain livestock grazing practices. In addition, livestock grazing and other ranching-related activities (e.g., herding, transport) may disturb or damage burrow systems and, in some cases, could even cause direct injury or mortality of Washington ground squirrel due to trampling. Finally, various range management activities (e.g., brush beating, prescribed fire) may alter the vegetation characteristics of existing habitats and could potentially make them less suitable or unsuitable for the Washington ground squirrel.

As described above in the Status of Species section and Threats sections, the net impacts of grazing can be beneficial or detrimental, depending on the grazing levels, regimes, and protocols. However, overgrazing can lead to reduced productivity, reduced plant survival and changes in vegetation community composition (Krausman et al. 2009, p. 15). Overgrazing can impact the grassland quality by destroying the multi-tiered habitat that many species prefer, and burrows could be disturbed or trampled (Cannings 1995, p. 8; Savignac et al. 2011, p. 14). However, there is currently a lack of information addressing the specific effects that livestock grazing and other ranching-related activities may have on the life history requirements of the Washington ground squirrel. Appropriately managed livestock grazing may have little effect on the vegetation communities used by the Washington ground squirrel (Carlson et al 1980 pp. 8-9; Greene 1999, p. 50) and it may be possible to implement management measures on enrolled lands to avoid or reduce potential direct effects due to burrow trampling by livestock or other ranching-related activities. Implementation of BMPs, including required grazing prescriptions implemented through the MSGCP, would minimize the effects to the Washington ground squirrel through ensuring that cover and forage is provided consistent with grazing plans.

Such infrastructure maintenance practices as road and trail management, water development and infrastructure such as fences and fence maintenance may result in a temporary loss of habitat quality, or provide perches for avian predators, but the infrastructure can, if implemented to rotate pastures more effectively, result in an improvement of habitat quality. While such practices as grazing rotation, moving and herding stock, distributing water (systems), salt distribution, wintering, confining, calving, feeding and manure management may also result in temporary negative impacts and, possibly, even isolated mortality, implementation of these activities following the BMPs described below, is expected to result, overall, in an improvement of habitat quality.

In addition to the ranching BMPs described previously under general effects, the following species-specific measures (Appendix E of MSGCP) add addition minimization measures for ranching (and potentially some farming) activities.

In known occupied habitats:

- Survey fence lines to locate active burrows. Limit clearing of fence line to 8' width by hand or mower. No mowing or brush removal within 30' of a burrow.
- No in-ground posts (metal or wood) within 30' of a burrow. Use rock jacks or figure-4 braces within 30' of a burrow and no posts of any kind within 10' of burrow. Limit activities to late summer and fall (avoid breeding, rearing period, and winter high stress period).
- Utilize Integrated Pest Management practices that consider the range of treatment options (including: biological agents, mechanical, hand pulling, grazing practices).
- Avoid grazing during Washington ground squirrel active season (typically from April 1 until June 30 when Washington ground squirrels enter their extended period of dormancy, or when documented to enter summer dormancy).

Effects Specific to Farming (irrigated and dryland)

Agricultural practices such as tilling may directly impact adjacent Washington ground squirrel colonies. Certain practices, such as leaving croplands fallow, could negatively affect foraging Washington ground squirrels. Wheat/fallow rotation is the most common and traditional crop production system in the Oregon and Washington Columbia Plateau. The winter wheat/summer fallow rotation is used on about 4.5 million acres in the drier portion of the region, where rainfall is considered inadequate to produce a crop every year (Machado 2004, p. 1). Bare ground may also leave squirrels more vulnerable to predation (Greene 1999). Carlson et al. (1980) suggested that wheat fields may be dispersal barriers (due to little or no vegetation coverage during seasons when fields are harvested or fallow) for the Washington ground squirrel.

Certain farming activities (e.g., equipment staging and storage, field access, pest control) on suitable, undeveloped habitats adjacent to crop fields could impact the Washington ground squirrel as a result of disturbance or damage to burrow systems. Direct injury or mortality of individual animals would also occur. In addition, it is possible that farming activities on existing crop fields could directly injure or kill dispersing Washington ground squirrels, destroy burrows on the edge of crop fields, or make individuals more vulnerable to predation due to a lack of cover on these developed lands.

Habitat conversion reduces the complexity and structure of shrub-steppe. Habitat restoration, maintenance, or plantings through programs such as CRP (including SAFE) may result in short-term population reductions during plowing and seeding efforts but should result in long-term population increases as habitat quantity and quality increase to provide foraging, cover, and potential breeding habitat for Washington ground squirrels.

As sagebrush re-colonizes CRP fields via seeds from adjacent shrub-steppe, habitat value increases over time from added structure and forage diversity for sage-dependent species (Vander Haegen et al. 2001, p. 305). Older CRP lands that have a diversity of native shrub-steppe species could potentially be used by squirrels if they provide forage and if soil structure has not been severely or permanently altered. As described under the status of the species, Washington ground squirrel may use abandoned wheat fields or CRP, but the extent of that use is unknown. Washington ground squirrels may use lands enrolled in CRP in Washington but no direct observations have been made. The extent that squirrels may use CRP land likely depends on the quality and quantity of neighboring habitat for Washington ground squirrels, the amount of time in CRP designation, and the historic land-use of the property. We do not expect that all CRP sites will be re-occupied; however, for areas containing soils that are still suitable, we anticipate as habitat quality improves, squirrel sites may expand and increase over time, resulting in increases in Washington ground squirrel populations. Therefore, we assume that decreases in CRP (and SAFE) will result in decreases in Washington ground squirrel habitat.

Under the MSGCP, if CRP/SAFE parcels or other habitats are converted to farming, the Service would be notified at least 30 days prior to undertaking any habitat altering activity, to give the Service and/or WDFW the opportunity to move any Washington ground squirrels that may be affected by the conversion of habitat. If CRP/SAFE parcels are converted, remnant patches of shrub-steppe within the CRP/SAFE will be maintained and protected from degradation. A process to evaluate and address potential changed circumstances has been built into the MSGCP, and if the CRP/SAFE acres decrease below 10 percent of the starting acres in the County as a whole, and additional lands are not protected within 2 years to go above that 10 percent trigger, then the adequacy of the MSGCP will be revisited, as described previously in the proposed action.

Over time, CRP/SAFE acres may fluctuate in Douglas County, and have both beneficial and negative effects on the Washington ground squirrel. The MSGCP expects that those acres in Douglas County in CRP/SAFE may dip below a 10 percent change from June 30, 2013 numbers (182,072 acres) (73,681 ha) (as described in changed circumstances in the MSGCP) and stay at that point for as long as two years while the FCCD and other partners evaluate how to come up above the 10 percent level. We assume that CRP/SAFE acres may dip below 10 percent within a 2-year period no more than 6 times (based on estimated CRP contract renewal points, and assuming 10-year renewal periods) during the 50-year term of the MSGCP. It is assumed that even if CRP/SAFE contracts are not renewed for all acres, many farmers would not immediately begin cropping those acres, so not all acres would be converted and result in loss of Washington ground squirrel habitats.

In addition to the BMPs described previously, the following species-specific measure (Appendix E of MSGCP) adds an additional minimization measure for farming activities.

In known occupied habitats:

- Avoid cultivating lands that contain active ground squirrel colonies. If habitat conversion activities or CRP/SAFE takeout must be done, avoid January 21 to June 30.

Effects and HSI analysis

As described under the environment baseline discussion, the FCCD worked with WDFW and NRCS to develop a model of habitat suitability over time. Estimates of HSI-Acres were further defined for the existing conditions and projected out approximately 10 years and 50 years (Table 5; Table 3-4 and 3-5 of the MSGCP). The modeling team predicted that under the MSGCP there would be a gradual increase in habitat units (HSI-Acres); in the initial ten years they estimated an increase of 5 percent and increasing to 8 percent in 50 years for the Washington ground squirrel as a result of BMP implementation under the MSGCP. This estimate for increasing HSI-Acres results from implemented BMPs increasing the quality of the habitat as increased acreage is enrolled in the MSGCP. The habitat improvement is displayed with equivalent HSI acres to show a quality improvement (improved quality should support more individual covered species). Actual total acres of habitat on the ground may not actually increase. These HSI-Acre estimates are suggested assuming that environmental conditions remain as they existed in the initial 2008 analysis (based on 2005 imagery), and that all potential Permittees enroll. Therefore, this is a best-case scenario. In fact, during the comment period for the draft MSGCP, WDFW questioned whether the predicted habitat improvements were overly optimistic. The Service agrees that the model can be improved, and expects in general, habitat quality will improve over time, but the degree of improvement will depend on the number of farmers/ranchers that sign up. Upon implementation of the MSGCP, the FCCD will develop a new HSI model using more recent satellite imagery and methods to determine the baseline condition of the MSGCP and to track habitat quality trends over time. The HSI acre estimates in the current model display the expected trend over time and the model was a best case scenario for enrollment; the next model may have differing acre and HSI numbers.

Table 5. Best-case Scenario in Habitat Suitability Improvement (HSI) for Washington Ground Squirrel's Habitats (HSI-acres) for the proposed MSGCP.
(MSGCP 2015)

MSGCP SPECIES	EXISTING CONDITION[1]	MSGCP	
		YR 10	YR 50
WA Ground Squirrel	37,930 ac (15,349 ha)	39,827 ac (16,117 ha)	40,965 ac (16,577 ha)

For the Washington ground squirrel, population estimates were calculated by multiplying the quantity of HSI-Acres required for one individual of each species by the observed quantity of HSI-Acres in the County (Michael Schroeder, WDFW, Personal Communication, 2005, as referenced in MSGCP). The modeling team assumed that

because of conservation activities from the MSGCP, populations of Covered Species on agricultural lands would increase in proportion with HSI-Acres over 50 years.

One way to quantify effects is to make assumptions on habitat and population trends through the HSI model. After developing population estimates for the Washington ground squirrel of 215 individuals in Douglas County (Table 3-2 in the MSGCP), the FCCD (after consultation with the Service, WDFW, and NRCS) determined based on best professional judgment, that up to five percent of the species' population exposed to Covered Activities may be injured, killed, or their breeding, feeding or sheltering would be impaired through habitat impacts. As the habitat improved and the population increased the number of Washington ground squirrel exposed to those effects would increase. While similar assumptions on effects to populations are sometimes made, the Service notes that the HSI model included a county-wide project area that included both agricultural and non-agricultural lands that provide habitat for MSGCP species, the model was developed based on a best case scenario regarding enrollment, and the model used what is now dated information. While population estimates in the County and HSI-generated population predictions help to display trends over time, the resultant population numbers are likely imprecise. The Adaptive Management and Monitoring Plan (AMMP) expects a new HSI model run at the beginning of MSGCP implementation, and also allows use of a different modeling process in the future, as long as the baseline and changes over time are comparable to the initial HSI model. The Service does not view the current HSI model and resulting estimates as the best way to quantify effects over time, and we present another approach below.

Quantifying Effects over Time

Washington ground squirrels occur in several locations in Douglas County (Figure 5). As habitats improve and Washington ground squirrel populations increase proportionately over the 50-year duration of the MSGCP, more Washington ground squirrels will be exposed to Covered Activities both in suitable breeding and foraging habitats, and as they disperse through other agriculture lands. In Appendix B, Table 1, we describe Covered Activities and how or whether those activities result in effects including injury, mortality, disturbance, vulnerability to increased predation from reduction in cover, impaired breeding from impacts to forage, or impaired breeding from damage to burrows.
Not all activities in all locations will result in adverse effects to the Washington Ground squirrel, but over the large area of Douglas County, but over the large area of Douglas County, and given the long duration of the MSGCP, the following activities may result in the following adverse effects:

- Injury or mortality as a result of Covered Activities including: being hit by farming machinery; through increased vulnerability to predators and/or damage to burrows or from mowing, plowing, burning, equipment staging and storage, livestock movement, brush/beating, field preparation, harvesting, or conversion of CRP/SAFE; structures such as fencing that injure or kill Washington ground squirrels during construction through impacts to burrows, or by providing increased perching substrate for avian predators.
- Significant impairment of essential breeding, feeding, or sheltering behaviors as a result of Covered Activities including: farming activities that perpetuate a fragmented landscape resulting in decreased cover and connectivity; through limited food or cover

during mowing, burning, plowing, field prep, crop management, harvesting, or conversion of CRP/SAFE; road management, or trail management that impair connectivity; livestock grazing and other covered activities that removes cover or foraging habitat or increases the vulnerability to predation (although BMPs including grazing standards will help to ameliorate those effects); ranching activities including machinery and range improvement that damages burrows.

- Disturbance as a result of Covered Activities including: noise from machinery, vehicles, livestock movement, or other human activities; however, because we have limited knowledge on the response of Washington ground squirrel to disturbance, and it is a prey animal, we assume that Washington ground squirrel would hide from short-term disturbing activities, and most potential noise-generating Covered Activities are short-term such as mowing, plowing, harvesting, therefore the impact from disturbance may be minor.

Washington ground squirrels may be injured, killed, and/or have their breeding, feeding, and sheltering behavior significantly impaired from the Covered Activities described above and in Appendix B, Table 1, in some locations over the 50-year duration of the MSGCP. The actual impact on Washington ground squirrel will vary with location and timing of activities, and not all individuals exposed to a particular disturbance or impact will be significantly affected. In other words, adverse effects may occur, such as removal of cover during Covered Activities, but not all will rise to the level of injury or death, or impaired breeding, feeding, or sheltering.

Although we can qualitatively describe adverse effects to the Washington ground squirrel as above, quantifying those effects is more challenging. One approach to quantification is to describe current and predicted future numbers of individuals that may be exposed to Covered Activities, but not all habitats have been surveyed in the County, and colony locations are not always consistent. Populations fluctuate, and locations supporting a colony one year may not support it the next year, but may be re-colonized again in the future. When sites are vacated, it is uncertain whether individuals from vacated colonies disperse or die. Also, the MSGCP is programmatic, and it is not known where or how many Permittees will join. All of these factors together make it difficult to predict the numbers of affected Washington ground squirrels.

We can evaluate effects to the Washington ground squirrels by using habitat quantity as a surrogate for adverse effects to Washington ground squirrels and assume that activities on all acres have an equal chance of injuring, killing, or harming individuals. In the proposed action, we described the potential for 50% of the agriculture landowners in Douglas County joining the MSGCP, and included estimates of 50 percent of the shrub-steppe acres, and cropland acres. We assume the shrub-steppe habitat can provide current or future breeding and foraging habitat for the Washington ground squirrel. The historic range of the Washington ground squirrel likely included all of Douglas County, and if Washington ground squirrel populations increase, they could use much or all of the shrub-steppe habitat in the County; 50 percent of the shrub-steppe would be 206,903 acres (83,730 ha) of habitat. These are the upper acre quantities where Washington ground squirrel may be exposed to Covered Activities within potential breeding or foraging habitat such as ranching activities.

Washington ground squirrels are rarely observed in wheat fields (Carlson et al 1980, p. 9) and while they may excavate burrows on the edge of old fields (USFWS 2012c, p. 7), no colonies have been documented as being established. However, burrows extend into wheat fields and bare ground limits dispersal and makes the species more vulnerable to predation. A low incidence of injury or mortality may occur on 269,766 acres of crop land (50 percent of the cropland in the County) from increased vulnerability to predation and direct impacts from heavy equipment.

There have been reports of Washington ground squirrels using lands enrolled in CRP by WDFW (USFWS 2012c, p. 7). The highest likelihood for injury, mortality, or impairment of breeding of Washington ground squirrels from MSGCP Covered Activities would be during or after conversion of CRP/SAFE acres within Douglas County. During conversion, Washington ground squirrels are likely to be exposed to potential injury, mortality, increased vulnerability to predation from lack of cover, or impaired breeding feeding or sheltering from loss of habitat or damage to burrows. The Washington ground squirrel historic range included all of Douglas County, therefore the effect analysis from acres lost to CRP conversion includes the whole County, since over time, assuming habitat restoration and conservation efforts continue, Washington ground squirrel would be adversely affected by habitat impacts across the whole County when CRP/SAFE is converted. The following bullets describe the quantity and frequency of potential conversion.

- Total CRP/ SAFE acres in the County as of June 2013 equals 182,072 acres (73,681 ha)
- Total farm acres in the County equals 883,094 acres (357,375 ha)(USDA 2009)
- Non-orchard farms in the County equals 868,217 acres (351,354 ha) (total farms minus 14,877 acres (6,020 ha) orchards)
- Total CRP/ SAFE acres in the County (182,072 acres)/ total non-orchard farm acres (868,278 acres (351318 ha)) equals 21 percent CRP/SAFE
- Per changed circumstances, CRP /SAFE can drop below 10 percent of current levels for 2 year duration. Contract renewal points occur at years 2018, 2026, 2021, and we assume at 10-year renewal points thereafter, for a total of 6 times during the 50-year term of the MSGCP.
- 10 percent of 182,072 acres (73,681 ha) equals 18,207 acres (7,368 ha)
- Assuming up to half of the acreage is signed onto the MSGCP; 9,104 acres (3684 ha) of CRP/ SAFE may be converted and be associated with injury or mortality at 6 different 2-year periods during the life of the MSGCP.

Based on these assumptions and calculations, 9,104 acres of CRP/ SAFE may be converted and may result in injury or mortality or significantly impair breeding feeding or sheltering behaviors at 6 different occasions during the life of the MSGCP, for an estimated total of 54,612 acres (22,101 ha) of CRP/SAFE conversion over 50 years.

In summary, certain significant adverse effects to Washington ground squirrel may occur over the 50-year term of the MSGCP as described above in the effects section, in Chapter 3 of the MSGCP, and in Appendix B, Table 1, of this conference opinion. Douglas County provides important habitat concentration areas and linkages for the Washington ground squirrel (WHCWG 2012, p. 68), and the County is important for maintaining reproduction, numbers, and distribution of the Washington ground squirrel. Appendix C, Table 2, lists the recommended

conservation strategies from the species assessment (USFWS 2012c) that are appropriate for private landowners to address, and how the MSGCP addresses those strategies. We anticipate that the implementation of BMPs under the MSGCP will temper the adverse effects of covered activities and will facilitate the reproduction, numbers, and distribution of Washington ground squirrel in Douglas County, and provide a long-term, net benefit for the Washington ground squirrel and its habitat on a landscape scale.

CUMULATIVE EFFECTS: Washington Ground Squirrel

Cumulative effects for the Washington ground squirrel are the similar to those already addressed under the general effects discussion above. Since current land-use activities are expected to continue, for lands not enrolled under the MSGCP, most of the impacts to the Washington ground squirrel would also continue. Lands that are not enrolled in the MSGCP would likely remain similar to their current habitat condition, or there may be a higher likelihood of fire or development to occur. The loss of habitat on these non-enrolled lands will exacerbate the fragmentation of the landscape for Washington ground squirrel. In summary, the Washington ground squirrel will be affected by cumulative effects associated with the following activities within the action area:

- Disease or pathogens;
- Predation from pets, feral cats or dogs, and increased predation associated with predators using fences or other structures for greater visibility;
- Exposure to pesticides or herbicides or indirect decreases in cover or forage;
- Energy or windpower development decreasing or removing habitat; and
- Loss of habitat from development or other activities on private land.

Depending on the nature of the chemicals applied, Washington ground squirrels are expected to suffer adverse impacts from chemicals such as pesticides, herbicides, and fungicides applied to agricultural fields adjacent to occupied habitat. Direct exposure would occur from spraying, overspray and drift, and contact with treated soils, and by surface runoff. Washington ground squirrels would be indirectly exposed by foraging on vegetation in treated areas. At least 27 pesticides are registered in Oregon and Washington for application to control ground squirrels (WSU 2012). The uses vary from home and garden to general rangeland applications and may target other species that may occur in shrub-steppe communities. The authorized use of these pesticides is widespread in Oregon and Washington (WSU 2012) and is particularly likely to impact small, isolated populations of the Washington ground squirrel. The population-level effects of these chemicals on the species are unknown.

Sheffield et al. (2001, p. 239-240) noted that although herbicides generally have low acute oral toxicity to wild rodents, many indirect effects have been reported from the use of herbicides such as changes in quantity, diversity, or vegetative species composition. In reference to fungicides, Sheffield et al. (2001, p. 242) surmised that the reason behind the relative lack of information regarding exposure or potential effects on wild rodents is due to the low acute toxicity of these compounds to laboratory test species.

CONCLUSION: Washington Ground Squirrel

The effects of the action include the direct and indirect effects of approving the MSGCP on the Washington ground squirrel, together with the effects of other activities that are interrelated or interdependent with this action, that will be added to the environmental baseline. We anticipate that the MSGCP will promote conservation efforts in the context of farm and ranch operations providing a long-term, net benefit for the Washington ground squirrel and its habitat on a landscape scale. However, it is unlikely that all impacts to habitat and individuals can be avoided, and some adverse significant adverse effects to Washington ground squirrel will occur. Adverse effects, including those that injure, kill, disturb, or impair breeding, feeding, or sheltering of Washington ground squirrel are described above in the effects section, in Chapter 3 in the MSGCP, and in Appendix B, Table 1, of this conference opinion. These adverse effects may occur over the 50-year term, although the exact location of each impact will depend on the individual incidental take permits. These adverse effects are may occur from the Covered Activities that degrade or convert habitat and result in a low incidence of injury or mortality. As habitats improve and Washington ground squirrel numbers increase, the likelihood of exposure to these adverse effects will increase.

As described above under Recovery and Conservation Strategies, the conservation needs of the Washington ground squirrel include actions such as maintaining or improving habitats, populations, and corridors between populations; re-establishing normal fire cycles; surveying and monitoring habitats and populations; funding research; considering translocations; reducing shooting and poisoning, and increasing public education. Permittees that join the MSGCP will contribute to the conservation of Washington ground squirrels by implementing many of the conservation strategies listed in the candidate assessment (USFWS 2012c, p. 16-17). Many, but not all, of the conservation strategies are applicable to ongoing farming and ranching on private land. In general, the MSGCP addresses the conservation strategies for the Washington ground squirrel that are most appropriate for private landowners (see Appendix C, Table 2). Specific BMPs address the following:

- protection and maintenance of populations;
- monitoring of habitats prior to any conversion activities;
- maintenance of habitat and implementation of farm bill programs that benefit the Washington ground squirrel;
- monitoring of changes to habitat or conservation lands over time at a county-wide level;
- maintenance of remnant habitats, implementation of construction and disturbance requirements;
- managing rangelands and grazing to improve habitats; and
- managing wildfires through cooperation with local fire districts.

As displayed in Appendix C, Table 2, and summarized above, the Service anticipates that the conservation recommendations listed in the 2012 Candidate Assessment (USFWS 2012c) will be largely met on Permittee lands in Douglas County.

Douglas County is important for Washington ground squirrel conservation. The WHCWG (2012, p. 64) looked at a composite "upland network" that analyzed the combined networks of three species closely associated with upland shrub-steppe habitat: sharp-tailed grouse, greater

sage-grouse, and Washington ground squirrel, The upland network is strongly focused on the western half of the ecoregion, including Douglas County. Based on this analysis, Douglas County provides important habitat concentration areas and linkages for the Washington ground squirrel (WHCWG 2012, p. 68).

One third of known Washington ground squirrel sites are in Oregon on the BCA and the BNWSTF. This area is likely the largest contiguous occupied habitat in the entire range of the Washington ground squirrel. A portion of that area is part of the Threemile Canyon Farms MSCCAA and contributes to Washington ground squirrel conservation efforts (USFWS 2012c, p. 3). The MSGCP will maintain and improve habitat in Douglas County through maintenance of shrub-steppe fragments and the implementation of BMPs such as grazing prescriptions, and the conservation adds to that provided in the MSCCAA.

Initial queries by the FCCD indicate that about 50 percent of likely landowners are showing early interest in applying for permits under the MSGCP (Jon Merz, in litt. April 2, 2015). The more farmers/ranchers that join the MSGCP, the more the habitat will improve for the Washington ground squirrel and other covered species. There are three main reasons that covered species, including the Washington ground squirrel, still exist in Douglas County: 1) there are many fragments and blocks of habitat on private land throughout the County because of the shallow and rocky soils that are difficult or impossible to farm; 2) CRP/SAFE acres throughout the County provide habitat, cover, and forage for the covered species; and 3) there are large blocks of habitat (called HCAs) provided by WDFW, BLM, and TNC that are managed for wildlife or for multiple uses.

In the future, under the MSGCP, currently fragmented habitat will be maintained on enrolled farms. The SAFE program is a component of CRP that further emphasizes habitat for sage-grouse and sharp-tailed grouse, but may also provide habitat for the Washington ground squirrel. The CRP habitat may vary in quantity depending on Farm Bill funding but under the MSGCP, enrolled farmers are to look for other programs if CRP or SAFE contracts are not renewed, to avoid farming those CRP acres if economically feasible or if they cannot maintain those acres in conservation cover, CRP will be monitored across the County. If the CRP /SAFE drop below 10 percent of the 2013 amount, then the FCCD will work with the Service and others to ensure that CRP/SAFE returns to more than the 10 percent amount within 2 years. If that is not feasible, then the Service will revisit the MSGCP to determine if it still meets Section 10 issuance criteria, and, if not, how and whether it can be revised. If it cannot be revised, then permits may be revoked. Although HCA acres are not expected to decrease, monitoring will occur and, if they do drop by 10 percent across the County, then FCCD and the Service will also reconvene to determine if the MSGCP is working as expected, and if necessary permits may be revoked. For these reasons, and because habitat trends should improve on enrolled lands, the Service expects that habitats will continue to be available to support the survival and recovery of the Washington ground squirrel in Douglas County for the duration of the MSGCP.

For the Washington ground squirrel, the adverse effects caused by habitat modification, fragmentation, or direct mortality or injury during and after the implementation of Best Management Practices are expected to be localized. Many will be temporary in nature. The BMPs associated with the Covered Activities will minimize and mitigate adverse effects to the

Washington ground squirrel, and the conservation benefits of the MSGCP will benefit the population as a whole. Therefore, we do not anticipate that any decreases in the number, distribution, or reproduction of the Washington ground squirrel in Washington or across its range, due to implementation of the MSGCP will reduce, appreciably, the likelihood of persistence of the species. After reviewing the current status of the Washington ground squirrel, the environmental baseline for the action area, the effects of the action, and the cumulative effects, it is the Service's biological opinion that the issuance of future section 10(a)(1)(B) permit for the MSGCP, as proposed, is not likely to jeopardize the continued existence of the Washington ground squirrel. No critical habitat has been designated for the Washington ground squirrel; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT: Washington Ground Squirrel

The Douglas County MSGCP conforms to a "framework programmatic action" as defined at 50 CFR 402.02 (80 FR 26832). Pursuant to the authority under 50 CFR 402.14(i)(6) of the implementing regulations for section 7 (80 FR 26832), an incidental take statement is not required at the programmatic level. Under the Douglas County GCP, the Service will issue incidental take permits under the authority of section 10(a)(1)(B) to applicants who commit to comply with the provisions of the plan based on a site-specific site plan, prepared in accordance with the plan, that is submitted to the Service with their permit application. If the permit application is complete and satisfies the statutory permit issuance criteria, the Service will issue a permit authorizing the incidental take of the sage grouse based on the site-specific details provided in the site plan. In response to individual permit applications, the Service will conduct intra-Service section 7 consultation on the proposed permit action as is our customary practice. That consultation will rely on the fact-pattern specifics of the site plan and the analyses and findings presented herein as the basis for section 7(a)(2) determinations.

Conservation Recommendations and the Reinitiation Notice are provided for the Washington ground squirrel, the sage-grouse, and the sharp-tailed grouse at the end of this conference opinion.

STATUS OF THE SPECIES: Greater Sage-Grouse

Listing History and Status

Prior to European settlement in the 19th century, sage-grouse inhabited parts of 13 western states and three Canadian provinces (Schroeder et al. 2004, p. 364). Historically, sage-grouse were classified into two subspecies, the eastern (*C. u. urophasianus*) and the western (*C. u. phaios*), the latter occurring only in Washington, Oregon, and north eastern California. The classification was based on slight differences in coloration in eight museum specimens (Aldrich 1946, pp. 129-130). In 2003, Benedict and others (p. 305) published findings based on genetic work that invalidated the taxonomic distinction between the eastern and western subspecies, placing greater sage-grouse into a single species.

Federal Status

On May 7, 2001, prior to the taxonomic revision, the Service published a finding that the Washington population of western sage-grouse, identified as the Columbia Basin distinct population segment (DPS), was "warranted but precluded" (66 FR 22984). This finding indicated that this DPS of the western subspecies warranted protection under ESA, but listing was precluded by higher priority species thereby conferring candidate status on the DPS.

On January 12, 2005, the Service published a finding that the greater sage-grouse across its range did not warrant protection under the ESA (70 FR 2244). This "not warranted" finding was challenged in court and, in December 2007, a Federal judge ordered the Service to reconsider its decision. On March 23, 2010, the Service published a range-wide "warranted but precluded" finding (75 FR 13909), thereby conferring candidate status on the range-wide population of greater sage-grouse. The 2010 finding also determined that neither the western nor eastern subspecies constituted a listable entity based on scientific review.

On May 10, 2011, prompted by litigation, the Service was remanded in a multi-district settlement to make a final listing determination for the sage-grouse (including the Columbia Basin DPS) by the end of fiscal year 2015. However, since the Service no longer recognizes a division between an eastern and western subspecies of the sage-grouse, the status of the Washington population as a DPS is under review as well. As of the date of this conference opinion, the federal status has not changed.

Priority Areas of Conservation

In 2012, then Secretary of the Interior Ken Salazar and the governors of 11 western states formed a Sage-Grouse Task Force to develop recommendations to 1) advance a coordinated multi-state, range-wide conservation strategy, 2) ensure the long-term viability of the species, and 3) preclude the need to list greater sage-grouse under the ESA. The Sage-Grouse Task Force, in cooperation with the Director of the Service,

tasked a team of state wildlife agency and Service representatives (the Conservation Objectives Team, or COT) to develop range-wide conservation objectives for the sage-grouse to inform both the 2015 decision as well as the collective conservation efforts of the many partners working to conserve the species. In February 2013, the Service issued the Final Report: Greater Sage-Grouse (*Centrocercus urophasianus*) Conservation Objectives (COT Report; USFWS 2013). The report described the conservation status of the greater sage-grouse and the nature of the threats facing the species, and identified objectives to ensure its long-term conservation. The COT also established Priority Areas for Conservation (PAC) designated as key habitats and locations essential for sage-grouse conservation (USFWS 2013, p. 12).

In Washington, the COT Report established four PACs: Yakima Training Center (YTC), Moses Coulee, Crab Creek, and Yakama Nation (Figure 8). The YTC and Moses Coulee PACs are areas comprised of the only two remaining native populations of sage-grouse in Washington. The Crab Creek and the Yakama Nation PACs were previously extirpated, but WDFW and the Yakama Nation are reintroducing birds from Idaho, Oregon, and Nevada in an effort to establish increased ecological diversity of the species.

State Status

Although the sage-grouse is classified as a game species in Washington, hunting was terminated in 1988 (Schroeder et al. 2013, p. 3). The sage-grouse was listed as a threatened species by the State of Washington in 1998 (Hays et al. 1998 p. 29). A state recovery plan for the sage-grouse was published in 2004. The recovery goal established by WDFW is for the population to average more than 3,200 birds for a ten-year period with active lek complexes in at least six management units. Uplisting to endangered will be considered if the population decreases to less than 650 birds and continues to decline (Stinson et al. 2004, pp. 27-29).

Washington Sage-Grouse Management Units

The Washington Sage-grouse Working Group, an interagency technical group, outlined sage-grouse management units (SMU) within the historical range of sage-grouse that have potential for contributing to recovery (Stinson et al. 2004, p. 27). Each of the SMUs contain significant concentrations of shrub-steppe habitat; some have current use by sage-grouse and some were delineated for potential future use (Figure 8). At the date of the recovery plan, only the Mansfield Plateau, Moses Coulee, and the YTC SMUs were occupied by resident breeding populations of sage-grouse. Reintroduction efforts since 2004 (described briefly above) resulted in Crab Creek and Toppenish Ridge being regularly occupied by breeding populations. Occasional sage-grouse use has been observed in Bridgeport Point, Dry Falls, Rattlesnake Hills, Saddle Mountains, and Umtanum Ridge SMUs which are adjacent to currently occupied units (Stinson and Schroeder 2014, p. 3). See Table 6 and Figure 8 for the intersection between the PACs and the SMUs.

Table 6. PACs and Sage-Grouse Management Units in Washington.

PAC	Washington Recovery Plan Sage-Grouse Management Unit	Washington Counties
Crab Creek	Crab Creek	Lincoln, Grant
Moses Coulee	Mansfield Plateau, Moses Coulee	Douglas, Grant
Yakima Training Center	Yakima Training Center, Rattlesnake Hills, Umtanum Ridge,	Kittitas, Yakima
Yakama Indian Nation	Toppenish Ridge	Yakima

Summary of Status

In summary, the sage-grouse in Washington were previously designated as "warranted, but precluded" for listing as a DPS (66 FR 22984), but that DPS is being reanalyzed due to new information (Aldrich 1946, pp. 129-130). However, the sage-grouse within Washington may also be considered as part of the range-wide species which is currently "warranted, but precluded" (75 FR 13909). As required in a fiscal year 2015 remand to determine whether the sage-grouse continues to warrant listing, the Service is reviewing the status of the species. As of the date of this conference opinion, federal status has not changed; therefore, the sage-grouse potentially affected by this proposed action are federal candidates for listing under both the Columbia Basin DPS and the greater sage-grouse range-wide findings. They are also listed as threatened by the State of Washington.

Given the above, the Service will evaluate the effects of the action on both the Columbia Basin distinct population segment of the sage-grouse, and the range-wide population of the greater sage grouse. The proposed action will occur in Douglas County which supports the largest native population of sage-grouse in Washington. Douglas County contains the Moses Coulee and Mansfield Plateau SMUs (state delineated) and is located within the Moses Coulee PAC (federally delineated). The PACs will be carried forward as the geographical focus for describing current sage-grouse populations and impacts.

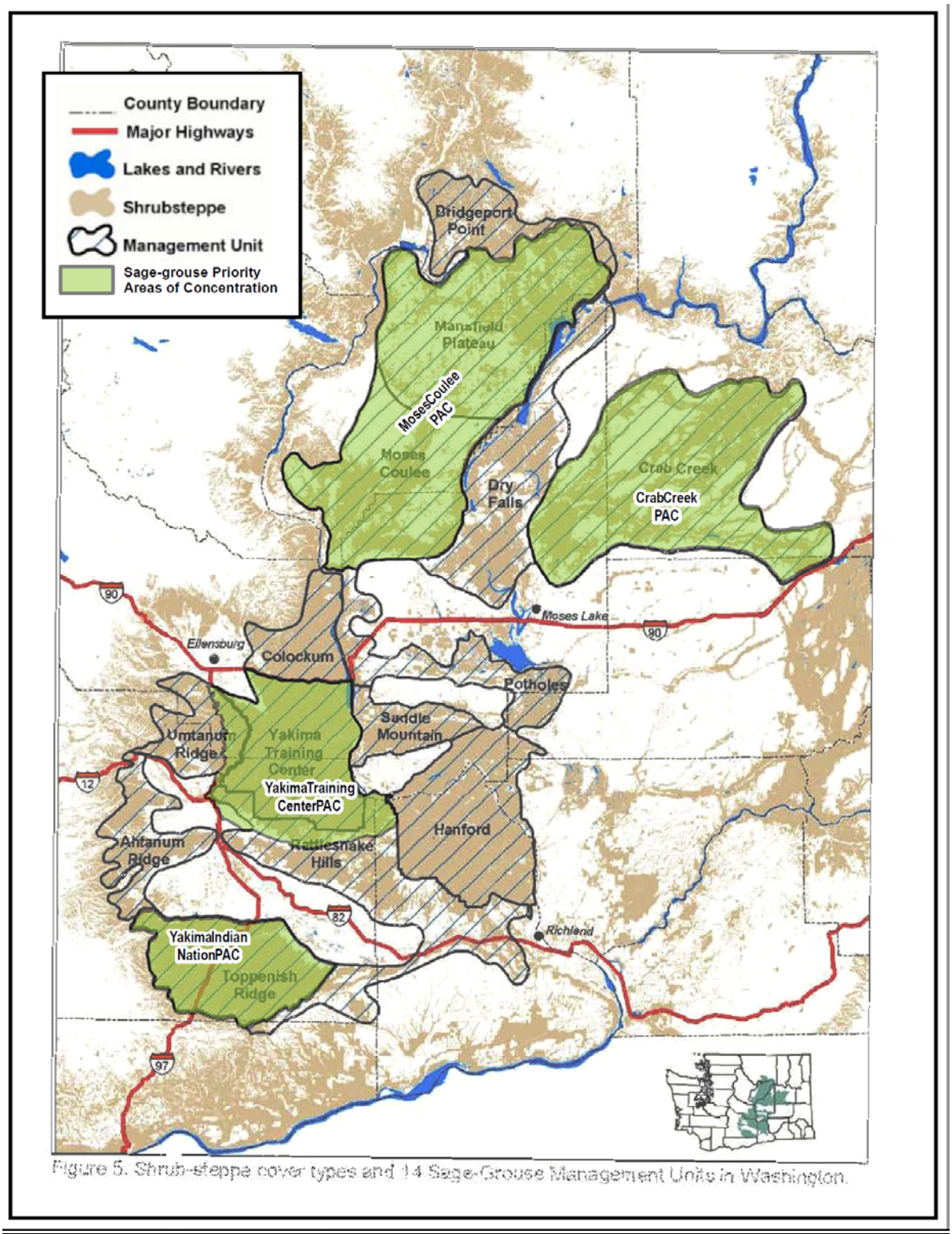

Figure 8. Intersection between COT Report PACs and WDFW Sage-Grouse Management Units.

Populations and Distribution

Rangewide

Sage-grouse have declined across their range and now occupy 56 percent of their historic range (Schroeder et al. 2004, p. 364). Sage-grouse have been extirpated from Nebraska, British Columbia, and possibly Arizona (Schroeder et al. 1999 p. 2). They currently occur in 11 states and two Canadian provinces (Knick and Connelly 2011, Figure 1; Stinson et al. 2004, p. 2).

Population declines began in the late 1800s as settlers removed sagebrush on better soils for crop cultivation and to improve grazing for livestock. Excessive grazing up until the early 1900s by domestic livestock, coupled with severe drought, had a significant, long-term impact on sagebrush habitats. Population declines based on lek counts were more dramatic from 1965 to 1985, averaging an annual decline of 3.5 percent (Connelly et al. 2004 pp. 6-71; 75 FR13922), and slowed during 1986 to 2003 to 0.37 percent. Western Association of Fish and Wildlife Agencies (WAFWA) (2008, entire) also analyzed trends based on lek counts for a longer period, but with different statistical methods, and also showed the annual rate of decline has lessened since 1985 (from 3.1 to 1.4 percent). Population declines continue and populations are now at much lower levels than in the early 1980's. These continuing negative
trends at such low relative numbers create concern for the persistence of the population over the long-term. The rates of long-term population decline vary range-wide due to regional differences in both habitat quality and localized threats.

Washington State

Historically, greater sage-grouse inhabited suitable shrub-steppe and meadow-steppe habitat in Eastern Washington. Their range extended from the Oregon border to the Canadian border and was bounded on the west by the foothills of the Cascade Mountains. On the south, the range ran along the Oregon border to the Blue Mountains, then north to the Spokane River, south of the Spokane River to its junction with the Columbia River, then up the Okanogan Valley into southern British Columbia (Stinson et al. 2004). Current distribution totals approximately 8 percent of Washington's historical range (Stinson et al. 2004, p. 2).

Washington's greater sage-grouse continued to decline dramatically through the 1980's in both distribution and population size due to conversion of shrub-steppe for production of crops and degradation of the remaining native habitat (Figure 9) (Stinson et al. 2004; Stinson and Schroeder 2014, p. 7). Despite a statewide closure of the sage-grouse hunting season in 1988, the sage-grouse population remained at low levels or continued to decline, probably due to reduction in habitat, deterioration and fragmentation of the remaining habitat, and isolation and small size of the remaining population (Stinson et al. 2004, pp. 21-22). Sage-grouse population size in Washington declined from approximately 3,800 birds in 1970 to 910 in 2014 (Schroeder 2014 in litt. 2014). Of 76 lek complexes documented since 1960, 64 percent are currently vacant (Schroeder et al.

2013, p. 3). Many of these vacant lek complexes (53 percent) are in areas where sage-grouse have been extirpated since 1960.

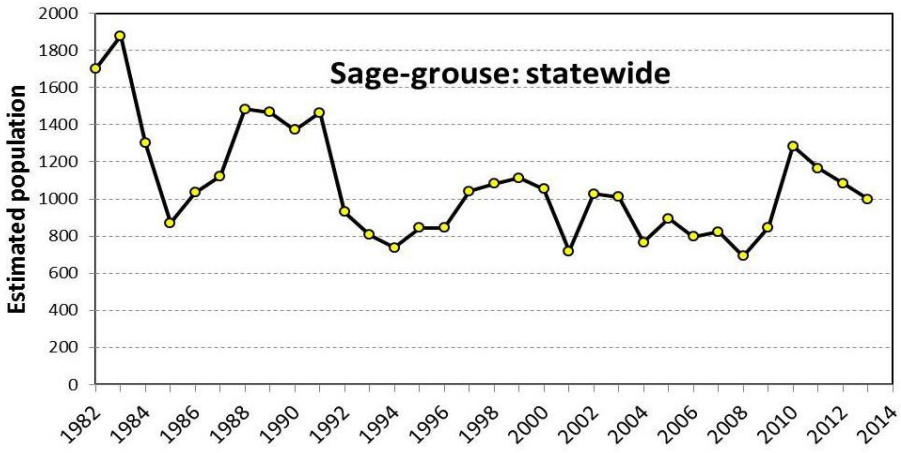

Figure 9. Estimated total population of greater sage-grouse in Washington, 1982-2013.

Systematic efforts to monitor sage-grouse populations in Washington were not begun until the early 1960's. Thus, most estimates of abundance and population trends only address the past 40 years. The sage-grouse population size for Washington is estimated using lek survey counts (Connelly et al. 2003; Stinson et al. 2004; Stinson and Schroeder 2014, p. 6). The number of sage-grouse in the Moses Coulee population was estimated at 1,665 individuals in 1970 and 400 birds in 1985. The ten-year average was approximately 1,000 birds with a high in 2010 with 1,284 birds. In 2012, 148 sage-grouse were estimated to occur on the YTC, 853 estimated in Douglas County, and 45 estimated in Lincoln County (Stinson and Schroeder 2014 p. 6). The 2013 spring population estimates showed decreases in the Douglas County population (to 712) while the YTC and Lincoln County populations both showed increases at 221 and 65 birds respectively (Figure 10). The 2013 lek survey data indicated a high of 274 males in Douglas County; a 17 percent decrease from 2012 (331). Annual changes in populations may not always be meaningful, but the conversion of CRP back to cropland may have contributed to the population declines seen since 2010 in Douglas County, while translocations of sage-grouse to Lincoln County may be reflected in the population increase seen there. In 2014, the population estimate was 910 (572 in Moses Coulee, 263 in YTC, 36 in Crab Creek, and 39 in Yakama Nation lands (Michael Schroeder, WDFW, in litt., 2014)).

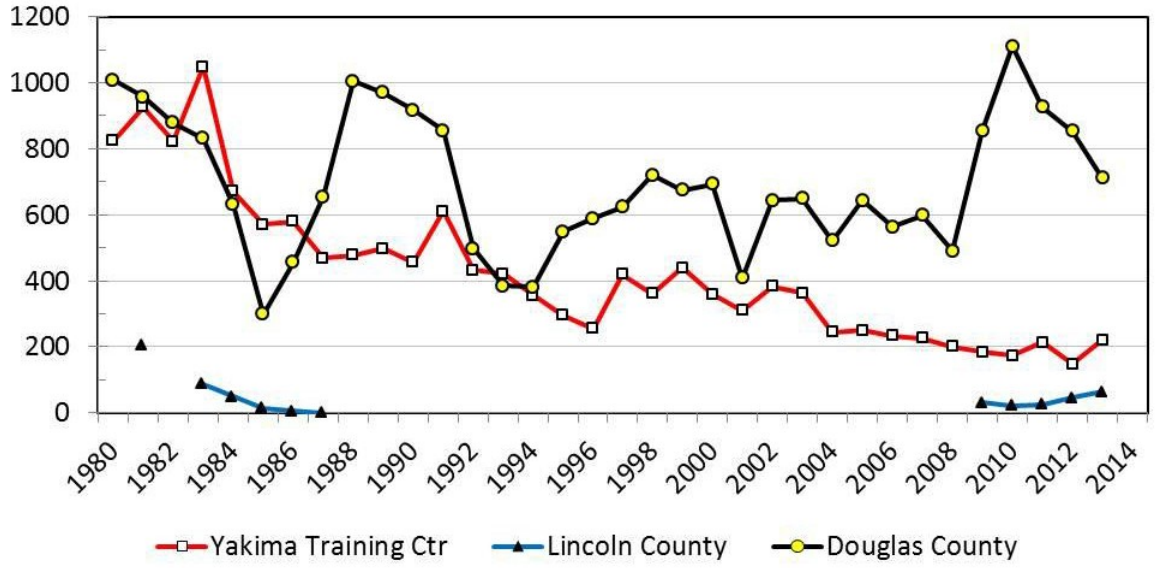

Figure 10. Estimates for three populations of sage-grouse in Washington, 1980-2013. (From Stinson and Schroeder 2014, p. 3, Figure 3)

Garton et al. (2011; USFWS 2013, pp. 85-87) predicted a 76.2 percent chance that the YTC and Moses Coulee PACs would dip below 200 males in the next 30 years and an 86.3 percent chance it would dip below 200 by 2107. Leks in Washington are not well-connected (Knick and Hanser 2011, p. 387). Although the PACs are likely large enough to support the current populations, the small size of those existing populations and their lack of current viability in the state means that recovery efforts and expansion of populations will be necessary.

Moses Coulee PAC

The population of sage-grouse within the Moses Coulee PAC has maintained its numbers until recently. In 2007, 230 males were counted in this population; Garton et al. (2011; USFWS 2013, pp. 85-87) estimated an 88 percent probability that the population would dip below 200 males by the year 2037 or close to a 100 percent probability that the population would dip below 200 males by the year 2107. They also estimated a 62 percent probability that the population would dip below 20 males by 2107. Threats to this population include the lack of habitat stability due to the amount of private land, habitat fragmentation, and dependence on farm programs. Public land (Washington Department of Fish and Wildlife, BLM, Washington Department of Natural Resources) is relatively sparse compared to the quantity of private land (Stinson et al. 2004; USFWS 2013, pp. 85-87). Because of relatively large amounts of enrollment in CRP and SAFE programs, there is a great deal of federal and state support for private landowners to conserve sage-grouse habitat in the Moses Coulee PAC, at least for the next decade. Even so, the existing high degree of habitat fragmentation in this PAC continues to affect

the sage-grouse population through lack of cover, lack of connectivity, and predation. The Moses Coulee population is discussed in more detail in the environmental baseline section below.

Yakima Training Center PAC

The population of sage-grouse within the YTC PAC is much smaller than the Moses Coulee population, but is almost entirely on public land. In 2007, 85 males were counted in this population; Garten and others (2011; USFWS 2013, pp. 85-87) estimated a 26 percent probability that the population would dip below 20 males by the year 2037 or 50 percent probability that the population would dip below 20 males by 2107. The number of males counted in 2011 was 72 (Schroeder et al. 2012, as referenced in USFWS 2013, pp. 85-87). The use of the YTC for military training activities and the resulting fires reduced the overall suitability of the habitat to support this population. Despite efforts to manage wildfire risk, wildfires have continued to reduce the quality of habitat in the YTC. Other key factors influencing this population are two interstate highways (I-82 and I-90) which border the population on the north and west side, power lines which border the population on the north, west, and south sides, the Columbia River Valley which is a natural barrier to movement on the east side, and wind energy development on the north side. These factors constrict the population's ability to expand.

Crab Creek PAC

The population of sage-grouse within the Crab Creek PAC was occupied by sage-grouse as recently as the mid-1980s (Schroeder et al. 2000; USFWS 2013, pp. 85-87). The Washington Department of Wildlife and the BLM acquired and/or consolidated approximately 50,000 acres (20,234 ha) of land in the Crab Creek area in the mid-1990s. Translocations to this area were initiated in 2008 (Schroeder et al. 2012; USFWS 2013, pp. 85-87) and, in 2012, 13 males were counted on a single lek. The potential for this population to expand appears promising. However, it is still too early to determine if the re-establishment effort was successful. Threats to this population include its small size, habitat fragmentation, and the risk of habitat loss on acres formerly enrolled in farm programs (CRP and SAFE).

Yakama Indian Nation PAC

The Yakama Nation population was previously extirpated, and translocation efforts in 2006-2008 were not promising (USFWS 2013, pp. 85-87). Threats in the area include poor habitat quality, small population size, lack of connectivity with existing populations, and -habitat impacts from wild horses.

Habitat and Life History

Rangewide

The greater sage-grouse is a sagebrush-obligate species that depends on a variety of shrub-steppe habitats throughout its life cycle (Schroeder et al. 2004, pp. 364-365). Sage-grouse can exhibit large movements between seasonal habitats or have seasonal ranges that overlap, but are not considered migratory unless movements are greater than 10 km (Connelly et al. 2000, p. 968). These seasonal habitats include breeding, nesting, brood-rearing, and wintering. Overall, large, interconnected expanses of sagebrush with healthy, native understories are an essential habitat component in all seasonal habitats (Connelly et al. 2004, pp. 4-17). While greater sage-grouse are dependent on large, interconnected expanses of shrub-steppe (Patterson 1952, pp 7-8; Connelly et al. 2004, pp. 4-17), information is not available regarding minimum habitat patch sizes required to support populations of greater sage-grouse. Greater sage-grouse exhibit strong site-fidelity to breeding and nesting areas (Connelly et al. 2004, pp. 4-17).

Sage-grouse breeding occurs on areas known as leks. Each spring, males congregate on leks and perform a "strutting display" or mating ritual to attract females (Schroeder et al. 1999). Adult male sage-grouse exhibit great fidelity to lek sites and have been shown to visit the same lek throughout the breeding season and year to year (Schroeder and Robb 2003, p. 693). The polygamous mating system and fluctuations of sage-grouse populations over time reduce the effective population size and increase the number of grouse needed for a population to be viable (Stinson et al. 2004, p. viii).

Sage-grouse typically strut in open areas near stands of sagebrush (with > 20 percent canopy cover used for food and escape cover (Emmons and Braun 1984, pp. 1024-1025, Klebenow 1985, pp. 35-37). Leks form as a result of proximity to nesting habitat. Across their range, sage-grouse leks are often located about 0.8 to 2.1 miles (1.289 to 3.38 km) from nesting areas (Berry and Eng 1985, p. 238, Connelly et al. 1988, p. 120, Autenrieth 1982 p. 8, Wakkinen et al. 1992, p. 382; Fischer et al. 1993, p. 1039). Rangewide, locations that sage-grouse choose for strutting is a reflection of the nesting habitat in the area and therefore lek habitat is not considered a limiting factor to sage-grouse population growth, although nesting habitat can be (Schroeder et al. 2000, pp. 970-971).

Sage-grouse population declines are most often related to poor nest success (Baxter et al. 2008, pp. 184-185). Nest success ranges from 15 to 86 percent depending on a variety of factors including the condition of the habitat and the age of the hen (Knick and Connelly 2011, Table 3). Average clutch size varies from 6.0 to 9.5 throughout the species range (Schroeder 1997, p. 269; Sveum et al. 1998, pp. 346-347).

Nesting typically occurs under sagebrush within one to two miles of the lek (Connelly et al. 2004, p. 3-10), usually in habitats dominated by sagebrush with horizontal and vertical structural diversity. Successful nests are most often found in understory composed of native grasses and forbs, which serves to hide the nest, as well as to provide a food source

for the hen and new chicks (Connelly et al. 2000, pp. 970-971). Nests have also been found under other shrubs or grass (Dahlgren et al. 2009, p. 1289-1290).

Early brood-rearing usually occurs relatively close to nest sites (Connelly 1982, p. 38; Gates 1983, pp. 32-44). Because sage-grouse chicks are dependent on insect prey after hatching (Johnson and Boyce 1990, p. 90) in order to grow quickly (Beckerton and Middleton 1982, pp. 573-575), habitats are open stands of sagebrush with at least 15 percent canopy cover of a diverse species richness of grasses and forbs (Lyon and Anderson 2003, p. 489; Sveum et al. 1998, pp. 346-349). As sagebrush habitats desiccate throughout the summer months, and if such habitats are available, sage-grouse broods will move to more mesic sites. Diet shifts almost entirely to sagebrush as local vegetation desiccates in the late summer (Schroeder et al. 1999).

Winter habitats appear to be somewhat similar across the range of sage-grouse because sage-grouse depend on sagebrush for their winter diet (Patterson 1952). Habitat selection is dependent on snow depths (Schroeder et al. 1999) because sage-grouse select areas where sagebrush remains relatively exposed (Beck 1977, pp. 20-21). Sage-grouse have been found to inhabit sagebrush in greater densities in winter than during other life-stages (Schroeder et al. 1999).

Sage-grouse depend on sagebrush for more than just nutrition; they also use it for cover and temperature regulation during colder temperatures, sometimes burrowing beneath shrubs (Beck 1977, pp. 20-21). Topography may also play a part in habitat selection, where sage-grouse typically move to lower elevations (Patterson 1952, p. 79) than those used during the summer, and select southward facing aspects (Crawford et al. 2004, p. 5) to ensure that snow does not entirely cover the shrub canopy.

Habitat and Life History Differences in Columbia Basin DPS and Moses Coulee PAC

In many ways, the Columbia Basin does not conform to range-wide generalities about sage-grouse habitat configuration. The Moses Coulee PAC occurs in a highly fragmented landscape with cropped agriculture as part of the shrub-steppe landscape matrix in many areas, and is almost entirely on private lands. The best remaining patches of habitat are relatively small parcels of ‘scablands’ with shallow soil and/or steep terrain, generally unsuited to cultivation. Some over-grazed lands, unsuitable for nesting due to a sparse herbaceous understory, are used for wintering habitat. In this PAC, most known leks occur in wheat fields (Schroeder et al. 2003, p. 17-2) and hens move farther distances between lek and nesting habitat than populations elsewhere (Schroeder et al. 2004, pp. 364-365).

Sage-grouse in the Moses Coulee PAC are dependent on CRP parcels that have been removed from crop production and established with perennial vegetation. Because CRP establishes relatively permanent cover, it provides more year-round security to wildlife than land under cultivation. Sage-grouse likely use CRP fields because the cover is contiguous and can provide good nesting habitat, which is usually not subject to livestock grazing. The quality of a CRP field for sage-grouse habitat depends on the type of vegetation planted and the length of time the field has been in the CRP. In Washington, sage-grouse are known to use higher quality CRP

Habitat loss is occurring from the expansion of native conifers (e.g., pinyon-pine (*Pinus edulis*) and juniper (*Juniperus* spp.[pinyon-juniper]) in some parts of the range mainly due to changes in fire return intervals and the overstocking of domestic livestock, particularly during the latter 1800's and early 1900's (Miller and Rose 1999, pp. 553-555).

Agricultural conversion is typically defined as the conversion of sagebrush habitats to tilled agricultural crops or re-seeded exotic grass pastures, resulting in habitat loss and fragmentation. Agricultural conversion can also include the conversion of conservation lands (e.g., those enrolled in CRP or SAFE) when such lands are providing important habitat components for sage-grouse. This type of conversion is detrimental to sage-grouse in areas where the birds depend on these interim successional habitats, such as in Washington (USFWS 2013, p. 51-52).

Exurban development (dispersed homes on small acreages) results in direct habitat loss, habitat fragmentation, and the introduction of invasive plant species. Urban and exurban activities also increase the presence of predator subsidies (e.g., trash, landfills, bird feeders) allowing for increased numbers of predators associated with humans that may have disproportionate impacts on greater sage-grouse (e.g., corvid, red fox (*Vulpes fulva*), skunks (*Mephiti*s sp.), raccoons (*Procyon lotor*). Additionally, pets may have negative impacts on sage-grouse through direct predation or disturbance (e.g., chasing birds). Infrastructure associated with exurban development also results in habitat loss and fragmentation, subsidies for avian predators such as ravens, and possible disturbance to sage-grouse (USFWS 2013, p. 50). Development of infrastructure for any purpose (e.g., roads, pipelines, powerlines, and cellular towers) results in habitat loss, fragmentation, and may cause sage-grouse habitat avoidance. Additionally, infrastructure can provide sources for the introduction of invasive plant species and predators (USFWS 2013, p. 51).

Livestock Grazing

Sage-grouse are adapted to high quality climax shrub-steppe habitat. Sagebrush provides forage and cover habitat throughout the year and the grass-forb understory supports food and cover during spring through fall. Livestock grazing is widespread across the sagebrush biome (Connelly et al. 2004, Knick et al. 2003, all as referenced in USFWS 2013, pp. 44-48). Over-grazing can have significant impacts on the shrub-steppe ecosystems found throughout the historic range of greater sage-grouse (Fleischner 1994, entire), and these impacts may be exacerbated in the Columbia Basin. Excessive grazing removes current herbaceous growth and residual cover of native grasses and forbs, and can increase the canopy cover and density of sagebrush, increase invasive species, and destroy the multi-tiered habitat that provides covers for nests (Livingston 1998, pp. 22-24; Cannings 1995, p. 8; Savignac et al. 2011, p. 14). Adequate forage and cover is critical to sage-grouse populations during the spring nesting and brood rearing periods, and affects sage-grouse reproductive potential (Crawford 1997, pp. 5-6; Connelly and Braun 1997, p. 231).

fields that contain sagebrush and native grasses. Establishment of CRP on approximately 17 percent of former sage-grouse habitat resulted in population growth as compared to the decline observed in populations with less than 2 percent CRP enrollment). CRP fields contained 40 percent of about 60 nests found in Douglas County from 1992 to 1996, 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 and Vander Haegen 2006, p. 4). These patches of shrub-steppe are typically privately owned land with poor suitability for agricultural conversion.

Threats to Sage-grouse within Washington

Threats include habitat loss and degradation resulting from large-scale fires, conversion of shrub-steppe to cropland, overgrazing, encroachment by invasive weeds, inappropriate use of herbicides, and development of wind energy. All of these threats have contributed to small isolated populations of sage-grouse (WDFW 2005 as referenced in USFWS 2007, p. 4). Sage grouse are sensitive to disturbances at both leks and nesting areas.

Small Population Size and Isolation

The loss and fragmentation of sagebrush habitats, particularly those used for nesting and brood-rearing, is a primary cause of the decline of sage-grouse populations (Patterson 1952, pp.7-9; Connelly and Braun 1997, p. 231; Braun 1998; p. 000; Johnson and Braun 1999; p. 78; Connelly et al. 2000, pp. 972-973; Connelly et al. 2004, pp. 4-17; Schroeder et al. 2004, p. 364). In some areas of the sage-grouse's range, populations are already isolated and at risk for extirpation due to genetic, demographic, and stochastic (i.e., unpredictable) events such as lightning caused wildfire.

The sage-grouse is threatened due to relatively small and isolated populations. Small populations are affected by loss of genetic variability, inbreeding, and predation pressure, and are at risk from stochastic events such as extreme weather or fires (Stinson et al. 2004, p. 22). The effective population size of sage-grouse populations is much smaller than the total number of individuals, since only a small portion of the adult males do most of the breeding. Sage-grouse populations are also somewhat cyclic, putting small populations at greater risk.

Habitat Loss and Degradation including Fire

In Washington, the lack of extensive good quality shrub-steppe vegetation limits sage-grouse (Hays et al. 1998, pp. 32-38, Schroeder et al. 1999). Habitat loss, degradation and fragmentation of shrub-steppe can be attributed to land conversion, development, grazing, sagebrush removal and burning, wild fires, erosion, mining, military activity, noise, power lines and roads (Klebenow 1972, pp. 312-313; Braun 1986, pp. 227-229; Swenson et al. 1987 Table 1 and Table 2; Eberhadt and Hofmann 1991, p. 30; Remington and Braun 1991, p. 130). Conversion and degradation of shrub-steppe habitat on public and private lands is continuing (Hays et al. 1998, p. 34),

Habitat loss, fragmentation, and isolation can result in reductions in lek persistence, lek attendance, population recruitment, yearling and adult annual survival, female nest site selection, nest initiation, and complete loss of leks and winter habitat (Holloran 2005; pp. 6-13; Aldridge and Boyce 2007, pp. 516-518; Doherty et al. 2008, p. 191). Greater sage-grouse avoid areas due to human activities, including noise, even when sagebrush remains intact (Blickley et al. 2012, p. 1).

Disturbed or altered habitats have less resilience than intact habitats, and restoration of disturbed areas is very difficult (Miller et al. 2011, p. 25). Data supporting the positive impacts of sagebrush manipulation on sage-grouse populations is limited (Beck et al. 2009, pp. 396-397). Not all areas previously dominated by sagebrush can be restored because the alteration of vegetation, nutrient cycles, topsoil, and living (cryptobiotic) soil crusts has exceeded recovery thresholds (Pyke 2011, p. 534), and processes to restore healthy native sagebrush communities from scratch are relatively unknown or expensive, (Pyke 2011, p. 5) and may require decades or centuries for success (Knick et al. 2003, and references therein). Except for areas where active restoration is attempted following disturbance (e.g. wildfire), management efforts in sagebrush ecosystems are usually focused on maintaining the remaining sagebrush (Miller et al. 2011, p. 83; Wisdom et al. 2011).

In addition to habitat loss and fragmentation, fire is one of the primary factors linked to loss of sagebrush-steppe habitat and corresponding population declines of greater sage-grouse (Connelly and Braun 1997, p. 232). Loss of sagebrush habitat to wildfire has been increasing due to an increase in fire frequency. The increase in mean fire frequency has been facilitated by the incursion of nonnative annual grasses, primarily *Bromus tectorum* (cheatgrass) and *Taeniatherum asperum* (medusahead) (Billings 1994, p. 24.). Increased fire frequency can preclude the opportunity for sagebrush to become re-established. Exotic annual grasses and other invasive plants reduce or eliminate native forbs and grasses essential for sage-grouse food and cover. Annual grasses and noxious perennials also increase with ground disturbances, including wildfire, improper grazing, farming, and infrastructure associated with energy development (Balch et al. 2013, pp. 177-178, Young et al. 1972, all; Bergquist et al. 2007, p. 386). Because the replacement of native perennial bunchgrass communities by invasive annuals is a primary contributing factor to increasing fire frequencies in the sagebrush ecosystem, every effort must be made to retain and restore this native plant community (USFWS 2013, p. 38-52).
Management of this threat is two-pronged: (1) control, or stopping the spread of invasive annual grasses, and (2) reduction or elimination of established invasive annual grasses.

The intentional removal or treatment of natural habitats and sagebrush (using prescribed fire, or any mechanical and chemical tools to remove or alter the successional status of the sagebrush ecosystem) contributes to habitat loss and fragmentation, a primary factor in the decline of sage-grouse populations. Removal and manipulation of sagebrush may also increase the opportunities for the incursion of invasive annual grasses, particularly if the soil crust is disturbed (Beck et al. 2012, as referenced in USFWS 2013, p. 52).

Livestock are commonly grazed in shrub-steppe lands within the range of sage-grouse in Washington (Hays et al. 1998, p. 36). The existence of healthy sage-grouse populations in areas long grazed suggests that certain grazing levels may be compatible with sage-grouse populations (Wambolt et al. 2002, p. 7). Livestock grazing effects vary with the timing, frequency, and intensity of grazing. Frequent heavy grazing deteriorates the composition and structure of native plant communities (Schroeder et al. 2003 p. 17-5) whereas light grazing of healthy shrub-steppe may not cause habitat degradation (Klebenow 1985, Table 3; Call and Maser 1985, pp. 17-18). The intensity of grazing that is appropriate in sage-grouse habitat is not clear, but may be < 25 percent utilization of the current year's growth of key forage species (Galt et al. 2000, p. 10;). This level of grazing should not be exceeded in areas where habitat restoration and maintenance is the objective (Galt et al. 2000, p. 10), during drought years and/or following fires (Beck et al. 2009, pp. 396-397). Restoring severely altered habitat (e.g., areas devoid of native species and seed sources) often requires more than simply removing cattle to recover the native plant community (Bunting et al. 2002, Part B).

Grazing by horses presents very different impacts from grazing than grazing by cattle or sheep. Per the COT Report (USFWS 2013), they consume more forage than cattle or sheep and remove more of the plant. Horse grazing results in a reduction of shrub cover and more fragmented shrub canopies, a greater abundance of annual invasive grasses, reduced native plant diversity, and reduced grass density, which can negatively affect sage-grouse habitat (Beever and Aldridge 2011; USFWS 2013, p. 46).

Predation and Mortality

Habitat that provides good shrub and grass cover for nesting and wintering allows grouse to increase despite predation, but losses of sage-grouse to predation may be greater where habitat is fragmented (Vander Haegen et al. 2004, pp. 7-11) and may be significant for small populations. Sage-grouse have long coexisted with predators and have developed strategies to minimize predation mortality. The numbers of some predators (e.g., badgers) may be lower today than they were historically, but other predators that benefit from human-associated food may be more abundant in some locations (e.g., ravens and coyotes). Sage-grouse may come under greater pressure when populations of other prey species (e.g., jackrabbits, ground squirrels) are low. Where studies indicate that juvenile survival is a problem, management of habitat to increase juvenile survival may be critical to restoring sage-grouse populations. Predator control programs are sometimes effective, but result can be short-lived, and other predators may replace a major predator that is controlled (Slater 2003; Cote and Sutherland 1997; Stinson et al. 2004 p. 54).

Structures, including those which support range management activities, can have negative impacts on sage-grouse habitats by increasing fragmentation (e.g., fences and roads) or diminishing habitat quality (e.g., concentrating ungulates in winter habitats) (USFWS 2013 pp. 38-52). Structures may include fences, water developments and mineral licks. Fences can be both a positive and negative impact on sage-grouse and their habitats, depending on their location and use. Flying grouse can collide with fences, utility wires, and other structures (Schroeder et al. 2003, p. 17-7). Fences can be deleterious to sage-

grouse populations and habitats, with threats including habitat fragmentation and direct mortality through strikes (USFWS 2013, p. 38-52). Fences can improve habitat conditions for sage-grouse (e.g. by protecting riparian areas providing brood-rearing habitats from overgrazing). The assessment of the impact or benefit of fences must be made considering local ecological conditions and the movement of sage-grouse within local areas.

Decreases in cover resulting from agricultural activities may also facilitate an increase in predation. Sage-grouse nests destroyed by predators in Wyoming showed a marked decline with increases in adjacent and/or overhead cover (Slater 2003). Similarly, successful grouse nests in northwestern Colorado, southeastern Idaho, and central Wyoming all had significantly higher vegetative surroundings (Halloran 2005, p. 52). Higher cover also facilitates escape from predators.

Disease

The West Nile virus was first confirmed in sage grouse in 2003 in Wyoming (Naugle et al. 2005, p. 617) and has caused high mortality in greater sage-grouse populations in some locations, but it is unknown whether these population declines will persist (Naugle et al. 2005; Stinson and Schroeder 2012, p. 80). West Nile virus activity has been detected in most Washington counties; and has been detected in other bird species in Spokane and Grant counties, but not in Lincoln, Douglas, and Okanogan counties (Stinson and Schroeder 2012, p. 81).West Nile virus is known to injure or kill sage-grouse (Naugle et al. 2005, p. 620); but generally, robust populations would be expected to adapt and recover (Kilpatrick et al. 2007; Stinson and Schroeder 2012, p. 81). The implications of West Nile Virus for Washington sage-grouse are not yet known, but the mortality rate in a Wyoming study was very high (60 percent) and no individuals contained antibodies that would suggest an immunity to the disease during future exposure (Stinson et al. 2004, p. 53). An increase in mortalities as a result of West Nile could devastate the small populations in Washington, but the infection rate to be expected is unknown.

Energy Projects and Utility Infrastructure

The ongoing and increasing demand for energy results in continued development in sage-grouse habitat which, in turn, results in habitat loss, fragmentation, and direct and indirect disturbance. Development results in further population declines (USFWS 2013, p. 43). Stinson and others (2004) note that wind towers may cause habitat loss and fragmentation due to behavioral avoidance of towers. Sage-grouse and other prairie grouse are reported to avoid areas with tall structures, even where anti-perching devices prevent raptor use. In California sage-grouse abandoned leks within 1.4 miles of new power lines, and lek attendance was reduced up to 3 miles from the power lines (Rodgers 2003, Manes et al. 2002, all as referenced in Stinson et al. 2004, pp. 50-51). The area of increased predation due to transmission lines and the perches they provide may extend up to 4.3 miles (6.9 kilometers) on each side of the transmission lines (Connelly et al. 2004, p. 13-21). Avoidance of the structures may be an instinctive response to tall structures that increase

vulnerability to predators (Stinson et al. 2004, p. 51). There may be similar effects from transmission lines and other tall structures; smaller distribution lines may be a collision concern. Roads and others structures fragment and degrade sage-grouse habitat and make it more hazardous for sage-grouse to move through habitat and between patches (Stinson et al. 2004, p. 51).

Pesticides

Pesticides can have direct and indirect impacts on sage-grouse or its habitats. Insecticides applied to sage-grouse summer habitat, particularly organophosphorus and carbamate insecticides, are highly toxic (Blus et al. 1989, pp. 1141-1144). Insects are the primary food source for young sage-grouse chicks, and insecticide use can be directly and indirectly detrimental to sage-grouse (Beck et al., 2009, pp. 396-397). Herbicides can suppress forbs which may eliminate or degrade habitat (Stinson et al. 2004, p. 55).

Other Threats

Recreational activities within sage-grouse habitats can result in habitat loss and fragmentation (e.g., creation of off-road trails, camping facilities) and both direct and indirect disturbance to the birds (e.g., noise, disruptive lek viewing, hunting dog trials, and dispersed camping) (USFWS 2013, p. 49).

Surface mining and appurtenant facilities within sage-grouse habitats result in the direct loss of habitat, habitat fragmentation, and indirect impacts from disturbance (e.g., noise, dust). Mineral extraction can result in lek abandonment (Hess and Beck 2012, pp. 1630-1632).Current reclamation activities do not always consider sage-grouse habitat needs. Those that do may take decades to restore habitats and experience the same limitations as restoration activities. Surface facilities supporting underground mining activities can have similar impacts (USFWS 2013, p. 48).

Recovery Needs/Conservation Strategies

Two conservation strategy guidance documents relevant to the sage grouse in Washington have been prepared; the first is Washington State's Greater Sage-Grouse Recovery Plan (Stinson et al. 2004, pp. 61-77), with main strategies and tasks listed below, and is more relevant to the Columbia Basin distinct population segment of the sage-grouse. The second conservation strategy is the COT Report that is more relevant to the range-wide greater sage-grouse perspective. However, many of the expectations from both conservation strategies are similar.

The Washington Greater Sage-Grouse Recovery Plan (Stinson et al. 2004) summarizes the state of knowledge of sage-grouse in Washington and outlines strategies to increase their population size and distribution in order to ensure the existence of a viable population of the species in the state. Maintaining sage-grouse in Washington depends on protecting remaining habitat, restoring degraded habitat and re-establishing populations outside their current range. Sage-grouse recovery will take a sustained cooperative effort by many agencies and individuals for a long period of time. Successful recovery of sage-grouse will result in benefits to many other

shrub-steppe species that have also declined dramatically in the state. The recovery goal is to establish a viable population of sage-grouse in a substantial portion of the species' historic range in Washington, with a recovery objective to increase breeding season populations to an average of 3,200 birds in Washington for a 10-year period, with active lek complexes in 6 or more Management Units (Stinson et al. 2004, p. 57). The WDFW Sage-Grouse Recovery Plan (Stinson et al. 2004, pp. 61-77) includes 11 main conservation strategies, and several sub-measures, to restore greater sage-grouse populations in Washington. The strategies are listed below, and more detail is provided in Appendix A.

Recovery Goals in the Washington State Recovery Plan for the Sage-Grouse (Stinson et al. 2004, pp.61-77):

1. Inventory and monitor the greater sage-grouse population in Washington.
2. Protect sage-grouse populations.
3. Enhance existing populations and re-establish additional populations.
4. Protect sage-grouse habitat on public lands.
5. Work with landowners to protect the most important sage-grouse habitat on private land.
6. Facilitate and promote the use of incentives, such as Farm Bill conservation programs, to benefit sage-grouse.
7. Facilitate management of agricultural and range-lands that is compatible with the conservation of sage-grouse.
8. Restore degraded and burned sage-grouse habitat within Sage-Grouse Management Units.
9. Conduct research necessary to conserve sage-grouse populations.
10. Cooperate and coordinate with other agencies and landowners in the conservation, protection, and restoration of sage-grouse in Washington.
11. Develop public information materials and educational programs for landowners, schools, community organizations, and conservation groups as needed.

Conservation Objectives within the COT Report (USFWS 2013)
The Service, with the backing of the Task Force, created a Conservation Objectives Team (COT) comprised of state and Service representatives to define the degree to which threats need to be reduced in order to ensure that the greater sage-grouse was no longer in danger, or likely to become in danger of extinction in the foreseeable future, and thus avoid the need for ESA listing (USFWS 2013). The COT report and Washington's Greater Sage-grouse Recovery Plan provide conservation measures to minimize threats to sage-grouse (USFWS 2013, pp. 38-52; Stinson et al. 2004, pp. 61-77). Refer to Appendix A, and the two documents for a full list of conservation recommendations and strategies.

The COT Report identified the following General Conservation Objectives:

1. Stop population declines and habitat loss.
2. Implement targeted habitat management and restoration.

3. Develop and implement state and federal sage-grouse conservation strategies and associated incentive-based conservation actions and regulatory mechanisms.
4. Develop and implement proactive, voluntary conservation actions.
5. Develop and implement monitoring plans to track the success of state and federal conservation strategies and voluntary conservation actions.
6. Prioritize, fund, and implement research to address existing uncertainties.

Implemented Conservation Actions and Recovery Efforts

Since the publication of Washington State's Recovery Plan for the sage-grouse, WDFW and other partners have begun implementing many of their previously mentioned goals. These implementation efforts are presented in Stinson and Schroeder (2014, entire), where the actions taken and how they've addressed the recovery goals, are outlined. The following examples represent a few highlighted actions:

- In the last several years, 41 miles of fences have been removed and 178 miles have been marked for visibility to decrease collision risk.
- Sage-grouse translocations were performed in 2004, 2005, and 2006 on the YTC.
- At total of 201 sage-grouse were reintroduced in Lincoln County on BLM and WDFW lands from 2008 to 2013.
- WDFW has acquired lands including at Sagebrush Flat, Swanson Lakes, and portions of L.T. Murray wildlife areas. BLM has consolidated acreage in the Crab Creek and Moses Coulee areas.
- 63,000 acres have been enrolled in the SAFE program.
- Through 2013, over 52,000 acres have been enrolled in SGI.

ENVIRONMENTAL BASELINE: Sage-Grouse

A general baseline description, applicable to all covered species, was previously described and is incorporated here by reference.

Conservation Role of the Action Area

Douglas County supports more sage-grouse than other areas in Washington State and is therefore very important for sage-grouse recovery in Washington. The Washington State Recovery Plan (Stinson et al 2004) includes two SMUs in Douglas County, and those geographic areas are also included in the Moses Coulee PAC described in the COT Report (USFWS 2013).

Douglas County

The action area is the Douglas County portion of the Moses Coulee PAC. The Moses Coulee PAC spans both Douglas and Grant counties; however, only landowners in Douglas County are eligible for enrollment in the MSGCP. Approximately 75 percent of the sagebrush habitats within the Moses Coulee PAC are privately owned.

In 2012, an estimated 853 sage-grouse were present in Douglas County. The 2013 spring population estimates showed decreases in the Douglas County population to 712 birds. The 2013 lek survey data indicated a high of 274 males in Douglas County, a 17 percent decrease from 2012 (n= 331) (Schroeder et al. 2013, pp. 4-5). Annual changes in populations may not always be of concern, but the conversion of CRP back to cropland may have contributed to the population declines in Douglas County seen since 2010, while translocations of sage-grouse to Lincoln County may be reflected in the population increase seen there.

Virtually all of Douglas County is included in the historic range of sage-grouse in Washington (Yocom 1956, p. 54, Schroeder and Vander Haegen 2011, p 37; Hays et al. 1998, pp. 2-3; Schroeder et al. 2000, pp. 518-519; Stinson et al. 2004, p. 3**).** Unlike other counties in the State where populations have been extirpated, much of Douglas County still supports sage-grouse, even though much of its original habitat has been fragmented (Schroeder and Robb 2003, p. 293). Range contraction from historical times has primarily occurred in the western half of the County (Schroeder et al. 2000, pp. 518-519***).*** In their recovery plan, the WDFW designated 2 management units for sage-grouse in Douglas County: 1) Mansfield Plateau- most of the northern half of the County and, 2) Moses Coulee - the eastern half of the southern portion of the County (Stinson et al. 2004, p. 3**).** The COT description of PACs includes the WDFW management units in Douglas County as part of the Moses Coulee PAC.

The Moses Coulee PAC is supported almost entirely on private lands (Stinson et al. 2004, pp. 26-27; USFWS 2007, p. 4***)***, with the best remaining patches of habitat on relatively small parcels with shallow soil and/or steep terrain generally unsuited to cultivation. Sage-grouse use some over-grazed, sparsely vegetated lands for wintering habitat that do not support nesting. A substantial amount of rangeland in Douglas County is no longer grazed. The grouse population has benefitted from CRP in Douglas and Grant Counties, where cropland has been re-vegetated with seed mixes that include native grasses and sagebrush (Schroeder et al. 2000). The permanent cover of CRP provides more year-round security to wildlife than land under cultivation, provides more contiguous land, and provides potential nesting habitat. Sage-grouse will use higher quality CRP fields that contain sagebrush and native grasses; CRP fields contained 40 percent of about 60 nests found in Douglas County from 1992 to 1996, and these nests were as successful as ones built in other cover types. The CRP fields that appeared to be most important were those near islands of shrub-steppe (Schroeder and Vander Haegen 2006, p. 31). In 2010, a large lek (65 birds) was discovered on CRP land that was unsuitable cropland until relatively recently. This lek likely had been there for at least a few years and gone undetected, but it was in a large matrix (about 50 km^2) of CRP-dominated habitat (Stinson and Schroeder 2014, p. 5). CRP likely allowed the Douglas County population to increase or to remain relatively stable over several years, while the YTC population has continued a downward trend, even though it occupies one of the largest areas (1,300 km2) of shrub-steppe remaining in the state (Schroeder and Vander Haegen 2011, p. 37). Schroeder and Vander Haegen (2011, p. 37) documented the importance of CRP for sage-grouse in Washington. They state that CRP is a long-term investment since

sagebrush requires years to mature, so the age of the CRP affects the value of the habitat to sage-grouse. The location of the CRP within the landscape is also important with land located within extant shrub-steppe likely more beneficial to sage-grouse. They also stress the need for additional studies in different locations throughout the range of sage-grouse. In Moses Coulee PAC, the fragmented landscape that includes patches of high quality shrub-steppe, CRP, and cropland has appeared to allow increases to occur in that population (Schroeder and Vander Haegen 2011, p. 37).

The Moses Coulee population is highly susceptible to changes in amounts of acreages enrolled in conservation programs and vegetation treatments necessary to maintain enrollment. Between 2010 and 2011, 75 percent of 63,000 acres (25,495 ha) of SAFE was enhanced, requiring mowing sagebrush to several inches high and preparing ground for grass seeding. This activity set back the height and growth of sagebrush in the short-term and is linked to initial population decreases. In 2017-2018 these same acres will be maintained per contract requirements, unless the maintenance is waived on a case-by-case basis. As of 30 June 2013, 182,072 acres (73,681 ha) were enrolled in CRP in Douglas County; including approximately 63,000 acres (25,495 ha) enrolled in the SAFE program.

The Service calculated total shrub-steppe in Douglas County, using Washington Gap data (2010), as approximately 413,805 acres (167,460 ha) of shrub-steppe (shrubland, steppe and savanna systems). This is out of a total of 1,183,057 acres (478766 ha) (~35 percent).

Habitat Suitability Index (HSI) model:

Appendix D, figure D-7 in the MSGCP displays potential sage-grouse habitats within Douglas County.

Foster Creek Conservation District, WDFW, and others developed a habitat model that determined the Habitat Suitability Index (HSI) (Ch.3 and Appendix G of the MSGCP), and evaluated potential changes over time for the MSGCP. The HSI is a model for determining the value of existing habitat by comparing it with an idealized habitat and contains a suite of environmental parameters needed by each species to successfully live and reproduce. For example, the parameters for a species might include foraging areas, migration areas, amount of escape cover, and amount of nesting cover. Values, such as acres or percent cover, for these environmental parameters are assessed for each species to determine a ranking factor for each area that indicates the relative impact each action has on the species. The HSI values range from 0.0 (no value) to 1.0 (most benefit to the species). In other words, an HSI model evaluates not just quantity of habitat, but also connects a quality value to the habitat. Because the data in the initial HSI model are becoming dated, the FCCD and others will need to conduct a new run of the same or similar model early in MSGCP implementation to establish the baseline for sage-grouse habitat quantity and quality. The HSI information in the MSGCP, Table 7 below, and later in the opinion, should be used to illustrate potential habitat improvement trends, but

the eventual HSI values may change based on the next habitat modeling evaluation process.

Table 7. Current HSI acre and population estimates for the sage-grouse. (MSGCP, 2015)

Covered SPECIES	**Existing Conditions HIS acres**	**Existing Condition-- Estimated MSGCP Species Populations (Number of Individuals)[2]**
Sage-Grouse	165,240 ac (66,870 ha)	650

[1] 2005 conditions HSI-Acre values computed from habitat conditions data obtained with 2005 satellite imagery.
[2] Estimated species population at risk is calculated by multiplying the quantity of HSI-Acres required for one individual of each species by the quantity of HSI-Acres in the entire County (Schroeder, WDFW, personal communication as referenced in MSGCP)

EFFECTS OF THE ACTION: Sage-Grouse

The purpose of the MSGCP is to implement actions on farming and ranching lands in Douglas County that conserve the covered species, including the sage-grouse. The effects to the species are minimized by implementation of BMPs under farm plans, including CPs and specific land-use measures that result in maintaining and improving habitat. While implementation of BMPs improve habitat, ongoing Covered Activities also have adverse effects to the sage-grouse and its habitat. General effects to shrub-steppe habitats in Douglas County from dryland agriculture, ranching, and irrigated agriculture were discussed previously in the biological opinion, and the general BMPs that minimize those effects were also described. That discussion is incorporated here by reference. The effects to the sage-grouse may occur in various locations in Douglas County on Permittees' lands over the 50-year duration of the MSGCP.

Covered Activities have varying effects on the sage-grouse. Early in the development of the MSGCP, the planning team met and discussed the impacts of Covered Activities on covered species in Douglas County. A review matrix was established identifying the relative qualitative severity or impacts of various activities on each of the MSGCP covered species (MSGCP 2015 Table 3-1). The Service added more detail to the review matrix, and this is included in Appendix B, Table 2. The matrix in appendix B, Table 2 lists the BMPs that will be applied through the MSGCP and individual farm plans to minimize effects. These effects are discussed in more detail in the following sections. Actual effects will vary with farm location, activity types, habitat, and sage-grouse distribution on each farm.

Many of the farming and ranching impacts to sage-grouse are habitat based, including loss of habitat, continued fragmentation, and changes to habitat quality (both positive and negative). There is also a likelihood of disturbance, injury, or mortality in some instances (Appendix B, Table 2). Injury or mortality is likely from impacts to individual sage-grouse, indirectly through loss of cover resulting in predation, through direct disturbance which results in lek or nest abandonment, or through direct damage to nests. Injury or mortality is anticipated through

mowing, burning, plowing, brush/beating, predator control, moving and herding livestock in occupied areas, or concentrating livestock operations in occupied areas. The injury or mortality could occur from machinery, livestock trampling, striking of structures, or impacts to habitat, or drowning in stock tanks. The exposure to mosquito-borne West Nile virus could be exacerbated through stock tanks or irrigation facilities. The likelihood of killing or injuring a sage-grouse from these activities is probably small initially, but will increase as the number of sage-grouse increases. The following species-specific BMPs minimize these risks (see Appendix E in MSGCP 2015):

- In areas near leks or in likely occupied habitats, if CRP/SAFE acres are taken out or converted, the conversion will not occur between March 15 and July 14.
- In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season (may vary by site but typically March through June for sharp-tailed grouse; and February 20 through June for sage-grouse).
- Avoid disturbance to occupied leks. Typical season is between March through June for sharp-tailed grouse, and February 20 through May 15 for sage-grouse. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise). At those times and locations, avoid physical, mechanical, and loud noise disturbances.
- Plan and design placement of new fences away from occupied and historic leks. If this is not possible, adequately mark fences to increase visibility. Identify existing fences that are nearby to an occupied or historic lek and consider removing or relocating the fence to a site further from the lek. At a minimum, mark all existing fences within ¼ mile from an occupied or historic lek, or in high risk areas where collisions are likely or known to occur. Use NRCS, SGI, or other appropriate national or local fence collision tools to prioritize fence marking.
- In addition to the general grazing prescriptions, in likely occupied nesting habitats in grazed pastures, implement measures to promote nesting cover (through appropriate rotations, stocking rates, rest, and/or deferment schedules).
- Immediately notify USFWS upon finding any dead or injured sharp-tailed grouse or sage-grouse on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Appendix C ,Table 4, compares the conservation strategies appropriate for private landowners to implement for the sage-grouse from the Washington state recovery plan, and the COT report, and lists the BMPs that will be applied to address the recommendations. Based on the analysis of potential threats associated with farming and rangeland management practices, and the suite of BMPs identified to address those threats, we believe the effects to the sage-grouse will be minimized by implementation of BMPs under farm plans, and GCP site plans.

Below we discuss the effects of the Covered Activities and implementation of the MSGCP by major covered activity types.

Effects Specific to Ranching

As displayed in Appendix B, ranching activities adversely impact potentially suitable shrub-steppe habitats on enrolled properties, and therefore the forage and cover requirements of sage-grouse, as a result of certain livestock grazing practices. In addition, livestock grazing and other ranching-related activities (e.g., herding, transport) may disturb or damage individual sage-grouse or nests and, in some cases, could even cause direct injury or mortality. Finally, various range management activities (e.g., brush beating, prescribed fire) may alter the vegetation characteristics of existing habitats and could potentially make them less suitable or unsuitable for the sage-grouse. While heavy grazing can destroy or degrade sage grouse habitat, appropriately managed livestock grazing minimizes the effect on the vegetation communities used by the sage-grouse and BMPs on enrolled lands help to avoid or reduce potential direct effects due to trampling by livestock or other ranching-related activities. Implementation of BMPs, including required grazing prescriptions implemented through the MSGCP, would minimize the effect to the sage-grouse through ensuring that cover and forage is provided consistent with grazing plans.

Infrastructure maintenance practices such as road and trail management, water development and infrastructure such as fences and fence maintenance may result in a temporary loss of habitat quality, provide perches for avian predators, or result in strikes by sage-grouse resulting in injury or mortality. However, the infrastructure can, when implemented to rotate pastures more effectively, result in a betterment of habitat quality. While such practices as grazing rotation, moving and herding stock, distributing water (systems), salt distribution, wintering, confining, calving, feeding and manure management may also result in temporary negative impacts and, possibly, even isolated mortality, these practices are also expected to result in an overall improvement of habitat quality. Flying birds can collide with fences, utility wires, and other structures (Schroeder et al. 2003 p.17-7). Fence collisions can be a major source of mortality for sage-grouse, and increasing the visibility of fences can dramatically reduce collisions (Stevens et al. 2012; WDFW 2012, p. 121). Woven wire fences are difficult for birds to readily move through (Braun 1998 p. 6). BMPs, including those requiring planning and design of new fences away from leks, and removal or marking of fences within a ¼ mile of occupied or historic leks, or in high risk areas where collisions are known to occur, will help to minimize the risk of mortality or injury from collisions or fence strikes by the sage-grouse.

Insects, particularly grasshoppers, beetles, and ants, make up more than 50 percent of the diet during the first and second weeks of life for sage-grouse chicks. Forbs become more important for juveniles (Stinson et al. 2004 p. 13). Extensive grazing can affect insect populations both in diversity and abundance (Kreuss and Tscharntke 2001, p. 298; Zhu et al. 2012, p. 1081; Frisina and Keigley 2004, p. 5). Reducing grazing or implementing resting phases into the grazing cycles were found to benefit small animal and insect populations (Krausman et al. 2009, p. 16). As described under the Threats section above, sage-grouse appear to coexist with limited grazing (Hays et al. 1998, p. 36; Wambolt et al. 2002, p. 7), but heavy grazing will decrease or degrade foraging habitats

and cover (Shroeder et al. 2003, p. 17-5). Grazing also impacts sagebrush through soil surface (cryptobiotic crust) disturbance and by promoting cheatgrass invasion which, in turn, alters the fire regime (Stinson et al. 2004, pp. 36-44). Light to moderate grazing has been shown to improve nesting success and to increase bird numbers (Kantrud and Kologiski 1983; Walker 2004). Habitat complexity can be restored both vertically and horizontally by correcting grazing protocols (Kantrud 1981; Whitmore 1981; Kantrud and Kologiski 1983, pp. 337-338; Patterson and Best, 1996, pp. 156-157; Delisle and Savidge, 1997, pp. 323-324). The MSGCP includes grazing prescriptions that are expected to ensure moderate levels of grazing that maintain or improve sage-grouse habitats. However, during rotational grazing scenarios, cover will still be removed or decreased in certain areas or seasons, making sage-grouse more vulnerable to predation. Livestock management such as moving, herding, wintering, calving and confinement, will degrade habitats in certain areas resulting in adverse effects to sage-grouse, damage to nests, or death or injury depending on the site specific conditions.

Effects Specific to Farming (irrigated and dryland)

Dryland and irrigated farming generally decrease riparian areas, cover, and shrub-steppe habitats available for sage-grouse, although some crop fields are used by sage-grouse for leks. As described in the Status of the Species section above, sage-grouse require vegetative cover, sagebrush, and succulent green forage along with insects. Thus, a variety of habitats are necessary. Certain farming activities (e.g., equipment staging and storage, field access, pest control) on suitable, undeveloped habitats adjacent to crop fields could disturb sage-grouse, damage nests, or directly injure or kill individuals. In addition, it is possible that farming activities on existing crop fields will disturb, injure, or kill sage-grouse, especially in or near leks during spring. Sage grouse may also be more vulnerable to predation due to a lack of cover on these developed lands.

Fragmentation of habitat by agriculture has also been shown to increase predation. Vander Haegen et al. (2002, p. 502) found in studies in Douglas County that predation of sage-grouse and other bird species' nests was greater in fragmented than in continuous habitat. He hypothesized that the level of predation on grouse, both sharp-tail and sage-grouse, may be greater than his studies indicated due to the difficulty of locating nests. Conversely, nest predation may not be a limiting factor to sage-grouse population persistence (Connelly et al. 2004, p. 10.1). Known predators such as domestic pets (cats and dogs) (van't Woudt 1990, pp. 292-293) and corvids (crows and ravens) have been shown to increase with fragmentation of habitat (Connelly et al. 2004, p. 12.6). The MSGCP includes BMPs that require maintaining remnant native habitat, but in general current levels of fragmentation will continue.

Besides loss of habitat, direct mortality may result from agricultural activities and structures. Fence lines may cause mortality or physical injury through bird-fence collisions, a major threat in some areas (Stinson et al. 2004, p. 1). Fences may also provide perches for avian predators, increasing the risk of predation (Stinson et al. 2004, p. 64). The MSGCP includes BMPs that address fence locations, and require marking of

fences within a ¼ mile of occupied or historic leks to minimize this risk of mortality or injury.

Agricultural activities have the potential to disturb birds at leks, but the type of agriculture most common in Douglas County makes disturbance less likely (Stinson and Schroeder 2014, p. 7). Too much disturbance can impair the breeding of sage-grouse. Birds return to leks, some of which are in agricultural fields, in Douglas County during late February or March (Schroeder et al.1999) and the peak of lek attendance is from mid-March to mid-April. Dryland winter wheat or canola are the most common crops in north-central Washington and those crops are tilled and planted in the summer and fall, so many agricultural activities are not common in the spring when the birds are at the leks or nesting. In the instances where agriculture activities could disturb grouse at leks, timing restrictions will be implemented through the MSGCP to minimize that disturbance. Disturbance may still occur if a lek moves, or is small and not noticed initially by the Permittee. However, once a lek becomes known, farm plans, site plans, or BMPs will be revised to address the new information.

Recent literature, including Schroeder and Vander Haegen (2006), suggest that sage-grouse in north central Washington are closely tied to habitats on CRP lands. In particular, the document states:

> "Because CRP is clearly supporting a substantial portion of the sage-grouse breeding population in north-central Washington, it is likely that the population would be severely impacted if the CRP program ended. Although sage-grouse females would likely nest in shrubsteppe [sic] if CRP were not present, territoriality among females would preclude many females from having the opportunity to select the best shrubsteppe [sic] habitats. In any case it is clear that the loss of CRP would likely push the north-central Washington population of greater sage-grouse closer to extirpation."

Although nests are typically associated with thick sagebrush and grass cover in shrub-steppe habitats, half of the nests in Douglas County occur in CRP fields. Schroeder and Vander Haegen (2011, p. 517) reported that sage-grouse use of CRP lands for nesting increased from 1992-94 (~ 31 percent) to 1995-97 (~50 percent). Nesting success was equal (~38 percent) between plots. Sage-grouse also use CRP fields adjacent to nest sites during brood rearing in summer. Use of CRP as winter habitat occurs in localized areas with native shrub-steppe receiving the greater majority of use. Loss or conversion of large amounts of CRP will negatively impact the sage-grouse, depending on the location of the parcels. Loss or conversion of CRP/SAFE will result in loss of nesting habitat and destruction of nests, if takeout occurs during nesting season. Brood habitat and localized wintering areas would also be lost. As described earlier in this section, if CRP conversion occurs in areas with leks or adjacent to leks, or in likely occupied habitats it will not be done between March 15 and July 15.

A process to evaluate and address potential changed circumstances has been built into the MSGCP, and if the CRP/SAFE acres decrease below 10 percent of the starting acres in the County as a whole, and additional lands are not protected within 2 years to go above that 10

percent trigger, then the adequacy of the MSGCP will be revisited. As described earlier in this section, if CRP conversion occurs it will not be done between April 1 and July 31.

As described previously under Assumptions, CRP and SAFE acres may change during the life of the MSGCP, and those changes may affect covered species. Over time, the acres may increase and decrease. The MSGCP expects that those acres in Douglas County may dip below a 10 percent change from June 30, 2013 numbers (182,072 acres) (as described in changed circumstances in the MSGCP) and stay at that point for as much as two years while the FCCD and other partners evaluate how to come up above the 10 percent change point. We assume that CRP acres may dip below 10 percent within a 2-year period, up to 6 times (based on estimated CRP contract renewal points, and assuming 10-year renewal periods) during the 50-year term of the MSGCP. It is assumed that even if CRP contracts are not renewed for all acres, not all farmers would immediately begin cropping those acres.

Effects and HSI analysis

As described under the environment baseline discussion, the FCCD worked with WDFW and NRCS to develop a model of habitat suitability over time. Estimates of HSI-Acres were further defined for the existing conditions and projected out approximately 10 years and 50 years (Table 8; Table 3-2 in MSGCP). The modeling team predicted that under the MSGCP there would be a gradual increase in habitat units (HSI-Acres); they estimated habitat quality would increase by 10 percent in the first 10 years, and by 15 percent in 50 years, as a result of BMP implementation under the MSGCP. This estimate for increasing HSI-Acres is based on BMPs increasing the quality of the habitat as acreage is enrolled in the MSGCP. The habitat improvement is displayed with equivalent HSI acres to show a quality improvement (improved quality should support more individual covered species) (see Table 8). Total acres of habitat on the ground may not actually increase. These HSI-Acre estimates are suggested assuming that environmental conditions remain as they existed in the initial 2008 analysis (based on 2005 imagery), and that all potential Permittees enroll. Therefore, this is a best-case scenario. In fact, during the comment period for the draft MSGCP, WDFW questioned whether the predicted habitat improvements were overly optimistic. The Service agrees that the model can be improved. We expect that habitat quality will improve over time, but the degree of improvement will depend on the number of farmers/ranchers that sign up. Upon implementation of the MSGCP, the FCCD will develop a new HSI model using more recent satellite imagery and methods to determine the starting point of the MSGCP and to track habitat quality trends over time. The HSI acre estimates in the current model display the expected trend over time and the model was a best case scenario for enrollment, the next model may have differing acre and HSI numbers.

Table 8. Best-case Scenario in Habitat Improvement for sage-grouse habitats (HSI-acres) for the proposed MSGCP.
(MSGCP, 2015)

Existing Condition	Year 10	Year 50
165,240 ac (66,870 ha)	181,764 ac (73,557 ha)	190,026 ac (76,900 ha)

For the sage-grouse, population estimates were calculated by multiplying the quantity of HSI-Acres required for one individual of each species by the observed quantity of HSI-Acres in the County (Michael Schroeder, WDFW, Personal Communication, 2005, as referenced in MSGCP). The modeling team assumed that because of conservation activities, in part from the MSGCP, populations of Covered Species on agricultural lands would increase in proportion with HSI-Acres over 50 years.

One way to quantify effects is to make assumptions about habitat and population trends through the HSI model. After developing population estimates for the sage-grouse of 650 individuals in Douglas County (Table 3-2 in the MSGCP), the FCCD (after consultation with the Service, WDFW, and NRCS) determined based on best professional judgment, that up to five percent of the species' population exposed to Covered Activities may be injured, killed, or their breeding, feeding or sheltering would be impaired through habitat impacts. As the habitat improved and the population increased, the number of sage-grouse exposed to those effects would increase. While similar assumptions regarding effects to populations are sometimes made, the Service notes that the HSI model included a county-wide project area that included both agricultural and non-agricultural lands that provide habitat for MSGCP species, the model was developed based on a best case scenario regarding enrollment, and the model used what is now dated information. While population estimates in the County and HSI-generated population predictions help to display trends over time, the resultant population numbers are likely imprecise. The AMMP expects a new HSI model run at the beginning of MSGCP implementation, and also allows use of a different modeling process in the future, as long as the baseline and changes over time are comparable to the initial HSI model. The Service does not view the current HSI model and resulting estimates as the best way to quantify effects over time, and we present another approach below.

Quantifying Effects over Time

Sage-grouse occur in many areas in Douglas County. As habitats improve, conservation efforts continue, and sage-grouse populations increase over the 50-year duration of the MSGCP, more sage-grouse will be exposed to Covered Activities both in suitable breeding and foraging habitats (i.e., shrub-steppe), but also at leks in agriculture fields and in other habitat as they move between habitat blocks. In Appendix B, Table 2, we describe Covered Activities and how or whether those activities result in effects including injury, mortality, disturbance, vulnerability to increased predation from reduction in cover, impaired breeding from disturbance or from impacts to forage, or damage to nests. Not all activities in all locations will result in adverse effects to the sage-grouse, but over

the large area of Douglas County, and given the long duration of the MSGCP, the following activities may result in the following adverse effects:

- Injury or mortality as a result of Covered Activities including: heavy equipment that directly kills or injures adult and juvenile sage-grouse, especially brooding females and their young or eggs (killing of a female will result in death of the young or eggs); water tanks or water features that result in sage-grouse drowning; standing water that attracts mosquitoes and increases the risk of West Nile virus outbreaks; fences and other structures that cause injury or death from collision, or indirectly through providing increased perches for avian predators; conversion of CRP/SAFE that kills or injures sharp-tailed grouse, although the BMPs regarding timing of that conversion decreases the likelihood.

- Significant impairment of essential breeding, feeding, or sheltering behaviors as a result of Covered Activities including: farming activities that perpetuate a fragmented landscape, resulting in decreased cover and connectivity; livestock grazing that results in loss of cover and increases sage-grouse vulnerability to predation, or impairs feeding; concentrations of livestock that degrades nesting and brood-rearing habitat and increases the risk of establishing invasive weeds that degrade or remove foraging habitats, resulting in impaired feeding or reproduction; conversion of CRP or SAFE acres that removes nesting or breeding habitats.

- Disturbance as a result of Covered Activities including: the use of heavy equipment, vehicles, noise from generators or windmill-powered pumps, that cause short-term disturbances to sage-grouse or cause sage-grouse to avoid otherwise usable habitat, especially near leks or nesting areas; disturbance near leks that impairs breeding and reproduction (this is more likely where historical nests have moved or new leks are being established before BMPs are added to minimize the disturbance); livestock management activities such as moving cattle to different areas, or recreational activities that causes sage-grouse to flush or otherwise disrupt their behavior (this disturbance may be minor or may cause nest abandonment, depending on the duration or scale).

Sage-grouse may be injured, killed, and/or have their breeding, feeding, and sheltering behavior significantly impaired from the activities described above and in Appendix B, Table 2, in some locations over the 50-year duration of the MSGCP. The actual impact on sage-grouse will vary with location and timing of activities, and not all individuals exposed to a particular disturbance or impact will be significantly affected. In other words, adverse effects may occur, such as disturbance of sage-grouse during Covered Activities, but not all will rise to the level of injury, death, or significant impairment or disruption of breeding, feeding, or sheltering behavior.

Although we can qualitatively describe adverse effects to the sage-grouse as above, quantifying those effects is more challenging. One approach to quantification is to describe current and predicted future numbers of individuals that may be exposed to Covered Activities, but not all

habitats have been surveyed in the County, and population numbers vary year to year due to weather, fire, or other conditions not directly related to farming or ranching. Sage-grouse may move lek sites due to a fire, and be difficult to relocate. Also, the MSGCP is programmatic, and it is not known where or how many Permittees will join. All of these factors together make it difficult to predict the numbers of affected sage-grouse.

We can evaluate effects to the sage-grouse by using habitat quantity as a proxy for adverse effects and assume that activities on all acres have an equal chance of injuring, killing, or disturbing individuals. In the proposed action, we described the potential for 50% of the agriculture landowners in Douglas County joining the MSGCP, and included estimates of 50 percent of the shrub-steppe acres, and cropland acres. The historic range of the sage-grouse likely included all of Douglas County, and if sage-grouse populations increase, they could use much, or all, of the shrub-steppe habitat in the County; 50 percent of the shrub-steppe would be 206,903 acres (83,730 ha) of habitat. These are the upper acre quantities where sage-grouse may be exposed to Covered Activities such as ranching activities within potential breeding or foraging habitat on shrub-steppe habitats.

Covered Activities on agriculture fields near breeding or foraging habitat may also have adverse effects, including disturbance, on the sage-grouse where leks occur, however BMPs will minimize those effects on Permittees' lands. A low incidence of injury or mortality may occur on 269,766 acres of crop land (50 percent of the cropland in the County) from increased vulnerability to predation and direct impacts from heavy equipment.

Sage-grouse in the Moses Coulee PAC and in Douglas County will use CRP habitat for nesting, especially when the CRP is near islands of shrub-steppe (Schroeder et al 2004, pp. 364-365). The highest likelihood for injury, mortality, or impairment of breeding through removal of nesting habitat by MSGCP Covered Activities would be during or after conversion of CRP/SAFE acres within Douglas County. The sage-grouse historic range included all of Douglas County; therefore the analysis of acres lost to CRP conversion includes the whole County, since over time, assuming habitat restoration and conservation efforts continue, the species would be adversely affected by habitat impacts across the whole County when CRP is converted. The following bullets describe the quantity and frequency of potential conversion.

- Total CRP /SAFE acres in the County as of June 2013 equals 182,072 acres (73,681 ha)
- Total farm acres in the County equals 883,094 acres (357,375 ha)(USDA 2009)
- Non-orchard farms in the County equals 868,217 acres (351,354 ha) (total farms minus 14,877 acres (6,020 ha) orchards)
- Total CRP/ SAFE acres in the County (182,072 acres)/ total non-orchard farm acres (868,278 acres (351318 ha)) equals 21 percent CRP/SAFE
- Per changed circumstances, CRP/ SAFE can drop below 10 percent of current levels for 2 year duration. Contract renewal points occur at years 2018, 2026, 2021, and we assume at 10-year renewal points thereafter, for a total of 6 times during the 50-year term of the MSGCP.
- 10 percent of 182,072 acres (73,681 ha) equals 18,207 acres (7,368 ha)

- Assuming up to half of the acreage is signed onto the MSGCP; 9,104 acres (3684 ha) of CRP/ SAFE may be converted and be associated with injury or mortality at 6 different 2-year periods during the life of the MSGCP.

Based on these assumptions and calculations, 9,104 acres of CRP/ SAFE may be converted and may result in injury or mortality or significantly impair breeding feeding or sheltering behaviors at 6 different occasions during the life of the MSGCP, for an estimated total of 54,612 acres (22,101 ha) of CRP/SAFE conversion over 50 years.

In summary, certain significant adverse effects to sage-grouse may occur over the 50-year term of the MSGCP as described above in the effects section, in Chapter 3 in the MSGCP, and in Appendix B, Table 2, of this conference opinion. Both the State recovery plan (Stinson et al. 2004), and the COT report (USFWS 2013) list portions of Douglas County as important to the conservation of the sage grouse, both for the Columbia Basin distinct population segment and the greater sage grouse. Appendix C, Table 4, lists the recommended recovery or conservation strategies for the sage-grouse that are appropriate for private landowners to address, and how or whether the MSGCP addresses those recommendations. We anticipate that the implementation of BMPs under the MSGCP will temper the adverse effects of covered activities and will facilitate the reproduction, numbers, and distribution of sage-grouse in Douglas County, and provide a long-term, net benefit for the sage-grouse and its habitat on a landscape scale.

CUMULATIVE EFFECTS: Sage-Grouse

Cumulative effects for the sage-grouse are similar to those already addressed under the general effects discussion above. Since current land-use activities are expected to continue, for lands not enrolled under the MSGCP, most of the threats to sage-grouse would also continue. Lands that are not enrolled in the MSGCP would likely remain similar to their current habitat condition, or there may be a higher likelihood of fire or development to occur. The loss of habitat on these non-enrolled lands will exacerbate the fragmentation of the landscape for sage-grouse. In summary, the sage-grouse will be affected by cumulative effects associated with the following activities within the action area:

1. Ongoing development, including conversion to agriculture to residential and commercial housing.
2. Changes in the amount and type of cover.
3. Increases in predation, facilitated by changes in the amount and type of cover.
4. Increases in predation from avian predators facilitated by electrical transmission lines and fences.
5. Changes in food source availability and composition.
6. Adverse effects of wind power facilities and transmission lines. Wind power guidelines will mitigate these impacts to some extent.
7. Fluctuations in weather and the future impacts of climate change.
8. Effects of long-term and short-term planning efforts by groups such as ALI, Washington Wildlife Habitat Connectivity Working Group, TNC, and the Sage-Grouse Initiative.

In addition to the cumulative effects listed above, sage-grouse may be disturbed by activities at and near leks. However, interference with sage-grouse at or near leks is minimal because access on public lands (BLM, WDFW, and YTC) is limited (few open roads with minimal access to areas near leks). Access on tribal land (Yakama Nation) is also limited. Although access on private land is controlled by private landowners, there is generally minimal disturbance during the nesting and brood-rearing seasons (Stinson and Schroeder 2014, p. 6).

Pesticide application is not a covered activity under the MSGCP, and pesticide applications are likely to continue in Douglas County. However, typical applications near leks, such as application of glyphosate may occur once in early March for weed control on agricultural fields, but would take less than one day and spraying would occur during daylight hours after the weeds have dried off for better adhesion of the herbicide. Sage-grouse spend early morning and late evenings at leks and are in nearby shrub-steppe during other times (Wallestad and Schladweiler 1974, pp. 635-636). Average date of nest initiation is April 22 and average lek to nest distance is 3.6 miles (5.1 km) in north-central Washington (Schroeder and Bayback 2001, pp. 24-25). Therefore, in Douglas County the likelihood of sage-grouse exposure to pesticide applications in agricultural fields is low.

CONCLUSION: Sage-Grouse

The effects of the action include the direct and indirect effects of approval of the MSGCP on the sage-grouse, together with the effects of other activities that are interrelated or interdependent with this action, which will be added to the environmental baseline. We anticipate that the MSGCP will promote conservation efforts in the context of farm and ranch operations and provide a long-term, net benefit for the sage-grouse and its habitat on a landscape scale. However, certain significant adverse effects to sage-grouse may still occur. Adverse effects, including those that injure, kill, disturb, or impair breeding, feeding, or sheltering behaviors of sage-grouse are described above in the effects section, in Chapter 3 in the MSGCP, and in Appendix B, Table 2, of this conference opinion. These adverse effects may occur over the 50-year term of the MSGCP, although the exact timing and location of each impact will depend on the individual incidental take permits. These impacts include degradation or loss of habitat and a low incidence of injury or mortality. As sage-grouse numbers increase due to habitat improvements, the number of sage grouse exposed to these adverse effects will increase. However, the resilience of the population to such impacts is also expected to increase.

Permittees that join the MSGCP will contribute to the conservation of the sage-grouse, and will implement measures consistent with many of the conservation strategies listed in the recovery plan (Stinson et al. 2004), and in the COT report (USFWS 2013). Some of the conservation measures in the recovery plan, or in the COT report, are not addressed in the MSGCP (such as energy development or urban development measures) because they are not applicable to the Covered Activities. Appendix C, Table 4, lists the recommended recovery or conservation strategies for the sage-grouse that are appropriate for private landowners to address, and how or whether the MSGCP addresses those

recommendations. In general, the MSGCP addresses most of those recommendations, and the BMPs include: protection of sage-grouse populations from disturbance, particularly at leks; reducing the likelihood of collision with fences; maintaining or improving riparian habitats; monitoring habitat over time; maintaining and restoring habitat, especially remnant shrub-steppe; implementing farm bill programs to benefit sage-grouse; managing rangelands and grazing to improve habitats; implementing integrated pest management; and managing wildfire in cooperation with local fire districts.

As displayed in Appendix C, Table 4, and summarized above, the Service anticipates that the recovery goals and objectives currently identified in the Washington State Recovery Plan (Stinson et al. 2004) would be largely met through implementation of the MSGCP. The MSGCP also largely complies with recommendations listed in the COT Report (USFWS 2013).

Douglas County is key for both the Columbia Basin distinct population segment, and the greater sage-grouse survival and recovery in Washington. The State sage-grouse recovery plan (Stinson et al. 2004) delineated sage-grouse management units in and around Douglas County. The COT Report (USFWS 2013) includes expectations for the Moses Coulee PAC, much of which is in Douglas County. The WHCWG (2012, p. 64) looked at a composite "upland network" that analyzed the combined networks of three species closely associated with upland shrub-steppe habitat: sharp-tailed grouse, greater sage-grouse, and Washington ground squirrel. The upland network is strongly focused on the western half of the ecoregion. Based on this analysis, Douglas County provides important habitat concentration areas and linkages for several covered species, including greater sage-grouse (p. 66).

Initial queries by the FCCD indicate that about 50 percent of landowners are showing early interest (Jon Merz, in litt., April 2, 2015). The more farmers/ranchers that join the MSGCP, the more habitat for the sage-grouse and other covered species will improve. There are three main reasons why covered species, including the sage-grouse, still exist in Douglas County: 1) there are many fragments and blocks of habitat on private land throughout the County because of the shallow and rocky soils that are difficult or impossible to farm; 2) CRP/SAFE acres throughout the County provide habitat, cover, and forage for the covered species; and 3) there are large blocks of habitat (called HCAs) provided by WDFW, BLM, and TNC that are managed for wildlife or for multiple uses.

In the future, under the MSGCP, currently fragmented habitat will be maintained on enrolled farms. As described in the status of the species, and the effects section, sage-grouse in Douglas County use CRP habitats for nesting. The SAFE program is a component of CRP that further emphasizes habitat for sage-grouse and sharp-tailed grouse. The CRP habitat may vary in quantity depending on Farm Bill funding but, under the MSGCP enrolled farmers are to look for other programs if CRP or SAFE contracts are not renewed, to avoid farming those CRP acres if economically feasible, or if they cannot maintain those acres in conservation cover, CRP will be monitored across the County. If the CRP drops below 10 percent of the 2013 amount, then the FCCD will

work with the Service and others to ensure that CRP returns to more than the 10 percent amount within 2 years. If that is not feasible, then the Service will revisit the MSGCP to determine if it still meets Section 10 issuance criteria and, if not, how and whether it can be revised. If it cannot be revised, then permits may be revoked. Although HCA acres are not expected to decrease, monitoring will occur and, if they do drop by 10 percent across the County, FCCD and the Service will also reconvene to determine if the MSGCP is working as expected and, if necessary, permits may be revoked. Based on the requirement to maintain fragments, and because of the BMPs and changed circumstances addressing CRP, and because habitat trends should improve on enrolled lands, the Service expects that habitats will continue to be available to support the survival and recovery of the sage-grouse in Douglas County for the duration of the MSGCP.

Douglas County is unique in Washington, and across the range of the sage-grouse, in that sage-grouse still occur there despite a high percentage of farmed acreage in the County. While the importance of Douglas County for sage-grouse recovery is emphasized, there is still a recent downward trend in population (see Status of the Species above). This may be due to recent fires in the north end of the County (e.g., the Leahy and Barker Canyon Complex fires in 2013 burned 18,000 acres and 73,000 acres, respectively (http://inciweb.nwcg.gov/incident/3262/)), or due to short term decreases in habitat when CRP contracts expired and fields were converted starting in 2010. . While SAFE acres were implemented and planted (66,000 acres [26709 ha] in Douglas County as of 2013), until the SAFE acre habitat develops, there will be a delay in benefits accrued to sage grouse. For the term of the MSGCP, as described above, monitoring of quantities of CRP/SAFE acres and HCA acres across the County should allow time to react to changes in habitat, and/or revisit the adequacy of the MSGCP if decreases below 10 percent can't be addressed within 2 years.

In summary, management to support habitat and subpopulations of sage-grouse will be emphasized. The MSGCP will support habitat maintenance and improvement through implementation of BMPs resulting in appropriate grazing management and maintenance of shrub-steppe fragments, together with other BMPs applied on enrolled private lands. The MSGCP contains several provisions and methods that will allow for changes in conditions, including changed circumstances, and the ability to revise farm plans, site plans, or BMPs based on new information. For the sage-grouse, the adverse effects caused by Covered Activities are minimized by BMPs and are expected to be localized. Many will be temporary in nature. The BMPs associated with the Covered Activities will minimize and mitigate the adverse effects to covered species, and are consistent with expectations in the Washington recovery plan (Stinson et al. 2004) and in the COT Report (USFWS 2013). Therefore, we do not anticipate that any decrease in the number, distribution, or reproduction of the Columbia Basin DPS of the sage-grouse in Douglas County, or in Washington, due to implementation of the MSGCP will reduce, appreciably, the likelihood of persistence of the species. After reviewing the current status of the sage-grouse, the environmental baseline for the action area, the effects of the action, and the cumulative effects, it is the Service's biological opinion that the issuance of a section 10(a)(1)(B) permit for the MSGCP, as proposed, is not likely to jeopardize

the continued existence of the sage-grouse. No critical habitat has been designated for the sage-grouse; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT: Sage-Grouse

The Douglas County MSGCP conforms to a "framework programmatic action" as defined at 50 CFR 402.02 (80 FR 26832). Pursuant to the authority under 50 CFR 402.14(i)(6) of the implementing regulations for section 7 (80 FR 26832), an incidental take statement is not required at the programmatic level. Under the Douglas County GCP, the Service will issue incidental take permits under the authority of section 10(a)(1)(B) to applicants who commit to comply with the provisions of the plan based on a site-specific site plan, prepared in accordance with the plan, that is submitted to the Service with their permit application. If the permit application is complete and satisfies the statutory permit issuance criteria, the Service will issue a permit authorizing the incidental take of the sage grouse based on the site-specific details provided in the site plan. In response to individual permit applications, the Service will conduct intra-Service section 7 consultation on the proposed permit action as is our customary practice. That consultation will rely on the fact-pattern specifics of the site plan and the analyses and findings presented herein as the basis for section 7(a)(2) determinations.

Conservation Recommendations and the Reinitiation Notice are provided for the Washington ground squirrel, the sage-grouse, and the sharp-tailed grouse at the end of this conference opinion.

STATUS OF THE SPECIES: Sharp-tailed Grouse:

Listing status

The Columbian sharp-tailed grouse is classified as a game species in Washington. However, hunting was suspended in 1988 (Stinson and Schroeder 2012, pp. 1, 17). The sharp-tailed grouse is currently listed as a state-threatened species (Stinson and Schroeder 2012, p. vii).

Populations and Distribution

Sharp-tailed grouse were originally found throughout much of central and western North America, including a large portion of Canada and Alaska (Stinson and Schroeder 2012, p. 4). Of 6 subspecies of sharp-tailed grouse in North America, only the Columbian subspecies (*T. p. columbianus*) is found in Washington. Columbian sharp-tailed grouse (sharp-tailed grouse) originally ranged from southern British Columbia, through to northeastern California, Utah, Colorado, Wyoming and western Montana (Stinson and Schroeder 2012, pp. 37-38).

Columbian sharp-tailed grouse currently occupy about 8 percent of their historical range (Stinson and Schroeder 2012, p 37). Considering only public lands, Bart (2000; Stinson and Schroeder 2012, p. 37) estimated that sharp-tailed grouse were imperiled on 91−95 percent of their current range, and estimated the total range-wide population at 56,000−62,000, with most of these birds in Idaho (40,000). Very small populations will likely require augmentation to survive in the long term. Many of the local populations in the U. S. depend on lands enrolled in CRP, and the main populations in British Columbia are in clearcuts, and dependent on timber harvest to maintain habitat on the landscape (Stinson and Schroeder 2012, pp. 37-38).

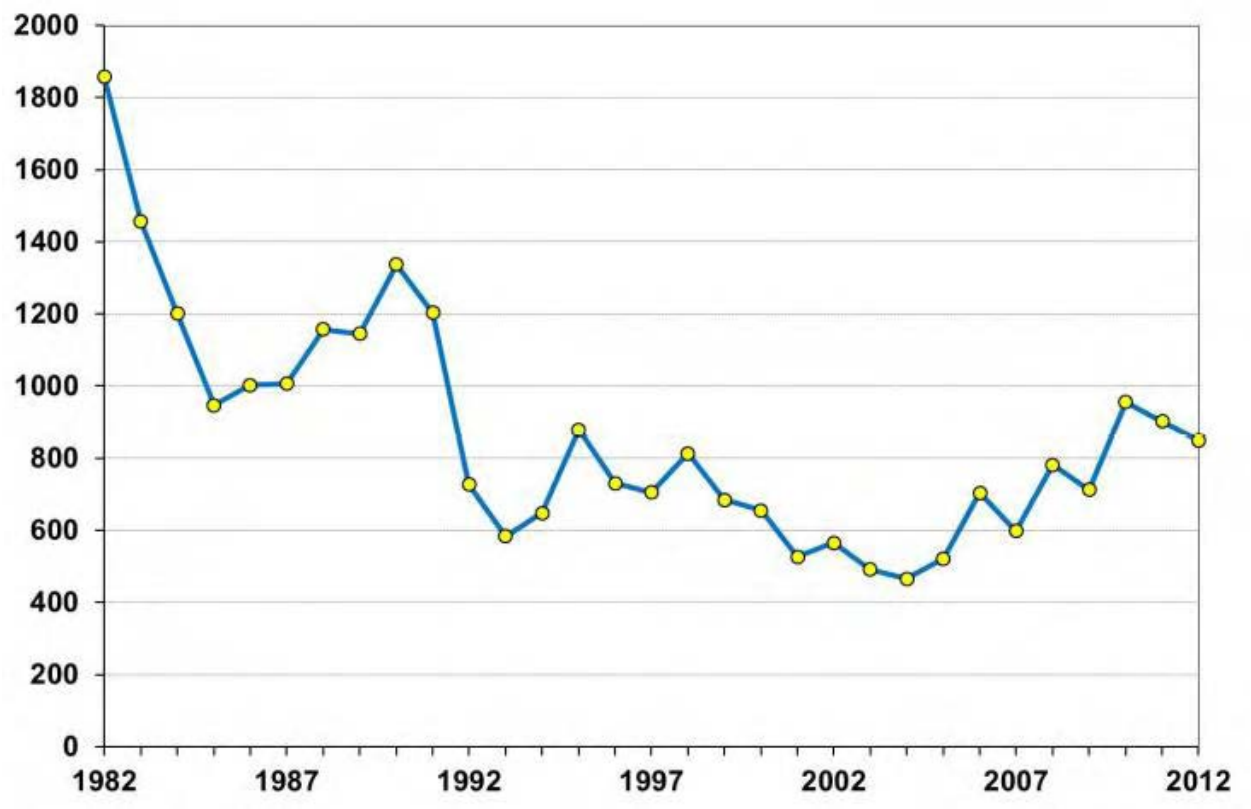

Figure 11. Estimated total population of sharp-tailed grouse in Washington, 1982-2012. (WDFW 2012, p. 125).

Occurrence in Washington

Sharp-tailed grouse currently occur in north-central Washington in seven small isolated populations (Figure 11) (Stinson and Schroeder 2012, p. 43). The sharp-tailed grouse currently occupies an estimated 2,173 square kilometers of suitable habitat in Washington, approximately 2.8 percent of the historic distribution (Stinson and Schroeder 2012, p. 43).

Sharp-tailed grouse were historically found throughout much of eastern Washington (Stinson and Schroeder 2012, p. 4), including the foothills of the Cascades, with the exception of the mountainous Northeast, Okanogan Highlands, and the Blue Mountains. While historic population estimates are difficult to develop, the population of Columbian sharp-tailed grouse in Washington may have been in excess of 100,000 birds (Stinson and Schroeder 2012, p. 38-39).

The sharp-tailed grouse population in Washington declined and by 1970 was reduced to less than 4,000 birds. By the mid-1990s, the population had been reduced to approximately 1,000. The lowest population estimate was reached in 2001. Since then the population has increased slowly; the estimated population in 2011 was 902 birds (Stinson and Schroeder 2012, p. 43), but the population estimate for 2012 was 850 birds, statewide (Figure 11) (WDFW 2012, p. 125).

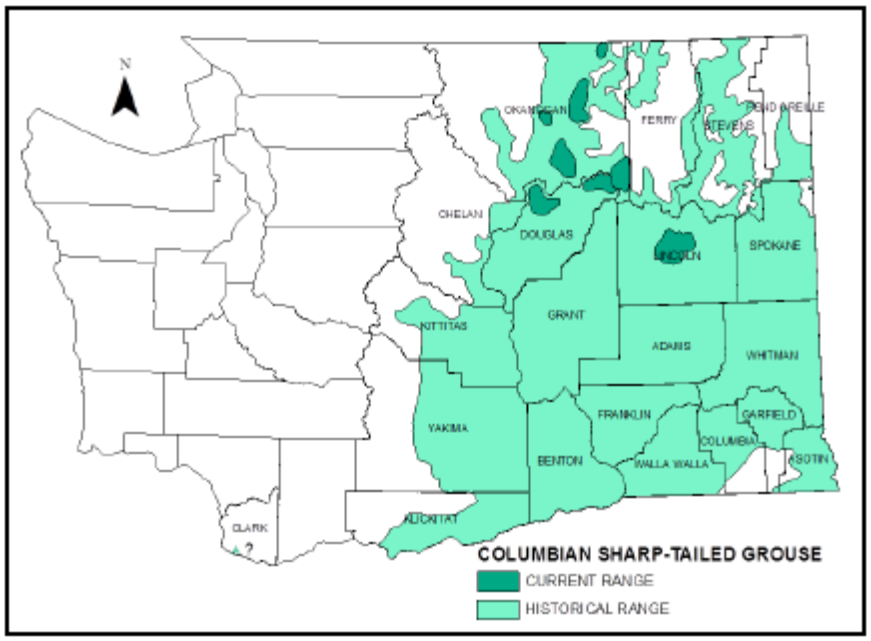

Figure 12. Historical and current range of the sharp-tailed grouse in Washington State. (Stinson and Schroeder 2012, p. 5)

Habitat and Life History

Sharp-tailed grouse occur in grass-dominated habitats with patches of deciduous trees and shrubs (Stinson and Schroeder 2012, p. 29); in Washington sharp-tailed grouse are associated with shrub-steppe, riparian, grassland, and steppe habitats (Stinson and Schroeder 2012, p. 29). Vegetation height and density are important habitat features; high quality habitat is typified by well-developed perennial bunchgrasses, forbs, and a diversity of shrub species (Stinson and Schroeder 2012, p. 31). During spring, males congregate on display sites (leks) to breed with females (Stinson and Schroeder 2012, p. 32). Leks are typically located on knolls and ridges with relatively sparse vegetation (Stinson and Schroeder 2012, p. 32). Lek habitat is probably not limiting, since males have been observed displaying on a variety of sites that comprise a range of plant conditions (e.g., croplands, roads, and native rangelands grazed by livestock).

Sharp-tailed grouse nest on the ground, usually in dense cover provided by clumps of shrubs, grasses and/or forbs (Stinson and Schroeder 2012, pp. 32-33). The previous years' grasses and forbs are particularly important for concealment and protection of nests and broods (Meints et al. 1992, p. 4; Giesen and Connelly 1993, pp. 327-28; Hays et al. 1998, pp. 9-10). Sharp-tailed grouse typically nest in areas with higher cover compared to available sites (Apa 1998, McDonald 1998, Boisvert 2002, Collins 2004, all as referenced in Stinson and Schroeder 2012, p. 33-34). In Washington, female sharp-tailed grouse selected nest sites with greater overhead cover, higher visual obstruction and litter cover, and less bare ground within 5 meters of the nest than occurred randomly in available cover types (McDonald 1998; Stinson and Schroeder 2012, p. 33-34). Cover variables were higher, and there was less bare ground at successful compared to

unsuccessful sharp-tailed grouse nests. In the Curlew Valley of Idaho, nesting areas averaged 62 percent shrub cover; grass cover and sagebrush height were important variables in predicting nest locations (Apa 1998 as referenced in Stinson and Schroeder 2012, pp. 33-34). Fields enrolled in CRP are often used by nesting sharp-tailed grouse (Schroeder et al. 2000, pp. 10-11).

In late spring and summer, hens with broods move to areas where succulent vegetation, including diverse cover of shrubs, forbs and bunchgrasses, and insects can be found (Gregg 1987, pp. 9-10; Marks and Marks 1987, pp. 745-746; Stinson and Schroeder 2012, p. 34). In late summer, sharp-tailed grouse use riparian areas and mountain-shrub communities (Giesen 1987 as referenced in Schroeder and Tirhi 2003b p. 16-3). In winter, sharp-tailed grouse use deciduous trees and shrubs in upland and riparian areas for foraging and protective cover; this is especially critical when snow conditions limit access to waste wheat (Stinson and Schroeder 2012, p. 36). During winter the sharp-tailed grouse eats fruits, seeds, and buds of deciduous trees and shrubs, and grains where available (Stinson and Schroeder 2012, pp. 21-22). Plants comprise most of the diet of sharp-tailed grouse year-round (Stinson and Schroeder 2012, p. 21-22). All sharp-tailed grouse consume insects, particularly grasshoppers, ants, and beetles, when available, but insects comprise only a small proportion of the diet of adults. Chicks, on the other hand, rely heavily on insects for food in the first few weeks of life (Hart et al. 1950; Parker 1970; Johnsgard 1983; Bernhoft 1969 as referenced in Stinson and Schroeder 2012, pp. 21-22). In Washington, the spring diet of sharp-tailed grouse included grass blades, especially Sandberg bluegrass (*Poa secunda*), sagebrush buttercup (*Ranunculus glaberrimus*), common dandelion flowers (*Taraxacum officinale*), beetles, and grasshoppers (Jones 1966; Stinson and Schroeder 2012, pp. 21-22). Lord (1866:303-304, as referenced in Stinson and Schroeder 2012, pp. 21-22) stated that the principal summer and fall foods of sharp-tailed grouse near Fort Colville, in present day Stevens County, were common snowberry (*Symphoricarpos albus*), kinnikinnik (*Arctostaphylos uva-ursi*), rose (*Rosa spp.),* and huckleberries (Vaccinium spp.). He also mentioned finding wheat, insect larvae, grass seeds, and small wildflowers in their crops. During winter the sharp-tailed grouse eats fruits, seeds, and buds of deciduous trees and shrubs, and grains where available (Stinson and Schroeder 2012, pp. 21-22, 110). The winter diet of sharp-tailed grouse also consists of: the buds of deciduous trees and shrubs, particularly serviceberry, chokecherry, hawthorn, water birch (*Betula occidentalis*), and quaking aspen (*Populus tremuloides*); fruits of hawthorn, juniper, wild rose, and snowberry; and green vegetation at seeps (Jones 1966; Marks and Marks 1987; Leupin 2003; Jewett et al. 1953 as referenced in Stinson and Schroeder 2012, pp. 21-22).

Habitats with deciduous trees and shrubs are essential during winter and provide cover, berries, seeds, buds, and catkins when the ground is snow-covered. These important winter habitats are frequently in riparian areas. Standing wheat or spilled grain in fields is an important winter food source in some locations (Stinson and Schroeder 2012, p. 36). Sharp-tailed grouse often use winter habitat relatively close to summer areas (Stinson and Schroeder 2012, p. 36), but in other locations move >20 km to winter habitat (Boisvert et al. 2005, as referenced in Stinson and Schroeder 2012, p. 36). The most important shrubs in winter habitat were serviceberry, chokecherry, and quaking aspen. Sharp-tailed Grouse moved to deciduous trees and shrubs as snow depth increased in Washington (Stinson and Schroeder 2012, pp. 36-37). In Washington,

sharp-tailed grouse winter in a variety of cover types (Stinson and Schroeder 2012, p. 37). Use of CRP, grass/forb, and grass/shrub cover types declined in winter and use of sagebrush and riparian/mountain shrub increased (McDonald 1998; Stinson and Schroeder 2012, p. 37). Riparian and mountain shrub habitats were also used more in winter than other seasons (15.9 vs. 3.7 percent) on the Colville Indian Reservation (McDonald 1998; Stinson and Schroeder 2012, p. 37).

Threats

The Washington State Recovery Plan for the Sharp-tailed Grouse (Stinson and Schroeder 2012, pp. 66-84) lists the following threats to the sharp-tailed grouse in Washington.

- Adequacy of Existing Regulatory Mechanisms
- Small Population Size, Isolation, and Genetic Health
- Habitat Quantity, Condition, and Continued Loss
- Livestock Grazing
- Predation in altered landscapes and communities
- Effects of Fire on Sharp-tailed Grouse Habitat
- Diseases
- Wind Energy Projects and Utility Infrastructure
- Climate Change
- Human-related disturbance
- Illegal and Accidental Killing.

Several of the threats are discussed in more detail below.

Small Population Size, Isolation, and Genetic Health

Sharp-tailed grouse populations in Washington are small in number and limited in distribution. An increasing number of studies indicate that goals to maintain viable populations of vertebrates need to be in the order of several thousands, rather than hundreds (Reed et al. 2003; Stinson and Schroeder 2012, pp. 67), although much smaller populations may sometimes persist for some time (Pacheco 2004; Stinson and Schroeder 2012, pp. 67). Sharp-tailed grouse populations naturally fluctuate with weather, habitat condition, and perhaps disease. This natural variability puts smaller populations at even greater risk of local extinction.

Low population numbers and population isolation could affect the continued existence of sharp-tailed grouse in Washington (Stinson and Schroeder 2012 p. 67). Many authors indicate that long-term survival (>100 years) of isolated populations requires many more individuals than populations that occasionally exchange genetic material between other populations (Dawson et al. 1987; Stinson and Schroeder 2012, p. 67). The remaining sharp-tailed grouse in Washington exist as seven populations separated by >10 km (Stinson and Schroeder 2012, p. 67). Limited data from radio-marked birds suggest that movements sufficient to allow genetic interchange between populations in north-central Washington may be rare. The negative effects of habitat change are amplified when populations become isolated; for example, dispersal by juveniles is typically

advantageous in widespread and connected populations, but in isolated populations it may become detrimental if dispersing juveniles are a net loss to the population and there is no compensating immigration.

Historically, the sharp-tailed grouse existed in very large populations with extensive gene flow across large geographic areas (Stinson and Schroeder 2012, p. 68). Washington populations of sharp-tailed grouse may be showing symptoms of isolation, including lower gene diversity and allelic richness at Swanson Lake compared to birds in Alberta, the most diverse population. A wide variety of genetic problems can occur with small isolated populations and can interact with demographic and habitat problems, leading to a population's extinction (Gilpin and Soule 1986; Lacy 1987; Reed and Frankham 2003; Stinson and Schroeder 2012, p. 67).

Habitat Loss and Degradation

Habitat loss from the conversion of native shrub-steppe habitat to cropland over most of the pre-settlement range of sharp-tailed grouse is the primary cause of long-term population declines (Buss and Dziedzic 1955, p. 187; Hays et al. 1998, p. 28; Schroeder et al. 2000, p. 9, Stinson and Schroeder 2012, p. 68). The main reason for the isolation and small size of remnant sharp-tailed grouse populations in Washington is loss of suitable sharp-tailed grouse habitat. Habitat loss and fragmentation creates or exacerbates other impacts to sharp-tailed grouse, including higher predation in habitat patches, encroachment by noxious weeds, and impacts of herbicides and insecticides sprayed on adjacent cropland (Schroeder and Baydack 2001, pp. 27-29). Mean patch size of sagebrush, grassland, and herbaceous wetlands has declined in Washington (Stinson and Schroeder 2012, p. 68). In addition to the issues of demographic and genetic isolation, habitat fragmentation creates or exacerbates other impacts to sharp-tailed grouse, including higher predation (Schroeder and Baydack 2001; Stinson and Schroeder 2012, p. 68), encroachment by noxious weeds, and increased impacts of herbicides and insecticides sprayed on adjacent cropland. Bousquet and Rotella (1998; Stinson and Schroeder 2012, p. 68) attributed the high nest success (74 percent) in their study in Montana partially to the lack of fragmentation of the grassland in their study area. Schroeder et al. (2000; Stinson and Schroeder 2012, p. 68) noted that the unoccupied portion of the sharp-tailed grouse's historical range in Washington was 38 percent cropland, while occupied areas were 11.3 percent cropland; Dyer Hill, which was 12 percent CRP, was an exception to this pattern. Most of the remaining habitat with native vegetation in Washington is in areas with thin or rocky soils that are poorly suited to cultivation. This includes extensive scablands with shallow soils, that have typically been used for livestock grazing (Stinson and Schroeder 2012, p. 68) and in most cases the native vegetation continues to reflect the effects of heavy historical grazing. It is uncertain if these lands can become highly productive for sharp-tailed grouse.

Sharp-tailed grouse in Douglas and Okanogan counties, and to a lesser degree in Lincoln County, are now generally restricted to habitats, mostly at higher elevations, where the impacts of grazing and conversion to wheat and orchards have been less severe (Stinson and Schroeder 2012, p. 69), whereas lower elevation areas historically provided

important winter habitat. Relatively high winter mortality of sharp-tailed grouse due to declining quantity and quality of winter habitat may be an important factor inhibiting recovery of sharp-tailed grouse populations in Washington (Stinson and Schroeder 2012, p. 68).

Remaining areas of suitable habitat in Washington are relatively small and highly fragmented, and some areas continue to be developed or subdivided (Stinson and Schroeder 2012, p. 69). Habitat loss and degradation continues through over-grazing, removal of native shrubs and trees in riparian and shrub communities, urban development, orchard development, fire, and permanent flooding of historic wintering habitat by dams along the Columbia River system (Stinson and Schroeder 2012, p. 69). Stinson and Schroeder (2012, p. 69) noted that habitat quality on WDFW and BLM lands in Lincoln, Douglas, and Okanogan counties has improved in areas actively managed for sharp-tailed grouse. They further noted that keeping private lands enrolled in CRP is important to improve habitat quality in Lincoln and Douglas counties. Habitat quality for sharp-tailed grouse on private and tribal lands will depend on the intensity of grazing and extent of fragmentation by residential development. Habitat condition appears to have improved in the Methow Valley in recent years due to reduced grazing pressure, but other habitat has been lost through residential development. Habitat restoration is needed to provide habitat connections between populations of sharp-tailed grouse where possible, and to increase populations to a level that provides resiliency to wildfires, and episodic weather extremes and to ensure genetic health over time.

Invasive vegetation can degrade sharp-tailed grouse habitat by displacing plant species more suitable for food and cover. Herbicides are often used to control infestations of noxious weeds, but may also kill native forbs and shrubs that provide food for sharp-tailed grouse (Blaisdell et al. 1982; Oedekoven 1985; and McArdle 1977, Kessler and Bosch 1982, and Klott 1987 all as referenced in Stinson and Schroeder 2012, p. 70). Stralser (1991 as referenced in Stinson and Schroeder 2012, p. 69) described two abandoned leks in Lincoln County that were surrounded by habitat that had been degraded by brush control using herbicides and fire, and had higher coverage of annuals than two active leks that had more intact shrub-steppe habitat and more native perennial vegetation.

Roads also degrade habitat by promoting the spread of weedy vegetation (Gelbard and Belnap 2003; Stinson and Schroeder 2012, p. 70). Vehicles and road construction activities transport weed seeds to roadsides and act as a conduit to invasion of adjacent habitats while soil disturbance, regular herbicide applications, and the greater moisture present on roadside edges favor some exotics over native species.

The CRP program has provided benefits to wildlife since its establishment in 1985, especially for ground-nesting birds. Rodgers and Hoffman (2005 as referenced in Stinson and Schroeder 2012, p. 77) reported that sharp-tailed grouse had increased in number and distribution in 10 of 12 states as a result of the CRP and the provision of increased habitat. However, some CRP fields provide better habitat than others, and early contracts often resulted in planting exotic grasses rather than diverse habitats that are more usable by the sharp-tailed grouse (Stinson and Schroeder 2012, p. 76). Land enrolled in CRP contracts in Washington has increased from

55,000 acres in 1986 to over 1.5 million acres on 5,000 farms in fiscal year 2011 (Stinson and Schroeder 2012, p. 76), which is about 7 percent of the historical range and about 4 percent of the occupied range of sharp-tailed grouse in the state. Although CRP covers a relatively small portion of the occupied range, it provides important nesting habitat in parts of Lincoln and Douglas counties and almost the only habitat in other portions of the historical range. In areas with little public land, such as Whitman County, CRP provides most of the steppe habitat, making it very important for future recovery of sharp-tailed grouse.

The conversion of ranches and farmland to residential areas results in unsuitable habitat conditions for sharp-tailed grouse, because of increases in fences, roads, traffic, structures, grazed horse pastures, dogs, and cats, that restrict the ability to connect populations and limit options for sharp-tailed grouse recovery (Stinson and Schroeder 2012, p. 68). Residential development also increases the number of wells that can, in turn, affect stream flow and further destroy or degrade riparian vegetation.; Stinson and Schroeder (2012, p.69) note this may be a concern along several tributaries of the Okanogan River.

The effects of fire on sharp-tailed grouse habitat in Washington vary with vegetation type. In the more mesic meadow steppe habitats where grasses and fire-tolerant shrubs predominate, habitat can recover quickly, resulting in benign or beneficial effects to sharp-tailed grouse (Stinson and Schroeder 2012, p. 77). However, in drier shrub-steppe areas with sage brush, wildfire is a serious threat (Fischer et al. 1996; Connelly et al. 2000; Stinson and Schroeder 2012, p. 77). The occurrence of wildfire in the sagebrush-grass region has increased dramatically due to the presence of the highly flammable cheatgrass (Billings 1994; Stinson and Schroeder 2012, p. 77). Although fires may accelerate the dispersal of noxious weeds, cheatgrass is not as invasive in the three-tip sagebrush and mountain big sagebrush vegetation types (Bunting et al. 2002; Stinson and Schroeder 2012, p. 77) as it is in other vegetation types; three-tip sagebrush and mountain big sagebrush is more important to sharp-tailed grouse in Washington than the drier Wyoming big sagebrush vegetation types. Nevertheless, Stinson and Schroeder (2012, p. 78) suggest restoring recently burned areas to sagebrush and native perennials in areas of abundant cheatgrass to maintain native communities.

Three large prescribed fires in areas containing active leks in Lincoln County in the 1980's are believed to be directly responsible for the decline and elimination of local populations of sharp-tailed grouse (Stinson and Schroeder 2012, p. 78). Sharp-tailed grouse use burned areas less compared to other vegetation manipulations (McArdle 1977, as referenced in Stinson and Schroeder 2012, p. 78). Likewise, Hart and others (1950; Stinson and Schroeder 2012, p. 78) reported that a fire caused sharp-tailed grouse to abandoned a lek site, as well as causing the loss of nests, winter food, and cover.

Livestock Grazing

Livestock grazing is an important factor affecting sharp-tailed grouse populations (Bart 2000; Stinson and Schroeder 2012, p. 70). Although many studies report negative impacts to sharp-tailed grouse from grazing, keeping large private ranches intact is important for the recovery of the species (Stinson and Schroeder 2012, p. 70). Livestock grazing may be compatible with

sharp-tailed grouse in uplands as long as habitat characteristics needed for breeding and nesting can be consistently maintained (Giesen and Connelly 1993; Stinson and Schroeder 2012, p. 70), and the ability to do this will depend on many factors including grazing history of the site; site condition; precipitation zone and year to-year precipitation; livestock type; stocking rate; and season, intensity, frequency, and duration of grazing. Although habitat conversion was a more important factor in the species' initial historical decline in Washington, the degraded condition of remaining habitat resulting from past heavy grazing is still an important factor affecting sharp-tailed grouse populations and recovery.

Schroeder and Stinson (2012, pp. 70-71) listed several ways that livestock grazing can affect the sharp-tailed grouse: 1) grazing may affect sharp-tailed grouse reproductive success through reduction of key food plants and insects available to females and broods (Hoffman and Thomas 2007); 2) grazing may decrease available nesting cover and reduce residual vegetation making females, nests, and chicks more vulnerable to predation (Schroeder and Baydack 2001, Flanders-Wanner et al. 2004); and 3) grazing may degrade riparian winter habitat.

Schroeder and Stinson (2012, pp.70-71) explained that these impacts can decrease or eliminate local populations (Giesen and Connelly 1993; ,Brown 1968, Zeigler 1979, Kessler and Bosch 1982, and Hoffman and Thomas 2007, all as referenced in Schroeder and Stinson 2012, p. 70-71), by shifting use to ungrazed areas following livestock use of traditional sharp-tailed grouse sites (Brown 1968), decreasing cover resulting in negative changes to leks (Brown 1966 as referenced in Schroeder and Stinson 2012, pp. 70-71), decreasing nesting and security cover, making females and eggs more vulnerable to predation (Apa 1998, as referenced in Schroeder and Stinson 2012, p. 70-71), and reducing insect populations. Livestock grazing during drought in southern Idaho rangeland generally reduced grasshopper populations (Fielding and Brusven 1995), which are an important food of growing chicks (Hart et al. 1950; Bernhoft 1969, and Mitchell and Riegert 1994 all as referenced in Schroeder and Stinson 2012, p. 70-71).

The impacts and qualities of livestock grazing in arid and semi-arid western ranges have been reviewed and debated considerably (Fleischner 1994; Belsky et al. 1999; Jones 2000; Curtin 2002; Stinson and Schroeder 2012, p. 72). Additionally, Knight (2002 as referenced in Stinson and Schroeder 2012, p. 2) proposed that the understory cool season bunchgrasses with a biotic crust (Belnap et al. 2001) reflect a recent evolutionary history without high numbers of large herbivores (Tisdale 1961, Daubenmire 1970, Shinn 1980, Mack and Thompson 1982). Although elk (*Cervus Canadensis*), deer (*Odocoileus hemionus*), and bighorn sheep (*Ovis Canadensis*), were at least seasonally or locally present, and bison (*Bos bison*) were sporadically present in modest numbers, regular grazing by large ungulates played little part in the evolution of the shrub-steppe ecosystem in Washington prior to the influences of Euro-Americans. Furthermore, according to Milchunas and Lauenroth (1993; Stinson and Schroeder 2012, p. 72) the most important factor in determining the effects of grazing was an evolutionary history that included grazers in the local environment. Consequently, their findings appear to corroborate the hypothesis that the impact of livestock grazing in the Columbia Basin would be different than in other regions, such as the Great Plains, where grasses were under continuous pressure by large herds of bison (Mack and Thompson 1982; Stinson and Schroeder 2012, p. 72).

Heavy grazing in shrub-steppe is likely to 1) decrease perennial forbs and grasses, 2) increase the dominance of introduced annuals and 3) increase the dominance of unpalatable woody species (Miller et al. 1994; Anderson and Inouye 2002; Stinson and Schroeder 2012, p. 72). Heavy grazing may also reduce the vigor and coverage of herbaceous plants of the Palouse and sagebrush communities in late spring and early summer, when they are sensitive to defoliation (Tisdale 1961; Crawford et al. 2004; Stinson and Schroeder 2012, p. 72). Trampling impacts from the disturbance of excessive and prolonged grazing to the biotic crust may affect the ability of native vascular plants to survive and recover, which in turn may affect sharp-tailed grouse habitat quality in the long run (Belnap et al. 2001; Stinson and Schroeder 2012, p. 72).

The loss and damage to deciduous riparian habitat from excessive livestock grazing, trampling and rubbing may be the most harmful effect of livestock on sharp-tailed grouse habitat in Washington (Stinson and Schroeder 2012, p. 73). Sharp-tailed grouse use deciduous riparian areas for foraging and escape cover throughout the year, but their use is most important in winter. Livestock mostly use riparian areas in summer and fall for water, forage, cover and shade (Stinson and Schroeder 2012, p. 73). However, livestock activities may reduce deciduous trees and shrubs in riparian areas, which in turn may have a negative effect on the sharp-tailed grouse's winter food and shelter (Parker 1970; Nielsen and Yde 1982; Marks and Marks 1987; and Kessler and Bosch 1982 as referenced in Stinson and Schroeder 2012, p. 73). Livestock may also affect riparian areas by altering the stream channel (i.e. widening and aggrading) and lowering the water table (Armour et al. 1991; Stinson and Schroeder 2012, p. 73). Lowering of the water table disconnects the floodplain leading to replacement of riparian vegetation with upland vegetation and exotic weeds (Belsky et al. 1999; Stinson and Schroeder 2012, p. 73).

According to Stinson and Schroeder (2012, pp. 73-74), long term grazing in many riparian areas in Eastern Washington has suppressed the regeneration of native shrubs and trees, such as hawthorn, snowberry, chokecherry, serviceberry, black cottonwood (*Populus balsamifera trichocarpa*), aspen, willows, and water birch, (Franklin and Dyrness 1973; Stinson and Schroeder 2012, pp. 73-74). Additionally, deciduous species have been replaced by sagebrush and rabbitbrush and grazing-resistant exotics such as bluegrass, thistles (*Cirsium spp.),* teasel (*Dipsacus fullonum*), common dandelion, and reed canarygrass (Chaney et al. 1993; Stinson and Schroeder 2012, p. 74).

Predation and Mortality

The most significant cause of mortality for sharp-tailed grouse is predation. However, its impact depends on 1) population size, where smaller isolated populations are more affected by losses, and 2) the rate of predation, which varies according to the quality of habitat (Stinson and Schroeder 2012, p. 74). Predation is a natural process, thus sharp-tailed grouse have developed adaptations and strategies to improve their chances of survival (Conover and Borgo 2008; Stinson and Schroeder 2012, p. 74). However, habitat changes and human associated food sources have generally increased the abundance of multiple species of predators in the range of sharp-tailed grouse. In Washington, predators include crows, ravens, magpies, great horned owls, coyotes, raccoons, striped

skunks, and red foxes (Sauer et al. 2008, as referenced in Stinson and Schroeder 2012, p. 74).

Past studies have shown that determining the species responsible for predation can be problematic due to scavenging, consumption of carcasses and removal of carcasses as well as due to similarities in nest remains, so assignment to a specific predator species, or even taxonomic group, particularly in the older literature should be interpreted with caution (Stinson and Schroeder 2012, p. 16). Studies have indicated that predators are primarily mammalian (41 percent) and avian (33 percent), although other studies have indicated a preponderance of avian-induced mortality and a relatively minor incidence of mammalian predation (Stinson and Schroeder 2012, p. 16).

Disease

Disease is assumed not to be a significant source of mortality for sharp-tailed grouse populations in Washington (Stinson and Schroeder 2012, p. 80) despite the difficulty of documenting mortalities due to disease. Diseases most likely to affect sharp-tailed grouse populations are West Nile virus and Histomoniasis.

The West Nile virus was first confirmed in sage grouse in 2003 in Wyoming (Naugle et al. 2005, p. 617) and has caused high mortality in greater sage-grouse populations in some locations, but it is unknown whether these population declines will persist (Naugle et al. 2005; Stinson and Schroeder 2012, p. 80). Positive tests for West Nile in sharp-tailed grouse have not been reported, but West Nile virus activity has been detected in most Washington counties; and has been detected in other bird species in Spokane and Grant counties, but not in Lincoln, Douglas, and Okanogan counties, where sharp-tailed grouse occur (Stinson and Schroeder 2012, p. 81). West Nile virus is known to injure or kill sage-grouse (Naugle et al. 2005, p. 620); but generally, robust populations would be expected to adapt and recover (Kilpatrick et al. 2007; Stinson and Schroeder 2012, p. 81). According to Stinson and Schroeder (2012, p. 80), if West Nile virus causes high mortalities in sharp-tailed grouse populations in Washington, the impact on small populations could be significant. The effect is presumably less severe for large populations as they are more likely to have birds that survive and pass on their ability to resist the disease to offspring. Standing water sources including stock-tanks and ponds managed for livestock watering can attract mosquitoes and increase the risk of West Nile virus outbreaks.

Histomoniasis (blackhead) can dramatically decrease populations of grouse and wild turkeys (Davidson and Doster n.d.; Beyer and Moritz 2000; Peterson 2004; Stinson and Schroeder 2012, p. 80). Additionally, the nematode that can carry the protozoan disease agent has been reported in sharp tailed grouse but the disease has not been reported in sharp-tailed grouse, as most diseases in free ranging wild animals go undetected (Stinson and Schroeder 2012, p. 81). There is also a potential for contact with Histomaniasis carriers such as pheasants and earthworms. However, interactions between pheasants and sharp-tailed grouse may be limited due to little overlap between pheasant release sites and areas of importance for sharp-tailed grouse (Stinson and Schroeder 2012, p. 81).

Energy Projects and Utility Infrastructure

There were 1,527 wind turbines in operation, and approximately an additional 300 under construction or permitted in eastern Washington in 2012 (Stinson and Shroeder 2012, p. 81). Many of these are in the historic range of sharp-tailed grouse. None were in occupied areas, however; recent proposals include a project in a potential sharp-tailed recovery area near Oakdale in Whitman County. Data on the effects of wind turbines on sharp-tailed grouse are limited (Stinson and Schroeder 2012, p. 81). However, upland game birds were the third most frequently killed bird group in 21 studies of avian mortalities at wind energy projects.

The main impacts of wind farms on grassland bird species are habitat loss and fragmentation due to behavioral avoidance of towers and noise (Pruett et al. 2009; Stinson and Schroeder 2012, p. 81). This potential loss and fragmentation of sharp-tailed grouse habitat is of significant concern and additional research is required to determine whether behavioral avoidance of tall structures is as important an issue for sharp-tailed grouse as it seems to be for prairie-chickens and sage-grouse. Unlike prairie chickens and sage-grouse, sharp-tailed grouse use habitat near trees and feed in deciduous shrubs and trees in winter, so they may not have the same instinctive avoidance response to tall structures (Stinson and Schroeder 2012, p. 81).

Noise may also impact sharp-tailed grouse use of nearby leks (Stinson and Schroeder 2012, p. 81). Data on the impacts of noise on sharp-tailed grouse are scant. Vodenhal (2011 entire; Stinson and Schroeder 2012, p. 81) reported that sharp-tailed grouse continued to display at leks in an area with wind turbines in Nebraska for several years post-construction, but there were no pre-construction data to evaluate effects on population trend or distribution. Considering that any loss or fragmentation of sharp-tailed grouse habitat is a concern, Based on literature reviews and expert advice, Manville (2004; Stinson and Schroeder 2012, p. 81) recommended a 5-mile buffer from active leks of all prairie grouse.

Wind energy projects also include support structures such as roads and power lines that produce some level of chronic disturbance. Sharp-tailed grouse mortalities from collisions with power lines, wire fences, and roads are all known to occur (Stevens et al. 2012, p. 297). Destruction, fragmentation and degradation of habitat also result from these structures and make it more hazardous for sharp-tailed grouse to move within otherwise suitable habitat and between habitat patches. Behavioral avoidance of wind turbines is also an issue with electrical transmission lines and any other tall structures (Stinson and Schroeder 2012, p. 81).

Illegal and Accidental Killing

Hunting of sharp-tailed grouse is no longer allowed in Washington. The incidence of illegal and accidental killing of sharp-tailed grouse is currently unknown. Sharp-tailed grouse can easily be mistaken for pheasants and other similarly-sized birds. Sharp-tailed grouse are also potentially vulnerable to shooting during winter when feeding on tree buds along rural roads (Stinson and Schroeder 2012, p. 84). It is possible that over hunting, if allowed in the future, could impact small isolated populations. The effect of hunting mortality on the breeding population may vary with population size, timing, weather, and the quality and extent of available habitat (Stinson and Schroeder 2012, p. 17).

Structures, including those which support range management activities, can have negative impacts on sharp-tailed grouse habitats. Fences can have both a positive (through grazing management and improved habitat) and negative impact depending on their location and use; flying grouse can collide with fences and result in mortalities (WDFW 2012, p.125; Stinson et al. 2004, p. 51). Fences may also provide perches for avian predators and increase predation (Stinson et al. 2004, p. 64).

Other Threats

The impacts of climate change on sharp-tailed grouse and their habitat in Washington are uncertain (Stinson and Schroeder 2012, p. 82). Recent model simulations indicate a modest increase in winter precipitation and a modest decrease in summer precipitation in Washington (Miles and Lettenmaier 2007; Stinson and Schroeder 2012, p. 82). Consequently, a longer growing season and reduced summer precipitation may result in more arid lands that in turn could cause the drier edge of sharp-tailed grouse range to retreat. In contrast, currently marginal, non-irrigated cropland may become less suited for dryland agriculture (Miles and Lettenmaier 2007; Stinson and Schroeder 2012, p. 82) and, if irrigation water is not available, it may become rangeland or become available for conservation programs. Increases in fire frequencies can also have a two-fold effect. It could reduce pine forest invasion into steppe habitats in some areas of Okanogan County, but may also expand areas where cheatgrass has replaced sagebrush (Stinson and Schroeder 2012, p. 82).

According to Stinson and Schroeder (2012, p. 83) increases of CO_2 may affect plant chemical and nutrient composition and affect wildlife in ways that are not fully understood. Reduction of protein value of forage may be likely (Inkley et al. 2004, as referenced in Stinson and Schroeder (2012, p. 83), which could affect sharp-tailed grouse reproduction or brood survival. Conversely, increases in atmospheric CO_2 are expected to increase concentrations of toxins in plants (Forbey 2012; Stinson and Schroeder 2012, p. 83) potentially further restricting foraging on some plant species. Climate change is likely to cause increasingly unstable and stressful conditions and have a greater impact on small isolated populations due to fewer resiliencies to these conditions in small populations.

Sharp-tailed grouse are vulnerable to disturbance when aggregated at leks and in riparian winter habitat. Disturbance from human activities can be caused by vehicles, livestock, and farming activities. Increasingly, there is also potential disturbance by bird watchers and nature photographers who visit leks while birds are displaying (Stinson and Schroeder 2012, p. 83). All these disturbances, if performed frequently enough, can flush birds off leks and can affect mating activity.

Recovery Needs and Conservation Strategies

The recovery goal for sharp-tailed grouse in Washington (Stinson and Schroeder 2012, p. 85) is to restore and maintain healthy populations of Columbian sharp-tailed grouse in a substantial portion of the species' historical range in Washington. Healthy populations are those large enough to readily recover from fluctuations due to disease, drought,

and extremes in weather, and to adapt to some degree of changes in habitat; this would require substantially increasing the number and distribution of sharp-tailed grouse in the state.

According to the Washington State sharp-tailed grouse recovery plan (Stinson and Schroeder 2012, p. 85), the Columbian sharp-tailed grouse will be considered for down-listing from State Threatened to State Sensitive status when:

> 1) Washington has at least one population that has averaged >2,000 birds for a 10-year period, and,
> 2) The total number of sharp-tailed grouse in Washington has averaged >3,200 birds for a 10-year period.

Alternatively, the sharp-tailed grouse would be considered for up-listing from State Threatened to State Endangered status if the total population falls to <450 birds.

The Sharp-tailed Grouse Recovery Plan sets recovery strategies and tasks for the Washington State populations of the sharp-tailed grouse (Stinson and Schroeder 2012, pp. 97-116). More detailed recovery strategies and tasks are listed in Appendix A. The main strategies are as follows:

1. Protect sharp-tailed grouse populations.
2. Protect sharp-tailed grouse habitat.
3. Enhance or restore sharp-tailed grouse habitat.
4. Inventory and monitor sharp-tailed grouse populations.
5. Augment existing populations and establish new populations.
6. Conduct research necessary to conserve and restore sharp-tailed grouse populations.
7. Coordinate and cooperate with other agencies, landowners, and private groups in the conservation, protection, and restoration of sharp-tailed grouse in Washington.
8. Develop public information and education programs.
9. Secure funding for recovery activities.

The State recovery plan outlines areas including portions of the historical range that still support or have the greatest potential to support the species, taking into account mean annual precipitation, slope, current vegetation, and the potential for habitat (Stinson and Schroeder 2012, p. 90). Twenty-two recovery units and two potential recovery regions are identified in the Washington Sharp-tailed Grouse Recovery Plan (Figure 13, and Table 9). The management focus and needs for recovery units and their importance for protecting known populations, recovery, potential for restoration and connectivity are identified in Table 9. The intent of the Recovery Units Map is to focus recovery efforts in those areas most likely to contribute to recovery of the sharp-tailed grouse (Stinson and Schroeder 2012, p. 90).

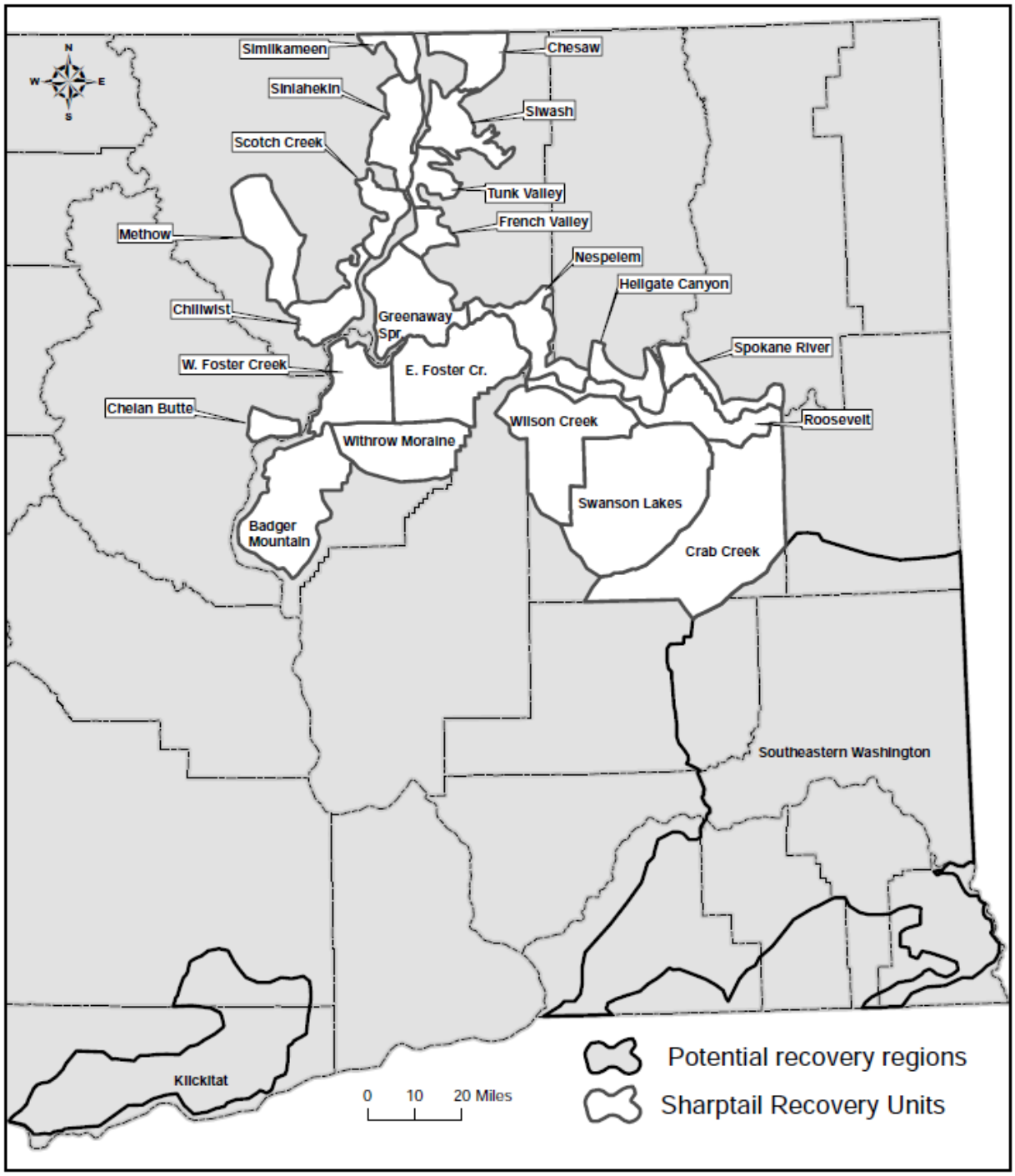

Figure 13. Sharp-tailed grouse recovery units and potential recovery units. (Stinson and Schroeder 2012, p. 92, fig 35)

Table 9. Sharp-tailed grouse recovery units (From Stinson and Schroeder 2012, p.93 Table 11). Recovery units in Bold occur within Douglas County.

Recovery Unit	Population Status (2010)	Notes and Management Needs
Badger Mountain	Extirpated	Unit somewhat peripheral; mostly cropland but has potential habitat and BLM lands.
Chelan Butte	Unknown	WDFW land; fragmented by topography but native vegetation being restored; half private lands
Chesaw	Breeding	Restored vegetation; population has potential to expand to WDFW lands further west; development risk on adjacent private lands.
Chiliwist	Possible low seasonal use	WDFW land; important for connectivity between Scotch Creek and Methow or W Foster Creek; management for deer winter range negatively affected habitat condition in past.
Crab Creek	Extirpated	Good potential expansion area; mostly private but with some BLM land; most CRP may be older monoculture that needs enhancement
East Foster Creek	Breeding	WDFW land and private CRP; important are for connectivity; SAFE may increase occupied area.
French Valley	Breeding	Small population, but location is important for connectivity; ongoing survey/monitoring needs.
Greenaway Springs	Breeding	No active leks known in 2010-2011, but population augmentation project initiated in 2012; contains extensive habitat, and condition improved in recent years; needs include increased survey/monitoring to evaluate augmentation
Hellgate Canyon	Unknown	Colville Confederated Tribes wildlife management lands present; area important for connectivity, but is fragmented by topography
Methow	Extirpated	Sharp-tails present until the 1980s; somewhat peripheral to the recovery area, but substantial public lands present; reduced grazing in the area has improved habitat in recent years; some WDFW lands have restoration underway, but more is needed.

Recovery Unit	Population Status (2010)	Notes and Management Needs
Nespelem	Breeding	Hosts largest population in the state; contains Colville Confederated Tribes wildlife management areas; area important for connectivity; survey/ monitoring needs; feral horses a problem in recent years.
Roosevelt	Unknown	Western part very important for connectivity; mostly private lands; development on river bluffs is increasing.
Scotch Creek	Breeding	WDFW land, recent and ongoing restoration projects for nesting and wintering habitat; also important for connectivity
Similkameen	Unknown	Somewhat peripheral to other populations, but relatively close to occupied areas and contains significant BLM lands; habitat condition and potential needs to be assessed.
Sinlahekin	Unknown	Horse Springs Coulee population believed recently extirpated; important for connectivity if Similkameen were occupied; most of WDFW land is not suitable, and some potential habitat in poor condition.
Siwash	Breeding	Important for connectivity between Tunk Vally and Chesaw; DNR, TNC lands; private land at risk to development; grazing on DNR land and conifer invasion are issues.
Spokane River	Unknown	Spokane Indian Reservation and private lands; modest amount of habitat; potential expansion area, but peripheral to recovery area.
Swanson Lakes	Breeding	Population recently augmented by translocations; substantial WDFW and BLM lands; reseeding of old CRP fields underway, but additional reseeding needed.
Tunk Valley	Breeding	Important for north-south connectivity; WDFW and private lands; high development risks.
West Foster Creek	Breeding	WDFW and private CRP; important for connectivity; SAFE may increase occupied areas.
Wilson Creek	Unknown	Mostly private cropland, but location very important for connectivity; re-establishment of a breeding population would be very beneficial for recovery.

Recovery Unit	Population Status (2010)	Notes and Management Needs
Withrow Moraine	Unknown	Shrub-steppe and lots of CRP; precipitation somewhat low; sparse wintering habitat; some WDFW, BLM lands.

Implemented Conservation Actions and Recovery Efforts

Sharp-tailed grouse have been translocated to Washington from outside of the State to improve the vigor of local populations (Schroeder et al. 2012, WDFW 2012, p. 125), and have likely prevented extirpation at Scotch Creek Wildlife Area. Since 1998, a total 391 sharp-tailed grouse have been translocated and released in areas in Washington. Additional releases are planned in future years.

In 2011 WDFW acquired two groups of properties with potential benefits to the sharp-tailed grouse, including 473 acres in Douglas County (WDFW 2012, p. 125). In 2012 WDFW purchased 373 acres adjacent to Scotch Creek Wildlife Area in Okanogan County.

Habitat restoration and enhancement efforts in recent years include addressing fence collisions by removing unneeded fences on WDFW lands, and marking fences including marking 28 miles of fences on WDFW lands in Douglas County (WDFW 2012, p. 125) and additional miles of fences on WDFW and BLM lands in Lincoln County, and Okanogan County. Habitat restoration has been implemented on Wildlife areas, including forb planting on the Wells/Sagebrush Flats Wildlife Area in Douglas County. WDFW also boosted habitat through implementation of the SAFE program, resulting in enrolling 63,000 acres since 2010 (WDFW 2012, p. 127).

ENVIRONMENTAL BASELINE: Sharp-tailed grouse

A general baseline description, applicable to all covered species, was previously described and is incorporated here by reference.

Conservation Role of the Action Area

The Washington State Recovery Plan for Sharp-tailed grouse (Stinson and Schroeder 2012, p. 93) lists four potential sage grouse recovery units in Douglas County, out of 22 units in Washington. Those units (Figure 13 and Table 9) are expected to provide potential habitat (Badger Mountain Unit), connectivity habitat (East Foster Creek Unit and West Foster Creek Unit), and wintering habitat (Withrow Moraine Unit). The recovery units focus recovery efforts in areas that support sharp-tailed grouse currently or have the potential to support sharp-tailed grouse in the future (Stinson and Schroeder 2012 p. 90).

Douglas County

Four of 22 recovery areas occur within Douglas County (Table 9). Within Douglas County, the sharp-tailed grouse is currently more likely to occur in the northern portion of the County (MSGCP figure D12). Two small populations of sharp-tailed grouse occur in northern Douglas County, Dyer Hill and Nespelem (Stinson and Schroeder 2012, p. 44 Figure 14). These two populations are isolated from each other and from other populations of sharp-tailed grouse in the state.

We calculated total shrub-steppe in Douglas County, using Washington Gap data (2010), as approximately 413,805 acres of shrub-steppe (shrubland, steppe and savanna systems) out of a total of 1,183,057 acres (approximately 35 percent). The sharp-tailed grouse's historic range likely included most of the County.

Habitat Suitability Index (HSI) model

Appendix D, figure D-5 in the MSGCP displays potential sharp-tailed grouse habitats within Douglas County.

Foster Creek Conservation District, WDFW, and others developed a habitat model that determined the HSI (Ch.3 and Appendix G of the MSGCP), and evaluated potential changes over time for the MSGCP. The HSI is a model for determining the value of existing habitat by comparing it with an idealized habitat and contains a suite of environmental parameters needed by each species to successfully live and reproduce. For example, the parameters for a species might include foraging areas, migration areas, amount of escape cover, and amount of nesting cover. Values, such as acres or percent cover, for these environmental parameters are assessed for each species to determine a ranking factor for each area that indicates the relative impact each action has on the species. The HSI values range from 0.0 (no value) to 1.0 (most benefit to the species). In other words, an HSI model evaluates not just quantity of habitat, but also assigns a quality value to the habitat. Because the data in the initial HSI model is becoming dated, the FCCD and others will need to conduct a new run of the same or similar model with current imagery early in MSGCP implementation to establish the starting point for covered species habitat quantity and quality. The model results, including acres for dryland agriculture, rangelands, and irrigated agriculture in Douglas County are also displayed in Chapter 3. The HSI information in the MSGCP, Table 10 below, and later in the opinion, should be used to illustrate potential habitat improvement trends, but the eventual HSI values may change based on the next habitat modeling evaluation process.

Table 10. Current HSI acre and population estimates for the sharp-tailed grouse. (MSGCP 2015, Ch.3 Table 3-2)

COVERED SPECIES	EXISTING CONDITION HSI ACRES[1]	EXISTING CONDITION-- ESTIMATED MSGCP SPECIES POPULATIONS (NUMBER OF INDIVIDUALS)[2]
Sharp-tailed grouse	61,847 ac	619

[1] 2005 conditions HSI-Acre values computed from habitat conditions data obtained with 2005 satellite imagery.

[2]Estimated species population at risk is calculated by multiplying the quantity of HSI-Acres required for one individual of each species by the quantity of HSI-Acres in the entire County (Schroeder, WDFW, personal communication as referenced in MSGCP)

EFFECTS OF THE ACTION: Sharp-tailed Grouse

The purpose of the MSGCP is to implement actions on agricultural lands in Douglas County that conserve the covered species, including the sharp-tailed grouse. The effects to the covered species are minimized by implementation of BMPs under farm plans, including CPs and specific land-use measures that result in maintaining and improving habitat. While implementation of BMPs improve habitat, ongoing Covered Activities also have adverse effects to the sage-grouse and its habitat. The sharp-tailed grouse is affected by general effects to shrub-steppe habitats, as described previously in the general effects section. That discussion is incorporated here by reference. One particular general BMP to note relevant to sharp-tailed grouse is the BMP applied to riparian areas (see general effects discussion, and MSGCP Appendix E). As described in the status of the species, sharp-tailed grouse use riparian habitats especially during the winter for cover and feeding. The effects to the sharp-tailed grouse may occur in various locations in Douglas County on Permittees' lands over the 50-year duration of the MSGCP.

Covered Activities will have varying effect on the sharp-tailed grouse. Early in the development of the MSGCP, the planning team met and discussed the impacts of Covered Activities on covered species in Douglas County. A review matrix was established identifying the relative non-numerical severity or impacts of various activities on each of the MSGCP covered species (MSGCP 2015 Table 3-1). The Service added more detail to the review matrix, and this is included in Appendix B, Table 2. Most of the impacts to the sharp-tailed grouse would be from habitat quality changes, some loss of habitats, and some potential for disturbance and for mortality from impacts to nests or individual animals. The matrix in Appendix B, Table 2 lists the BMPs that will be applied through the MSGCP and individual farm plans to minimize effects. These effects are discussed in the following sections. Actual effects will vary with farm location, activity types, habitat and sharp-tailed grouse distribution and potential habitat on each farm.

Habitat changes and human-associated food sources have generally increased the abundance of multiple species of predators in the range of sharp-tailed grouse. In Washington, predators include crows, ravens, magpies, great horned owls, coyotes, raccoons, striped skunks, and non-native red foxes (Sauer et al. 2008 as referenced in Stinson and Schroeder 2012, p. 74). Although sharp-tailed grouse have developed adaptations and strategies to avoid predation, such as camouflage, flocking, distraction displays, reduced scent emission by incubating females (Stinson and Schroeder 2012, p. 74) and roost site selection (Conover and Borgo 2008; Stinson and Schroeder 2012, p. 74), changes in the landscape from agriculture and development have changed the predator and prey community and the sharp-tailed grouse may be more vulnerable to predation (Stinson and Schroeder 2012, p. 75).

Many of the farming and ranching impacts to sharp-tailed grouse are habitat based, including loss of habitat, continued fragmentation, and changes to habitat quality (positive and negative). There is also the chance of disturbance, injury, or mortality in some instances (Appendix B, Table 2). Injury or mortality may occur from impacts to individual sharp-tailed grouse, indirectly through loss of cover resulting in predation, and in addition breeding and sheltering may be impaired through disturbance causing nest abandonment, or direct damage to nests. Injury or mortality could occur through mowing, burning, plowing, brush/beating, predator control, moving and herding livestock in occupied areas, or concentrating livestock operations in occupied areas. The injury or mortality could occur from machinery, livestock trampling, striking of structures, or drowning in stock tanks or water features. The exposure to mosquito-borne West Nile virus could be exacerbated through stock tanks or other water or irrigation facilities. The likelihood of killing or injuring a sharp-tailed grouse from these measures is probably small initially, but increases as the exposed population increases. The following BMPs minimize these risks (see Appendix E in MSGCP 2015):

- In areas near leks or in likely occupied habitats, if CRP/SAFE acres are taken out or converted, the conversion will not occur between April 1 and July 31.
- In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season (may vary by site but typically March through June for sharp-tailed grouse; and February 20 through June for sage grouse).
- Avoid disturbance to occupied leks. The typical season is between March through June for sharp-tailed grouse, and February 20 through May 15 for sage grouse. Within 0.5 miles of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunrise to 3 hours after sunrise). At those times and locations, avoid physical, mechanical, and loud noise disturbances.
- Plan and design placement of new fences away from occupied and historic leks. If this is not possible, adequately mark fences to increase visibility. Identify existing fences that are nearby to an occupied or historic lek and consider removing or relocating the fence to a site further from the lek. At a minimum, mark all existing fences within ¼ mile from an occupied or historic lek, or in high risk areas where collisions are likely or known to occur. Use NRCS, SGI, or other appropriate national or local fence collision tools to prioritize fence marking.

- In addition to the general grazing prescriptions, in likely occupied nesting habitats with grazing, where appropriate, retain a residual cover of perennial grasses and forbs of at least 20 cm (8 in) for cover during the nesting season (April 1 through June 30).
- Immediately notify USFWS upon finding any dead or injured sharp-tailed grouse or sage grouse on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Appendix C, Table 3, compares the conservation strategies appropriate for private landowners to implement for the sharp-tailed grouse from the Washington state recovery plan, and lists the BMPs that address the recommendations. Based on the analysis of potential threats associated with farming and rangeland management practices, and the suite of BMPs identified to address those threats, we believe the effects to the sharp-tailed grouse will be minimized by implementation of BMPs under farm plans, and GCP site plans.

Effects Specific to Ranching

As displayed in Appendix B, Table 2, ranching activities adversely impact potentially suitable shrub-steppe habitats on enrolled properties and therefore the forage and cover requirements of sharp-tailed grouse. In addition, livestock grazing and other ranching-related activities (e.g., herding, transport) may disturb or damage individual sharp-tailed grouse or nests and, in some cases, could even cause direct injury or mortality. Finally, various range management activities (e.g., mowing/brush beating, prescribed fire) alter the vegetation characteristics of existing habitats and could potentially make them less suitable, or unsuitable, for the sharp-tailed grouse. Appropriately managed livestock grazing may be compatible with sharp-tailed grouse in uplands as long as habitat characteristics needed for breeding and nesting can be consistently maintained (Giesen and Connelly 1993; Stinson and Schroeder 2012, p. 70), and BMPs on enrolled lands will avoid or reduce potential direct effects due to trampling by livestock or other ranching-related activities. Implementation of BMPs including required grazing prescriptions would minimize the adverse effects to the sharp-tailed grouse through ensuring that cover and forage is provided consistent with grazing prescriptions. Infrastructure maintenance practices such as road and trail management, water development and infrastructure such as fences and fence maintenance may result in a temporary loss of habitat quality, provide perches for avian predators, or result in strikes by sharp-tailed grouse resulting in injury or mortality. However, the infrastructure can, when implemented to rotate pastures more effectively, result in an improvement of habitat quality. While such practices as grazing rotation, moving and herding stock, distributing water (systems), salt distribution, wintering, confining, calving, feeding and manure management may also result in temporary negative impacts and, possibly, even isolated mortality, these practices are also expected to result in an overall improvement of habitat quality.

Ranching activities require fencing, and flying grouse can collide with fences, utility wires, and other structures (WDFW 2012, p. 125). Markers increase the visibility of fences to grouse. Woven wire fences are difficult for sharp-tailed grouse to quickly fly or travel through. The MSGCP (Appendix E) requires placement of new fences away from occupied and historic leks, or marking of fences to increase visibility. BMPs, including those requiring planning and design of new fences away from leks, and removal or marking of fences within a ¼ mile of occupied or

historic leks, or in high risk areas where collisions are known to occur, will help to minimize the risk of collisions of fence strikes by the sharp-tailed grouse.

Sharp-tailed grouse chicks rely heavily on insects during their first few weeks of life (Stinson and Schroeder 2012, p. 21). Extensive grazing can affect insect populations both in diversity and abundance (Kreuss and Tscharntke 2001, p. 298; Zhu et al. 2012, p. 1081; Frisina and Keigley 2004, p. 5). Reducing grazing or implementing resting phases into the grazing cycles were found to benefit small animal and insect populations (Krausman et al. 2009, p. 16). As described under the Threats section above, livestock grazing may be compatible with sharp-tailed grouse in uplands as long as habitat characteristics needed for breeding and nesting can be consistently maintained (Giesen and Connelly 1993; Stinson and Schroeder 2012, p. 70), and the ability to do this will depend on many factors including grazing history of the site; site condition; precipitation zone and year to-year precipitation; livestock type; stocking rate; and season, intensity, frequency, and duration of grazing. Although habitat conversion was a more important factor in the species' initial historical decline in Washington, the degraded condition of remaining habitat resulting from past heavy grazing is still an important factor affecting sharp-tailed grouse populations and recovery.

The MSGCP includes grazing prescriptions that are expected to ensure moderate levels of grazing that maintain or improve sage-grouse habitats. However, during rotational grazing scenarios, cover will still be removed or decreased in certain areas or seasons, making sharp-tailed grouse more vulnerable to predation. Livestock management such as moving, herding, wintering, calving and confinement, will degrade habitats in certain areas resulting in adverse effects to sage-grouse, damage to nests, or death or injury depending on the site specific conditions.

Effects Specific to Farming (irrigated and dryland)

Dryland and irrigated farming generally decreases riparian areas, cover, and shrub-steppe habitats available for sharp-tailed grouse. However, many leks in southeastern Idaho were in CRP (58 percent of 50), 22 percent in sagebrush, 8 percent in pasture, 8 percent in agricultural fields, and 4 percent in mountain shrub (Ulliman 1995; Stinson and Schroeder 2012, p. 32). As described in the Status of the Species section above, sharp-tailed grouse require vegetative cover, sage brush, and succulent green forage along with insects. Thus, a variety of habitats are necessary. Certain farming activities (e.g., equipment staging and storage, field access, pest control) on suitable, undeveloped habitats adjacent to crop fields could impact the sharp-tailed grouse through disturbance, damage to nests, or directly injury or kill individual animals. In addition, it is possible, that farming activities on existing crop fields could disturb, injure or kill grouse, especially in or near leks during spring. Sharp-tailed grouse may also be more vulnerable to predation due to a lack of cover on these developed or cropped lands.

Agricultural activities have the potential to disturb birds at leks. Sharp-tailed grouse lek sites are typically small in area and located on open elevated knolls or ridges with good visibility (Stinson and Schroeder 2014, p. 7, p.32). Too much disturbance at a lek can impact mating behaviors. As previously described, the MSGCP (Appendix E) requires minimization of activities near leks

during the spring breeding season, including limiting disturbing activities during the active lek use period (morning and evening) within ¼ mile of leks.

Many Farm Bill incentive based programs such as CRP have been very successful at converting agricultural lands back into grass and/or shrub-steppe. Quality of habitat depends on the length of time that the land is enrolled and the initial planting regime. Some of the conservation acreage in Douglas County, for example, has been enrolled for more than 20 years and is beginning to resemble native shrub-steppe habitat in structure (Schroeder et al. 2012, p. 28). For conservation lands that have been enrolled for 10 or 20 years, the sagebrush may encroach and become established, even if it wasn't in the original planting mix. As described in the Status of the Species, Stinson and Schroeder (2012, pp. 76-77) explain that although CRP covers a modest portion of the currently occupied range, it provides important sharp-tailed grouse nesting habitat in parts of Lincoln and Douglas counties. In recent years, however, CRP fields have been planted with a diverse mix of native grasses and forbs more suitable for sharp-tailed grouse habitat and many older CRP fields are being improved with native species.

Figure 14 displays the distribution of CRP within current and historic range of the sharp-tailed grouse; the current range within Douglas County displays large portions of CRP. Sharp-tailed grouse in Douglas County often use CRP lands that have been re-invaded by sagebrush. In Lincoln County (similar habitat to Douglas County), sharp-tailed grouse placed 11 (out of 17) nests on CRP lands (McDonald 1998, as referenced in Stinson and Schroeder 2012, p. 33-34). Sharp-tailed grouse will use CRP fields during brood rearing in summer. Use of CRP as winter habitat occurs in localized areas with native shrub-steppe receiving the greater majority of use (McDonald 1998; Stinson and Schroeder 2012, p. 37). Loss or conversion of large amounts of CRP (or SAFE) will negatively impact the sharp-tailed grouse, depending on the location of the parcels, and will result in loss of nesting habitat and destruction of nests or broods if takeout occurs during the nesting season, and loss of localized wintering areas.

A process to evaluate and address potential changed circumstances has been built into the MSGCP, and if the CRP/SAFE acres decrease below 10 percent of the starting acres in the County as a whole, and additional lands are not protected within 2 years to go above that 10 percent trigger, then the adequacy of the MSGCP will be revisited. As described earlier in this section, if CRP conversion occurs it will not be done between April 1 and July 31.

As described previously under Assumptions, CRP and SAFE acres may change during the life of the MSGCP, and those changes may affect covered species. Over time the acres may increase or decrease. The MSGCP expects that those acres in Douglas County may dip below a 10 percent change from June 30, 2013 numbers (182,072 acres) (as described in changed circumstances in the MSGCP) and stay at that point for as much as two years while the FCCD and other partners evaluate how to come up above the 10 percent change point. We assume that CRP acres may dip below 10 percent within a 2-year period, up to 6 times (based on estimated CRP contract renewal points, and assuming 10-year renewal periods) during the 50-year term of the MSGCP. It is assumed that even if CRP contracts are not renewed for all acres, not all farmers would immediately begin cropping those acres.

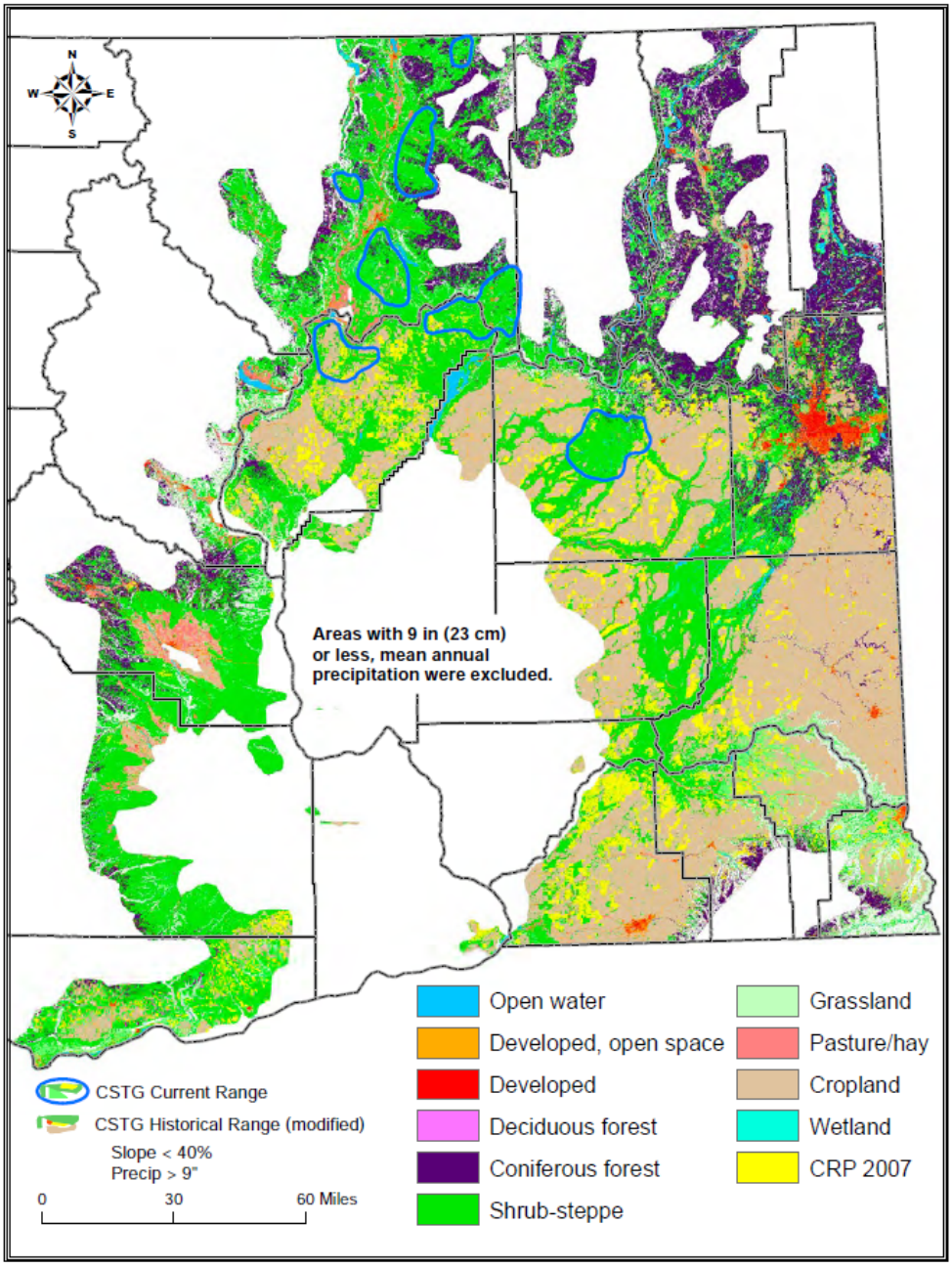

Figure 18. Land cover (2001 National Land Cover Data) and Conservation Reserve Program lands (2007 data) in the historical and current ranges of Columbian sharp-tailed grouse (steep slopes and low precipitation zones removed) in Washington.

Figure 14. Land cover and CRP lands in historic and current range of Columbian sharp-tailed grouse.
(from Stinson and Schroeder 2012, p. 52 figure 18).

Effects and HSI Analysis

As described under the environment baseline discussion, the FCCD worked with WDFW and NRCS to develop a model of habitat suitability over time. Estimates of HSI-Acres were further defined for the existing conditions and projected out approximately 10 years and 50 years (Table 11; Table 3-2 in MSGCP). The modeling team predicted that under the MSGCP there would be a gradual increase in habitat units (HSI-Acres); they estimated habitat quality would increase by 5 percent in the first 10 years, and by 8 percent in 50 years for the sharp-tailed grouse as a result of BMP implementation under the MSGCP. This estimate for increasing HSI-Acres is based on BMPs increasing the quality of the habitat as increased acreage is enrolled in the MSGCP. The habitat improvement is displayed with equivalent HSI acres to show a quality improvement (improved quality should support more individual covered species) (see Table 11). Total acres of habitat on the ground may not actually increase. These HSI-Acre estimates are suggested assuming that environmental conditions remain as they existed in the initial 2008 analysis (based on 2005 imagery), and that all potential Permittees enroll. Therefore, this is a best-case scenario. In fact, during the comment period for the draft MSGCP, WDFW questioned whether the predicted habitat improvements were overly optimistic. The Service agrees that the model can be improved. We expect that habitat quality will improve over time, but the degree of improvement will depend on the number of farmers/ranchers that sign up. Upon implementation of the MSGCP, the FCCD will develop a new HSI model using more recent satellite imagery and methods to determine the baseline condition of the MSGCP and to track habitat quality trends over time. The HSI acre estimates in the current model display the expected trend over time and the model was a best case scenario for enrollment, the next model may have differing acre and HSI numbers.

Table 11. Best-case Scenario in HSI for Sharp-tailed grouse habitat (HSI-acres) for the proposed MSGCP.

MSGCP SPECIES	EXISTING CONDITION[1]	MSGCP	
		YR 10	YR 50
Sharp-tailed Grouse	61,847 ac (25,028 ha)	68,031 ac (27,523 ha)	71,124 ac (28,782 ha)

[1] Existing conditions HSI-Acre values computed from habitat conditions data obtained with satellite imagery.

For the sharp-tailed grouse, population estimates were calculated by multiplying the quantity of HSI-Acres required for one individual of each species by the observed quantity of HSI-Acres in the County (Michael Schroeder, WDFW, Personal Communication, 2005 as referenced in MSGCP). The modeling team assumed that because of conservation activities in part, from the MSGCP, populations of Covered Species on agricultural lands would increase in proportion with HSI-Acres over 50 years.

One way to quantify effects is to make assumptions on habitat and population trends through the HSI model. After developing population estimates for the sharp-tailed grouse of 619 individuals in Douglas County (Table 3-2 in the MSGCP), the FCCD (after consultation with the Service, WDFW, and NRCS) determined based on best professional judgment, that up to five percent of the species' population exposed to Covered Activities may be injured, killed, or their breeding, feeding or sheltering would be impaired through habitat impacts. As the habitat improved and the population increased the number of sharp-tailed grouse exposed to those effects would increase. While similar assumptions on effects to populations are sometimes made, the Service notes that the HSI model included a county-wide project area that included both agricultural and non-agricultural lands that provide habitat for MSGCP species, the model was developed based on a best case scenario regarding enrollment, and the model used what is now dated information. While population estimates in the County and HSI-generated population predictions help to display trends over time, the resultant population numbers are likely imprecise. The AMMP expects a new HSI model run at the beginning of MSGCP implementation, and also allows use of a different modeling process in the future, as long as the baseline and changes over time are comparable to the initial HSI model. The Service does not view the current HSI model and resulting estimates as the best way to quantify effects over time, and we present another approach below.

Quantifying Effects Over Time

Sharp-tailed grouse currently occur in the northern part of Douglas County, however they likely occurred across much of the County historically (Figure 10). As habitats improve, conservation efforts continue, and sharp-tailed grouse populations increase over the 50-year duration of the MSGCP, more sharp-tailed grouse will be exposed to Covered Activities both in suitable breeding and foraging habitats (ie: shrub-steppe). They may be exposed to some Covered Activities on crop lands, especially during their seasonal movements. Not all activities in all locations will result in adverse effects to the sharp-tailed grouse, but over the large area of Douglas County, and given the long duration of the MSGCP, the following activities are may result in the following adverse effects:

- Injury or mortality as a result of Covered Activities including: using heavy equipment that may directly kill or injure adult and juvenile sharp-tailed grouse especially brooding females and their young or eggs (killing a female may result in death of young or eggs); conversion of CRP/SAFE may kill or injure sharp-tailed grouse, although the BMPs regarding timing of that conversion decreases the likelihood; water tanks or water features may result in sharp-tailed grouse drowning, and standing water can attract mosquitoes and increase the risk of West Nile virus outbreaks; fences and other structures cause injury or death from collision, or indirectly through providing increased perches for avian predators.

- Significant impairment of essential breeding, feeding, or sheltering behaviors as a result of Covered Activities including: farming activities that perpetuate a fragmented landscape, resulting in decreased cover and connectivity; heavy livestock grazing that impairs habitat, or concentration of livestock that results in compaction of soils and increased bare ground that degrades nesting and brood-

rearing habitat and increases the risk of establishing invasive weeds that degrades habitats; conversion of CRP or SAFE acres that removes nesting or breeding habitats.

- Disturbance as a result of Covered Activities including: use of heavy equipment, vehicles, noise from generators or windmill-powered pumps that cause short-term disturbances to sharp-tailed grouse or it cause sharp-tailed grouse to avoid otherwise usable habitat, especially near leks or nesting areas; disturbance near leks that impairs breeding and reproduction (this is more likely where historical nests have moved or new leks are being established before BMPs are added to minimize the disturbance); livestock management activities such as moving cattle to different areas, or recreational activities that cause sharp-tailed grouse to flush or otherwise disrupt their behavior (this disturbance may be minor or may cause nest abandonment, depending on the duration or scale).

Sharp-tailed grouse may be injured, killed, and/or have their breeding, feeding, and sheltering behavior significantly impaired from the activities described above and in Appendix B, Table 2, in some locations over the 50-year duration of the MSGCP. The actual impact on sharp-tailed grouse will vary with location and timing of activities, and not all individuals exposed to a particular disturbance or impact will be significantly affected. In other words, adverse effects may occur, such as disturbance of sharp-tailed grouse during Covered Activities, but not all will rise to the level of injury, death, or significant impairment or disruption of breeding, feeding, or sheltering behavior.

Although we can qualitatively describe adverse effects to the sharp-tailed grouse as above, quantifying those effects is more challenging. One approach to quantification is to describe current and predicted future numbers of individuals that may be exposed to Covered Activities, but not all habitats have been surveyed in the County, and population numbers vary year to year due to weather, fire, or other conditions not directly related to agriculture. Sharp-tailed grouse may move lek sites due to a fire, and be difficult to relocate. Also, the MSGCP is programmatic, and it is not known where or how many Permittees will join. All of these factors together make it difficult to predict the numbers of affected sharp-tailed grouse.

We can evaluate effects to the sharp-tailed grouse by using habitat quantity as a proxy for adverse effects to sharp-tailed grouse and assume that activities on all acres have an equal chance of injuring, killing, or disturbing individuals. In the proposed action, we described the potential for 50% of the agriculture landowners in Douglas County joining the MSGCP, and included estimates of 50 percent of the shrub-steppe acres, and cropland acres. The historic range of the sharp-tailed grouse likely included all of Douglas County, and if sharp-tailed grouse populations increase, they could use much or all of the shrub-steppe habitat in the County seasonally; 50 percent of the shrub-steppe would be 206,903 acres (83,730 ha) of shrub-steppe habitat. These are the upper acre quantities where sharp-tailed grouse may be exposed to Covered Activities such as ranching activities, within potential breeding or foraging habitats on shrub-steppe.

Covered Activities on agriculture fields or crop land near breeding or foraging habitat may also have adverse effects, including disturbance near nests or leks. BMPs will minimize those adverse

effects, however a low incidence of injury or mortality may occur on 269,766 acres of cropland (50% of cropland in the County) from increased vulnerability to predation and direct impacts from heavy equipment. These are the upper level of acreage where agriculture activities that may adversely affect the sharp-tailed grouse are expected to occur over the life of the MSGCP.

CRP lands provide important nesting habitat for sharp-tailed grouse in Douglas County (Stinson and Shroeder 2012, p. 76). The highest likelihood for injury, mortality, or impairment of breeding through removal of nesting habitat by MSGCP Covered Activities would be during or after conversion of CRP/SAFE acres within Douglas County. The sharp-tailed grouse historic range included all of Douglas County, therefore the analysis of acres lost to CRP conversion includes the whole County, since over time, assuming habitat restoration and recovery continues, the species would be affected by habitat impacts across the whole County. The following bullets describe the quantity and frequency of potential CRP/SAFE conversion:

- Total CRP/ SAFE acres in the County as of June 2013 equals 182,072 acres (73,681 ha)
- Total farm acres in the County equals 883,094 acres (357,375 ha)(USDA 2009)
- Non-orchard farms (cropland) in the County equals 868,217 acres (351,354 ha) (total farms minus 14,877 acres (6,020 ha) orchards)
- Total CRP/ SAFE acres in the County (182,072 acres)/ total non-orchard farm acres (868,278 acres (351318 ha)) equals 21 percent CRP/SAFE
- Per changed circumstances, CRP/ SAFE can drop below 10 percent of current levels for 2 year duration. Contract renewal points occur at years 2018, 2026, 2021, and we assume at 10-year renewal points thereafter, for a total of 6 times during the 50-year term of the MSGCP.
- 10 percent of 182,072 acres (73,681 ha) equals 18,207 acres (7,368 ha)
- Assuming up to half of the acreage is signed onto the MSGCP, 9,104 acres (3684 ha) of CRP /SAFE may be converted and be associated with injury or mortality at 6 different 2-year periods during the life of the MSGCP.

Based on these assumptions and calculations, 9,104 acres of CRP/ SAFE are expected to be converted and may result in injury or mortality or significantly impair breeding feeding or sheltering behaviors at 6 different occasions during the life of the MSGCP for an estimated total of 54,612 acres (22,101 ha) of CRP/SAFE conversion over 50 years.

In summary, certain significant adverse effects to sharp-tailed grouse may occur over the 50-year term of the MSGCP as described above in the effects section, in Chapter 3 in the MSGCP, and in Appendix B, Table 2, of this conference opinion. The Washington State Recovery Plan for Sharp-tailed grouse (Stinson and Schroeder 2012, p. 93) lists four potential sage grouse recovery units in Douglas County, out of 22 units in Washington, and those units are expected to provide potential habitat, connectivity habitat, and/or and wintering habitat. Appendix C, Table 4, lists the recommended recovery or conservation strategies for the sharp-tailed grouse that are appropriate for private landowners to address, and how or whether the MSGCP addresses those recommendations. We anticipate that the implementation of BMPs under the MSGCP will temper the adverse effects of covered activities and will facilitate the reproduction, numbers, and distribution of sharp-tailed grouse by maintaining or improving habitat in Douglas County, and provide a long-term, net benefit for the sharp-tailed grouse and its habitat on a landscape scale.

CUMULATIVE EFFECTS: Sharp-tailed Grouse

Cumulative effects for the sharp-tailed grouse are similar to those already addressed under the general effects discussion above. Since current land-use activities are expected to continue, for lands not enrolled under the MSGCP, most of the threats to sharp-tailed grouse would also continue. Lands that are not enrolled in the MSGCP would likely remain similar to their current habitat condition, or there may be a higher likelihood of fire or development to occur. The loss of habitat on these non-enrolled lands will exacerbate the fragmentation of the landscape for sharp-tailed grouse. In summary, the sharp-tailed grouse will be affected by cumulative effects associated with the following activities within the action area:

- Ongoing development, including conversion to agriculture to residential and commercial housing.
- Changes in the amount and type of cover.
- Increases in predation, facilitated by changes in the amount and type of cover.
- Increases in predation from avian predators facilitated by electrical transmission lines and fences that provide perch sites.
- Changes in prey base availability and composition.
- Adverse effects of wind power facilities and transmission lines. Wind power guidelines will mitigate these impacts to some extent.
- Effects of long-term and short-term planning efforts by groups such as ALI, Washington Wildlife Habitat Connectivity Working Group, TNC, and the Sage Grouse Initiative.

Exposure to pesticides or herbicides or indirect decrease in cover or forage may occur. Pesticide application is not a covered activity under the MSGCP, and pesticide applications are likely to continue in Douglas County.

CONCLUSION: Sharp-tailed Grouse

The effects of the action include the direct and indirect effects of approval of the MSGCP on the sharp-tailed grouse, together with the effects of other activities that are interrelated or interdependent with this action, that will be added to the environmental baseline. We anticipate that the MSGCP will promote conservation efforts in the context of farm and ranch operations and provide a long-term, net benefit for the sharp-tailed grouse and its habitat on a landscape scale. However, certain significant adverse effects to sharp-tailed grouse may occcur. Adverse effects, including those that injure, kill, disturb, or impair breeding, feeding, or sheltering behaviors of sharp-tailed grouse are described above in the effects section, in Chapter 3 in the MSGCP, and in Appendix B, Table 2, of this conference opinion. These adverse effects may occur over the 50-year term of the MSGCP, although the exact timing and location of each impact will depend on the individual incidental take permits. These impacts include degradation or loss of habitat and a low incidence of injury or mortality. As sharp-tailed grouse numbers increase due to habitat improvements, the number of sharp-tailed grouse exposed to these adverse effects will increase. However, the resilience of the population to such impacts is also expected to increase.

Permittees that join the MSGCP will contribute to the conservation of sharp-tailed grouse and will implement measures consistent with many of the conservation measures listed in

Washington's Sharp-tailed Grouse Recovery Plan (Stinson and Schroeder 2012, pp. 97-117; Appendix A). Some of the conservation measures in the recovery plan are not addressed in the MSGCP (such as energy development or urban development measures) because they are not applicable to the Covered Activities. Appendix C, Table 3, lists the recommended conservation measures for the sharp-tailed grouse that are most applicable to private landowners, and how or whether the MSGCP addresses those recommendations. In general, the MSGCP addresses most of the recommendations, and the BMPs include: protecting sharp-tailed grouse populations from human disturbance, especially at leks; minimizing the likelihood of collision with fences; maintaining or improving riparian habitats; monitoring habitat over time; maintaining or improving habitats over time, especially shrub-steppe habitats; implementing Farm Bill programs to benefit the sharp-tailed grouse, managing rangelands and grazing to improve habitats, and cooperating on wildfire management with local fire districts. As displayed in Appendix C, Table 3, the Service anticipates that on lands enrolled in the MSGCP several conservation measures described in the Washington State Sharp-tailed Grouse Recovery Plan (Stinson and Schroeder 2012) would be largely met.

The WHCWG (2012, p. 64) looked at a composite "upland network" that analyzed the combined networks of three species closely associated with upland shrub-steppe habitat: sharp-tailed grouse, greater sage-grouse, and Washington ground squirrel. This analysis indicates that Douglas County provides important habitat concentration areas and linkages for the sharp-tailed grouse (p.66), and therefore the MSGCP is located in an important area and will support habitat concentration and linkages through implementation of BMPs including but not limited to the maintenance of shrub-steppe fragments and grazing prescriptions.

Initial queries by the FCCD indicate that about 50 percent of landowners are showing early interest in applying for permits under the MSGCP (Jon Merz, in litt., April 2, 2015). The more Permittees that join the MSGCP, the more that habitat for the sharp-tailed grouse and other covered species will improve as a result of implementation of the BMPs prescribed by the MSGCP. There are three main reasons why covered species, including the sharp-tailed grouse, still exist in Douglas County: 1) there are many fragments and blocks of habitat on private land throughout the County because of the shallow and rocky soils that are difficult or impossible to farm; 2) CRP/SAFE acres throughout the County provide habitat, cover, and forage for the covered species; and 3) there are large blocks of habitat (called HCAs) provided by WDFW, BLM, and TNC that are managed for wildlife or for multiple uses.

In the future, under the MSGCP, currently fragmented habitat will be maintained on enrolled farms. As described in the status of the species, and the effects section, sharp-tailed grouse in Douglas County use CRP habitats for nesting. The SAFE program is a component of CRP that further emphasizes habitat for sage-grouse and sharp-tailed grouse. The CRP habitat may vary in quantity depending on Farm Bill funding but, under the MSGCP enrolled farmers are to look for other programs if CRP or SAFE contracts are not renewed, to avoid farming those CRP acres if economically feasible, or if they cannot maintain those acres in conservation cover, CRP will be monitored across the County. If the CRP drops below 10 percent of the 2013 amount, then the FCCD will work with the Service and others to ensure that CRP returns to more than the 10 percent amount within 2 years. If that is not feasible, then the Service will revisit the MSGCP to determine if it still meets Section 10 issuance criteria and, if not, how and whether it can be

revised. If it cannot be revised, then permits may be revoked. Although HCA acres are not expected to decrease, monitoring will occur and, if they do drop by 10 percent across the County, FCCD and the Service will also reconvene to determine if the MSGCP is working as expected and, if necessary, permits may be revoked.

Based on the requirement to maintain fragments of shrub-steppe, because of the BMPs and changed circumstances addressing CRP and HCAs, and because habitat trends should improve on enrolled lands, the Service expects that habitats will continue to be available to support the survival of the sharp-tailed grouse in Douglas County for the duration of the MSGCP. As farmers and ranchers choose to participate, a net benefit will result in the form of improved habitat quality, and that is expected to result in improved populations. The benefits of improved habitats and populations, coupled with expected future augmentation efforts (WDFW 2012, p. 125) will increase the likelihood of connectivity and gene transfer that is necessary to maintain small populations (Stinson and Schroeder 2012, p. 67) of sharp-tailed grouse.

In summary, management to support habitat and subpopulations of sharp-tailed grouse will be implemented by landowners that join the MSGCP. The MSGCP will support maintenance and improvement of sharp-tailed grouse habitat through BMPs resulting in appropriate grazing management and maintenance of shrub-steppe fragments, and other measures. The MSGCP contains several provisions and methods that will allow for changes in conditions, including changed circumstances, and the ability to revise farm plans, site plans, or BMPs based on new information. For the sharp-tailed grouse, the adverse effects caused by Covered Activities are minimized by BMPs and are expected to be localized. Many will be temporary in nature. The BMPs associated with the Covered Activities will minimize and mitigate adverse effects and are consistent with Washington's recovery plan for the sharp-tailed grouse (Stinson and Schroeder 2012). Therefore, we do not anticipate that any decreases in the number, distribution, or reproduction of the Columbian sharp-tailed grouse in Washington or across its range, due to implementation of the MSGCP will reduce, appreciably, the likelihood of persistence of the species. After reviewing the current status of the sharp-tailed grouse, the environmental baseline for the action area, the effects of the action, and the cumulative effects, it is the Service's biological opinion that the issuance of section 10(a)(1)(B) permits under the MSGCP, as proposed, is not likely to jeopardize the continued existence of the Columbian sharp-tailed grouse. No critical habitat has been designated for the Columbian sharp-tailed grouse; therefore, none will be affected.

INCIDENTAL TAKE STATEMENT: Sharp-tailed Grouse

The Douglas County MSGCP conforms to a "framework programmatic action" as defined at 50 CFR 402.02 (80 FR 26832). Pursuant to the authority under 50 CFR 402.14(i)(6) of the implementing regulations for section 7 (80 FR 26832), an incidental take statement is not required at the programmatic level. Under the Douglas County GCP, the Service will issue incidental take permits under the authority of section 10(a)(1)(B) to applicants who commit to comply with the provisions of the plan based on a site-specific site plan, prepared in accordance with the plan, that is submitted to the Service with their permit application. If the permit application is complete and satisfies the statutory permit issuance criteria, the Service will issue a permit authorizing the incidental take of the sage grouse based on the site-specific details

provided in the site plan. In response to individual permit applications, the Service will conduct intra-Service section 7 consultation on the proposed permit action as is our customary practice. That consultation will rely on the fact-pattern specifics of the site plan and the analyses and findings presented herein as the basis for section 7(a)(2) determinations.

CONSERVATION RECOMMENDATIONS: Washington Ground squirrel, Sage-grouse, and Sharp-tailed Grouse

The conservation recommendation for the Conference Opinion is the same as that provided in the Biological Opinion for the CBPR and is here by incorporated by reference.

REINITIATION REQUIREMENT: Washington Ground squirrel, Sage-grouse, and Sharp-tailed Grouse

This concludes the conference with the Regional office on the issuance of incidental take permits for the Douglas County MSGCP. You may ask the EWFO to confirm the conference opinion as a biological opinion issued through formal consultation if any of the unlisted Covered Species become listed or critical habitat is designated. The request must be in writing. If the EWFO reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the EWFO will confirm the conference opinion as the biological opinion on the project and no further section 7 consultation will be necessary. After listing of the Covered Species as endangered threatened and or designation of critical habitat for the Covered Species and any subsequent adoption of this conference opinion, the Federal Agency shall request reinitiation of consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

The incidental take statement provided in this conference opinion does not become effective until the species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the project will be reviewed to determine whether any take of the Covered Species has occurred. Modification of the opinion and incidental take statement may be appropriate to reflect that take. No take of the Covered species may occur between the listing of the Covered species and the adoption of the conference opinion through formal consultation, or the completion of a subsequent formal consultation.

We appreciate the opportunity to work closely with you in attaining our mutual goals for the enhancement and recovery of listed species. If you have any further questions regarding this consultation, please contact Michelle Eames in the Eastern Washington Field Office at (509) 893-8010 or by email at Michelle_Eames@fws.gov.

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APPENDIX A, Species Recovery Needs

Appendix A: Covered Species Conservation and Recovery Needs

The following lists of conservation strategies list the main tasks, actions, or steps that are needed for conservation of the covered species. For more background or detail on the steps please refer to the referenced plans and reports. Yellow highlights indicate those measures that are most appropriate for agriculture landowners in Douglas County to address.

Columbia Basin Pygmy Rabbit

From the CBPR recovery plan (USFWS 2012 p.49-57).

Action 1: Manage partially controlled field-breeding for the Columbia Basin pygmy rabbit (CBPR).

1.1 – Identify, establish, and maintain enclosures for breeding and reintroduction efforts.

1.2 – Optimize the genetic and demographic characteristics of CBPR (see Recovery Action (RA) 2.4).

1.3 – Determine feasibility and need for retaining CBPR within one or more of the enclosures for future reintroduction efforts.

Action 2: Reestablish free-ranging CBPR subpopulations within their historical distribution.

2.1 – Manage recovery emphasis areas (see RA 4 and 5).

2.2 – Provide supplemental features at release sites to improve the survival (see RA 5.3).

2.3 – Identify appropriate source populations and translocate CBPR to support reintroduction efforts.

2.4 – Identify and release CBPR at the highest priority recovery emphasis area(s) (see RA 1.1, 3.1, and 5.5).

2.5 – Update the Reintroduction and Genetic Management Plan as necessary.

Action 3: Survey for, monitor, and assess free-ranging CBPR.

3.1 – Search for any remaining wild subpopulations.

3.2 – Monitor free-ranging subpopulations and document their status.

3.3 – Monitor and manage the diversity of free-ranging subpopulations.

3.4 – Continue to develop and refine abundance indices of overall and effective population sizes (see RA 3.2).

3.5 – Continue to assess and identify the appropriate population sizes, number, distribution, and configuration necessary to delist the CBPR (see RA 4, 5, and 6).

Action 4: Protect free-ranging CBPR.

4.1 – Evaluate and address the effects of predators on CBPR.

4.2 – Monitor for diseases and implement measures to treat infection and transmission in free-ranging CBPR.

4.3 – Identify and minimize the effects of human activities on CBPR.

4.4 – Enforce Federal regulations that protect CBPR from unauthorized “take” (see Glossary).

Action 5: Manage habitats at recovery emphasis areas and intervening properties.

5.1 – Investigate and refine estimates of the quantity and quality of habitats needed to support CBPR (see RA 3.5).

5.2 – Protect habitats at recovery emphasis areas and intervening properties (see RA 6).
5.3 – Investigate and implement enhancement and restoration measures to improve habitat quantity and quality for CBPRs.
5.4 – Document methods, treatments, timing, and results of all habitat enhancement, restoration, and protection projects undertaken for CBPR.
5.5 –Identify, assess, and prioritize potential recovery emphasis areas; formally establish recovery emphasis area(s) and provide recommendations to address habitat management needs at these sites (see RA 3.5 and 5.1).
5.6 –Through conservation agreements (see RA 6), incentives, conservation easements, and/or willing acquisition or exchange, increase the size of recovery emphasis areas.

Action 6: Pursue conservation agreements with landowners and managers of intervening properties within the population's historical distribution.

6.1 – Develop Site Plans under the existing SHA and issue associated Permits (see Stakeholder Involvement).
6.2 – Develop and provide guidelines and technical assistance to interested landowners and managers.
6.3 – Develop new HCPs.
6.4 – Continue to coordinate recovery efforts with various entities.
6.5 – Continue to identify and secure funding sources to implementation recovery actions, and/or to otherwise provide incentives for conservation efforts for CBPR (also RA 8).

Action 7: Exchange information with stakeholders and the general public to address concerns and increase support for CBPR recovery efforts.

7.1 – Continue to identify stakeholders and address issues of concern.
7.2 – Meet or otherwise contact stakeholders and other concerned parties to communicate recovery information and to solicit input.
7.3 – Engage local media through news releases and invitations to scheduled events to inform the public concerning recovery efforts for the CBPR.

Action 8: Secure funding for CBPR recovery efforts.

8.1 – Continue cooperative efforts with a diverse group of stakeholders in recovery implementation for the CBPR.
8.2 – Establish a cooperative framework for matching and cost-sharing Federal and non-Federal funding sources.
8.3 – Establish research and management connections between experts in pygmy rabbit biology and the greater shrub steppe ecosystem.

Action 9: Revise this Federal Recovery Plan to facilitate implementation of adaptive management measures considered necessary to achieve the phased recovery strategy.

9.1 – Revise Implementation Schedule.

Washington Ground Squirrel

Conservation Needs of the Washington Ground Squirrel based on the Service's candidate assessment (USFWS 2012 p.16-17):

1. Maintain remaining areas of suitable habitat and restore degraded habitat using a variety of tools appropriate for site-specific needs (e.g., thinning, mechanical treatment, burning or fire suppression, reseeding and plugging of native species).
2. Maintain populations as individual units where possible to prevent loss of genetic variation.
3. Create or maintain corridors between occupied sites to facilitate dispersal and genetic exchange among colonies. This may be achieved using widely spaced piles of wood or stones.
4. Re-establish normal fire cycles to encourage patchy (versus widespread) fire events. The appropriateness of this measure will depend on the site and methods used. Use of fire without subsequent seeding with natives may increase the amount of cheatgrass and other non-native species.
5. Monitor habitat and populations in both states and survey areas of potential habitat for squirrel sites.
6. Fund and carry out research in a variety of areas (e.g., monitoring effects of grazing, disease, herbicides, pesticides, noise, climate fluctuations, or translocation; studying demography, population dynamics, genetic variation, potential female dispersal, effectiveness of vegetation treatments, and potential for re-colonization of vacated sites).
7. Use translocation either 1) as a last resort from areas that will be developed, 2) to augment sites experiencing inbreeding depression or other loss of genetic variation, or 3) to reintroduce squirrels to suitable habitat. This alternative should be used with caution, and its effects should be closely monitored to determine whether it is successful.
8. Post, replace, and augment signs and patrol state and Federal property to increase public awareness regarding the species' status and protection where appropriate.
9. Encourage the reduction of shooting and poisoning, and enforce prohibition against shooting and poisoning where applicable.
10. Increase public education about the species and threats.
11. Encourage private landowners, organizations, and government land agencies to monitor and/or provide species protection.
12. Explore methods to restore developed areas to native condition and monitor results.
13. Combine monitoring or surveying where similar survey efforts are implemented (e.g., CBPR, sage-grouse, or hawk surveys).
14. Develop candidate conservation agreements for the Washington ground squirrel in both Oregon and Washington to implement a variety of conservation measures on private and public lands.
15. Since terminology of "colonies" and "detections" is not always consistent, conduct a range-wide GIS spatial analysis of all know detections and colonies to inform future range-wide comparisons.

Sage-Grouse

The Sage-Grouse has two conservation strategy guidance documents, one is Washington State's Greater Sage-grouse Recovery Plan (Stinson et al 2004 p.61-77), with main strategies and tasks listed below, and the second is the COT report, following this section. Yellow highlights indicate those measures that are most appropriate for agriculture landowners in Douglas County to address.

1. **Inventory and monitor the greater sage-grouse population in Washington.**
   - 1.1 Conduct lek counts and survey for lek complexes.
     - 1.1.1 Conduct annual lek counts.
     - 1.1.2 Conduct surveys for new leks.
   - 1.2 Coordinate data collection and maintenance.
   - 1.3 Estimate population size.
   - 1.4 Evaluate population trend.
2. **Protect sage-grouse populations.**
   - 2.1 Protect active sage-grouse leks from human disturbance.
     - 2.1.1 Avoid activities that interfere with sage-grouse at or near leks.
     - 2.1.2 Avoid potentially disturbing activities such as farming, mining, and recreation near leks (-2 km) between the hours of 1800 and 0900 during February-April.
     - 2.1.3 Provide advice to regulatory agencies and private landowners to minimize disturbance from construction and development activities, particularly within 1 km of breeding habitat during February - June.
     - 2.1.5 [sic] Treat lek locations as sensitive data.
   - 2.2 Protect nesting and brood rearing areas from disturbance.
   - 2.3 Minimize incidental mortality.
     - 2.3.1 Enforce regulations that protect sage-grouse from harm and harassment.
     - 2.3.2 Document incidents of illegal and accidental killing of sage-grouse and evaluate the need for remedies.
     - 2.3.3 Carefully review scientific collection permits issued by WDFW that involve disturbance or handling of sage-grouse.
   - 2.4 Reduce the collision and predation hazards posed by poles, wires, and fences.
     - 2.4.1 New powerlines and utilities should use existing corridors or be located so as to minimize collision risk and damage to habitat.
     - 2.4.2 Existing powerlines should be buried or modified with perch guards to prevent use as raptor perch sites.
     - 2.4.3 Remove unneeded fences in sage-grouse use areas.
   - 2.5 Minimize or eliminate exposure of sage-grouse to organophosphate insecticides.
3. **Enhance existing populations and re-establish additional populations.**
   - 3.1 Evaluate the feasibility of sage-grouse re-introductions.
     - 3.1.1 Identify additional sage-grouse management units that may require reintroductions and determine habitat restoration that will be needed to support populations.
   - 3.2 Conduct reintroductions and population augmentations.
     - 3.2.1 Develop scientifically approved protocol for sage-grouse translocations in Washington.

3.2.2 Conduct augmentations to existing populations to maintain genetic diversity.

3.2.3 Conduct reintroductions to re-establish populations in areas where sage-grouse have been extirpated and where assessments indicate that habitat is of sufficient quantity and quality to support populations.

3.3 Monitor and evaluate translocations.

3.3.1 Evaluate the success of the planned YTC translocation to determine if genetic diversity was improved.

4. Protect sage-grouse habitat on public lands.

4.1 Within Sage-Grouse Management Units, map shrub-steppe habitat into specific categories based on features that are significant to sage-grouse, including potential habitat type (breeding, brood-rearing, winter), management history, habitat quality, and suitability for sage-grouse, and prioritize for protection.

4.1.1 Prioritize habitat areas within the recovery area for protection.

4.1.2 Evaluate habitat capability of the Hanford Unit with existing vegetation maps, and assess need and feasibility of restoration.

4.1.3 Evaluate habitat connectivity and the capacity for sage-grouse movement between

Sage-grouse Management Units.

4.1.4 Rank sage-grouse habitat areas for ecoregional conservation assessments.

4.2 Protect habitat from fire.

4.2.1 Develop and implement fire management plans on public lands to prevent catastrophic destruction of sage-grouse habitat.

4.2.3 Work with local fire managers to protect shrub-steppe important to sage-grouse.

4.3 Protect important sage-grouse habitat on public lands from development and agricultural conversion.

4.3.1 Work with public agencies to minimize conversion of native shrub-steppe habitat.

Work with WDNR to identify important shrub-steppe habitat for sage-grouse.

4.3.2 Provide information to regulatory agencies about the potential for sage-grouse habitat loss from wind turbines and utility towers (U.S. Fish and Wildlife Service 2003b).

4.3.3 Provide technical advice to regulatory agencies to minimize the negative effects of energy and mining exploration, development, and construction activity in important sage-grouse habitats.

4.4 Ensure compatibility of grazing management on public lands managed for sage-grouse.

4.4.1 Where protection and restoration of sage-grouse is a major objective for public lands, manage grazing so that the habitat characteristics needed for breeding and wintering can be consistently maintained (Connelly et al. 2000b).

4.4.2 Minimize grazing damage to soil crusts.

4.4.3 Ensure that grazing leases on WDFW lands managed for sage-grouse are compatible with sage-grouse habitat needs (Connelly et al. 2000b, Schroeder et al. 2003).

4.4.4 Fence WDFW lands to exclude livestock when necessary to protect and restore sage-grouse habitat.

4.4.5 Evaluate the potential impact of elk wintering on WDFW lands on sage-grouse movement between populations, and identify and implement ways to minimize impacts.

4.5 Manage riparian habitats on public lands to support sage-grouse conservation.

4.5.1 Promote recovery of vegetation in riparian zones degraded by past over-grazing.

4.5.2 Avoid moderate to heavy livestock grazing, road development, and human disturbance in wet meadows.

4.6 Discourage expansion of road systems on public lands in management units.

4.6.1 Avoid adding new roads, trails, or right-of-ways.

4.6.2 Avoid improvements such as grading and widening of existing unpaved roads that receive little use.

4.6.3 Promote closures of unnecessary roads or those that are negatively impacting habitat quality.

4.7 Monitor changes in sage-grouse habitat through remote sensing and mapping.

5. Work with landowners to protect the most important sage-grouse habitat on private land.

5.1 Acquire easements when landowners are willing to negotiate conservation agreements.

5.2 Acquire habitat where there are willing sellers and when it provides the best option to protect and/or restore critical habitats.

5.2.1 Identify important parcels of sage-grouse habitat on private land that may be at risk of development or loss.

5.2.2 Work with landowners to determine if there are willing sellers of important habitats.

5.2.3 Use existing funding sources for potential acquisition, including the Washington Wildlife and Recreation Program (WWRP).

5.3 Provide advice to counties and regulatory agencies to increase protection of sage-grouse habitat.

6. Facilitate and promote the use of incentives, such as Farm Bill conservation programs, to benefit sage-grouse.

6.1 Assist landowners by providing information, advice, or materials for implementing incentive programs available for habitat protection and restoration.

6.1.1 Identify the best local opportunities for enhancing sage-grouse habitat and assist landowners interested in incentive programs.

6.1.2 Assist with securing grants for conservation easements or habitat protection and restoration through 2002 Farm Bill programs such as CRP, Wildlife Habitat Incentives Program and Grassland Reserve Program.

6.1.3 Provide technical assistance or materials to landowners to enhance habitat value above the minimum requirements of Farm Bill conservation programs.

6.2 Provide technical advice to the Natural Resources Conservation Service and the Farm Service Agency for the implementation of Farm Bill programs (CRP, GRP, WHIP, etc.) at the local, state and national level to facilitate sage-grouse conservation in Washington and to ensure the wildlife conservation benefits intended by Congress.

6.2.1 Identify priority areas in Washington where Farm Bill programs have the greatest potential to benefit sage-grouse.

Prioritize areas within the Sage-grouse Management Units with current populations or with a high potential to support sage-grouse range expansion.
6.2.2 Provide technical advice on planting requirements and management practices to enhance or restore potential sage-grouse habitat.
6.2.3 Review and comment during rule-making at the national level to ensure that Farm Bill programs continue to benefit sage-grouse in Washington.

7. Facilitate management of agricultural and range lands that is compatible with the conservation of sage-grouse.

7.1 Promote the protection of remnant areas of native shrub-steppe.
7.1.1 Encourage the protection of remnant shrub-steppe by providing information about the importance of shrub-steppe remnants in the matrix of CRP and croplands.
7.1.2 Discourage burning of CRP and vegetation along the edges of farm fields and roadsides, particularly where remnant patches of shrub-steppe may be burned in the process.
7.1.3 Discourage spraying practices that result in the accidental or incidental spraying of remnant areas of shrub-steppe with insecticides and herbicides.
7.1.4 Promote removal of old fences, unused equipment, and refuse from shrub-steppe remnants.
7.2 Work with range managers interested in sage-grouse conservation to utilize range management practices that result in increased habitat value for sage-grouse.
7.2.1 Support range management practices that result in retention of residual perennial grass cover and healthy communities of native perennial grasses and the associated forb and shrub communities.
7.2.2 Discourage development of additional springs and underground water wells for livestock, unless it can be shown that the result will benefit sage-grouse.
7.2.3 Discourage removal of sagebrush from known sage-grouse wintering areas and areas that provide escape cover in breeding habitat, especially within 3 km of leks.
7.2.4 Establish grass banks to provide alternative range during drought.
7.3 Promote agricultural practices which use fewer chemicals.
7.3.1 Discourage use of organophosphorus and carbamate insecticides in sage-grouse brood-rearing habitats.
7.3.2 Promote management strategies which minimize the potential exposure of sage-grouse to pesticides.
7.4 Promote agricultural practices which result in improved soil conservation, such as reduced tillage and stubble retention.

8. Restore degraded and burned sage-grouse habitat within Sage-Grouse Management Units.

8.1. Identify and prioritize areas for restoration.
8.2. Prepare contingency plans for habitat restoration to be used after wildfires.
8.3. Restore degraded sage-grouse habitat.
8.3.1 Shrub-steppe restoration projects should use native seed sources.
8.3.2. Suppress cheatgrass and weeds.
8.3.3 Restore bunchgrass and native forb understory to degraded areas.
8.3.4 Re-establish sagebrush where the shrub component has been lost.

8.3.5 Restore degraded wet meadows or vegetation at developed springs.

8.4 Document methods, treatments, timing, and results of all restoration projects.

9. Conduct research necessary to conserve sage-grouse populations.

9.1 Monitor the genetic health of sage-grouse populations.

9.2 Evaluate and adapt population monitoring techniques.

9.3 Investigate the demographics and population dynamics of sage-grouse.

9.4 Research methods for increasing the populations of sage-grouse, such as reducing predation through manipulation of habitat features.

9.5 Determine the effectiveness of habitat management methodologies.

9.5.1 Evaluate the importance of CRP lands in relation to sage-grouse abundance and distribution.

9.5.2 Monitor wildlife responses to restoration efforts.

9.6 Research practical methods for restoring the forb component required by sage-grouse.

10. Cooperate and coordinate with other agencies and landowners in the conservation, protection, and restoration of sage-grouse in Washington.

10.1 Participate in the development of a multi-agency conservation action plan.

10.2 Secure funding for recovery activities.

10.3 Participate in the interagency Washington Sage-grouse Working Group.

10.4 Assist with and provide technical advice for the development of the Foster Creek Conservation District Habitat Conservation Plan in Douglas County.

10.5 Help facilitate the exchange and dissemination of information about shrub-steppe restoration and management for sage-grouse.

10.5.1 Participate in the Washington Shrub-Steppe Working Group

10.5.2 Help facilitate exchange of information between WDFW wildlife area managers and other land managers and scientists working on shrub-steppe restoration.

11. Develop public information materials and educational programs for landowners, schools, community organizations, and conservation groups as needed.

11.1 Create and distribute updated fact sheets, management recommendations, and video or slide shows on the status and recovery needs of sage-grouse in Washington.

11.1.1 Develop educational materials.

11.1.2 Priority Species (PHS) Management Recommendations for sage-grouse.

Conservation Goals for sage-grouse from the Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report (COT Report; USFWS 2013)

General Conservation Objectives (p.31-35)

1. Stop population declines and habitat loss.

2. Implement targeted habitat management and restoration.

3. Develop and implement state and federal sage-grouse conservation strategies and associated incentive-based conservation actions and regulatory mechanisms.

4. Develop and implement proactive, voluntary conservation actions.

5. Develop and implement monitoring plans to track the success of state and federal conservation strategies and voluntary conservation actions.

6. Prioritize, fund, and implement research to address existing uncertainties.

Specific Conservation Objectives (p.37-38)

The objectives are targeted at Priority Areas for Conservation (PACs), but can be applied to sage-grouse habitats outside of PACs.

1. Retain sage-grouse habitats within PACs. This must be a priority. Restoration of these habitats, once lost, is difficult, expensive, and based on current knowledge, success may be limited.

2. If PACs are lost to catastrophic events, implement appropriate restoration efforts (Pyke 2011). Given that adequate restoration is often very difficult and takes many years, in addition to restoration, efforts should be made to restore the components lost within the PAC (e.g., redundancy or representation) in other areas such that there is no net loss of sage-grouse or their habitats.

3. Restore and rehabilitate degraded sage-grouse habitats in PACs. This will require sufficient funding and resources, a scientifically rigorous monitoring plan, and the ability to change management if the monitoring results so indicate.

4. Identify areas and habitats outside of PACs which may be necessary to maintain the viability of sage-grouse. If development or vegetation manipulation activities outside of PACs are proposed, the project proponent should work with federal, state or local agencies and interested stakeholders to ensure consistency with sage-grouse habitat needs.

5. Re-evaluate the status of PACs and adjacent sage-grouse habitat at least once every 5

years, or when important new information becomes available (e.g. identification of a previously unknown important winter habitat area). PAC boundaries should be adjusted based on new information regarding habitat suitability and refined mapping techniques, new genetic connectivity information, and new or updated information on seasonal range delineation. By maintaining current maps of the habitat areas necessary to provide redundancy and representation, conservation plans can be more accurately implemented, or modified if appropriate. Additionally, new restoration or rehabilitation opportunities may be identified, thereby increasing management flexibility. Basing management decisions on out-of-date data or natural resource dogma (Beck *et al*. 2012) may threaten the success of long-term conservation actions and conservation plans.

6. Actively pursue opportunities to increase occupancy and connectivity between PACs. Some areas that were not included as PACs may still have great potential for providing important habitat if active habitat management is implemented.

7. Maintain or improve existing habitat conditions in areas adjacent to burned habitat. In the late summer of 2012, several large wildfires in the Great Basin burned through sage-grouse habitats, including PACs (Figure 3). Significant sage-grouse habitat losses were sustained in PACs across California, Nevada, Idaho and Oregon, and in PACs that border those state boundaries. Acreage within fire perimeters in PACs total 265,151 acres in California, 486,293 acres in Nevada, 286,820 acres in Idaho, and 695,619 acres in Oregon. The resulting, immediate loss of habitat raises concerns for the capacity of at least some of those PACs to sustain sage-grouse populations. The unburned portions of these PACs cannot tolerate further impacts to sage-grouse without risking additional population declines. Funding for restoration activities to restore habitat and connectivity in these areas must be a priority. Minimizing or eliminating anthropogenic activities in surrounding, unburned PACs and sage-grouse habitats outside of PACs must also be a priority to enhance opportunities for re-establishment of connectivity among populations, and subsequent re-colonization of restored areas. Management actions within those surrounding PACs must strive to maintain or improve existing habitat conditions so that when a fire occurs, there is a greater chance for successful habitat recovery. Research to understand sage-grouse response to these fires should be prioritized so that any appropriate management modifications, including the modification or addition of PACs, can be implemented.

Threat Reduction

The following threat reductions objectives apply to PACs, but all opportunities to reduce threats within sage-grouse habitats should be considered. Pages 40-52 of the COT report provide more detail on conservation measures and conservation options to address some of the threats listed in Table 1 below.

Table 1. COT Report Threats and Conservation Objectives (p.38-52).

Threat	*Conservation Objective, Conservation Measures, and Conservation Options where relevant*
Fire	Retain and restore healthy native sagebrush plant communities

	within the range of sage-grouse. 1. Restrict or contain fire within the normal range of fire activity (assuming a healthy native perennial sagebrush community), including size and frequency, as defined by the best available science. 2. Eliminate intentional fires in sagebrush habitats, including prescribed burning of breeding and winter habitats. 3. Design and implement restoration of burned sagebrush habitats to allow for natural succession to healthy native sagebrush plant communities. This will necessitate an intensive and well-funded monitoring system for this long-term endeavor. To be considered successful, restoration must also result in returning or increasing sage-grouse populations within burned areas. 4. Implement monitoring programs for restoration activities. To ensure success, monitoring must continue until restoration is complete (establishment of mature, healthy native sagebrush plant communities), with sufficient commitments to make adequate corrections to management efforts if needed. 5. Immediately suppress fire in all sagebrush habitats. Where resources are limited, these actions should first focus on PACs and any identified connectivity corridors between PACs.
Non-native, Invasive Plant Species	Maintain and restore healthy, native sagebrush plant communities. 1. Retain all remaining large intact sagebrush patches, particularly at low elevations. 2. Reduce or eliminate disturbances that promote the spread of these invasive species, such as reducing fires to a “normal range” of fire activity for the local ecosystem, employing grazing management that maintains the perennial native grass and shrub community appropriate to the local site, reducing impacts from any source that allows for the invasion by these species into undisturbed sagebrush habitats, and precluding the use of treatments intended to remove sagebrush. 3. Monitor and control invasive vegetation post-wildfire for at least three years. 4. Require best management practices for construction projects in and adjacent to sagebrush habitats to prevent invasion. 5. Restore altered ecosystems such that non-native invasive plants are reduced to levels that do not put the area at risk of conversion if a catastrophic event were to occur. This is

	especially important within Wyoming big sagebrush communities as these cover types are the most at risk to displacement by cheatgrass (Wisdom et al. 2005). While complete elimination of non-native invasive plants would be ideal, we acknowledge that this is unlikely given our current understanding of underlying ecological processes, shifts in climate, and lack of resources.
Energy Development	Energy development should be designed to ensure that it will not impinge upon stable or increasing sage-grouse population trends. 1. Avoid energy development in PACs (Doherty et al. 2010). Identify areas where leasing is not acceptable, or not acceptable without stipulations for surface occupancy that maintains sage-grouse habitats. 2. If avoidance is not possible within PACs due to pre-existing valid rights, adjacent development, or split estate issues, development should only occur in non-habitat areas, including all appurtenant structures, with an adequate buffer that is sufficient to preclude impacts to sage-grouse habitat from noise, and other human activities. 3. If development must occur in sage-grouse habitats due to existing rights and lack of reasonable alternative avoidance measures, the development should occur in the least suitable habitat for sage-grouse and be designed to ensure at a minimum that there are no detectable declines in sage-grouse population trends (and seek increases if possible) by implementing the following: a. Reduce and maintain the density of energy structures below which there are not impacts to the function of the sage-grouse habitats (as measured by no declines in sage-grouse use), or do not result in declines in sage-grouse populations within PACs. b. Design development outside PACs to maintain populations within adjacent PACs and allow for connectivity among PACs. c. Consolidate structures and infrastructure associated with energy development. d. Reclamation of disturbance resulting from a proposed project should only be considered as mitigation for those impacts, not portrayed as minimization. e. Design development to minimize tall structures (turbines, powerlines), or other features associated with the development (e.g., noise from drilling or ongoing

	operations; Blickley et al. 2012).
Sagebrush Removal	Avoid sagebrush removal or manipulation in sage-grouse breeding or wintering habitats.
Grazing	Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover). Areas which do not currently meet this standard should be managed to restore these components. Adequate monitoring of grazing strategies and their results, with necessary changes in strategies, is essential to ensuring that desired ecological conditions and sage-grouse response are achieved.
Range Management Structures	Avoid or reduce the impact of range management structures on sage-grouse. 1. Range management structures should be designed and placed to be neutral or beneficial to sage-grouse. 2. Structures that are currently contributing to negative impacts to either sage-grouse or their habitats should be removed or modified to remove the threat.
Free-Roaming Equid Management	Protect sage-grouse from the negative influences of grazing by free roaming equids. Conservation measures are included in the COT Report (p.46-47), but not listed here because not relevant to MSGCP action area.
Pinyon-juniper Expansion	Remove pinyon-juniper from areas of sagebrush that are most likely to support sage-grouse (post-removal) at a rate that is at least equal to the rate of pinyon-juniper incursion. Conservation measures are included in the COT Report (p.47-48), but not listed here because not relevant to MSGCP action area.
Agricultural Conversion	Avoid further loss of sagebrush habitat for agricultural activities (both plant and animal production) and prioritize restoration. In areas where taking agricultural lands out of production has benefited sage-grouse, the programs supporting these actions should be targeted and continued (e.g. CRP/SAFE). Threat amelioration activities should, at a minimum, be prioritized within PACs, but should be considered in all sage-grouse habitats. Conservation Option 4: If lands that provide seasonal habitats for sage-grouse are taken out of a voluntary program, such as CRP or SAFE, precautions should be taken to ensure withdrawal of the lands minimizes the risk of direct take of sage-grouse (e.g., timing to avoid nesting season). Voluntary incentives should be implemented to increase the amount of sage-grouse habitats enrolled in these programs.

Mining	Maintain stable to increasing sage-grouse populations and no net loss of sage-grouse habitats in areas affected by mining.
Recreation	In areas subjected to recreational activities, maintain healthy native sagebrush communities based on local ecological conditions and with consideration of drought conditions, and manage direct and indirect human disturbance (including noise) to avoid interruption of normal sage-grouse behavior.
Ex-Urban Development	Limit urban and exurban development in sage-grouse habitats and maintain intact native sagebrush plant communities.
Infrastructure (e.g., roads, pipelines, powerlines, and cellular towers)	Avoid development of infrastructure within PACs. [Conservation measures and options address non-agricultural infrastructure.]
Fences	Minimize the impact of fences on sage-grouse populations. Conservation Options: 1. Mark fences that are in high risk areas for collision (Stevens et al. 2012) with permanent flagging or other suitable device to reduce sage-grouse collisions on flat to gently rolling terrain in areas of moderate to high fence densities (i.e., more than 1 km of fence per km2) located within 2 kms of occupied leks. 2. Identify and remove unnecessary fences. 3. Placement of new fences and livestock management facilities (including corrals, loading facilities, water tanks and windmills) should consider their impact on sage-grouse and, to the extent practicable, be placed at least 1 km from occupied leks (Stevens et al. 2012).

Sharp-tailed Grouse

Recovery Strategies and Tasks for the Sharp-tailed Grouse
(Stinson and Schroeder 2012 p. 97-116)

1. Protect sharp-tailed grouse populations.

1.1. Reduce the collision hazards posed by wires and fences in sharp-tailed grouse habitat.

1.1.1 Promote removal of fences, powerlines, cables, and poles that are no longer in use.

1.1.2 Mark existing fences in areas occupied by sharp-tailed grouse to increase visibility.

1.1.3 Modify existing fences to minimize collision hazard.

1.1.4 Minimize proliferation of additional power lines, towers, and fences.

1.2 Identify and minimize other human-related and natural sources of mortality.

1.2.1 Document incidents of illegal and accidental shooting of sharp-tailed grouse and evaluate the need for remedies.

1.2.2 Minimize accidental killing of sharp-tailed grouse during hunting or falconry seasons.

1.2.3 Minimize destruction of nests during haying and tilling and by livestock trampling.

1.2.4 Minimize the risk of exposing sharp-tailed grouse to histomoniasis or other diseases by reducing overlap of sharp-tailed grouse and pheasant releases.

1.2.5 Reduce sources of disease vectors such as mosquitos.

1.3 Reduce predation by human-associated predators.

1.3.1 Where feasible, eliminate poles, posts and structures used for nesting.

1.3.2 Existing utility poles should be modified with perch guards to prevent use as raptor perch sites.

1.3.3 Promote removal of human-related food sources for corvids, raptors, and carnivores.

1.4 Protect sharp-tailed grouse from human-related disturbance.

1.4.1 Identify any human-related disturbance factors and avoid disturbing activities such as gravel crushing, ORV use, and recreation near leks (≈ 2 km).

1.4.2 Treat lek locations as sensitive data.

2. Protect sharp-tailed grouse habitat.

2.1 Conduct additional fine scale analysis of habitats to identify locations to reestablish additional sharp-tailed grouse populations and movement corridors.

2.2 Ensure compatibility of grazing management on public lands in the sharp-tailed grouse recovery area.

2.2.1 Ensure that grazing leases on WDFW lands are compatible with sharp-tailed grouse habitat needs.

2.3 Manage riparian and meadow habitats on public lands to support sharp-tailed Grouse.

2.3.3 Control reed canarygrass to restore woody vegetation in riparian areas.

2.3.4 Remove white poplar and other exotic trees.

2.4 Discourage expansion of roads and transmission lines on public lands in sharp-tailed grouse recovery units.

2.4.1 Avoid adding new roads, ORV trails, electrical transmission lines or rights of-way that would destroy or fragment habitat or isolate populations.

2.4.2 Avoid improvements such as grading and widening of existing unpaved roads that receive little use.

2.4.3 Promote closures of unnecessary roads or those negatively impacting habitat quality.

2.5 Facilitate management of private agricultural and rangelands that is compatible with the conservation of sharp-tailed grouse.

2.5.1 Promote the protection of remnant areas of native grassland and shrubsteppe.

2.5.2 Discourage burning of CRP and vegetation along the edges of farm fields and roadsides where patches of shrub-steppe may be burned in the process.

2.5.3 Work with landowners to avoid impacts on grouse nests and young broods when converting former CRP fields to grain.

2.5.4 Discourage use of insecticides and herbicides in grouse brood-rearing habitats and spraying practices that damage areas of native steppe.

2.6 Protect shrub-steppe habitat by reducing the risk and effects of wildfires.

2.6.1 Reduce fire risk in shrub-steppe on WDFW lands and encourage appropriate fire management measures on other public lands.

2.6.2 Work with owners of private lands near and adjacent to WDFW and other public lands essential to sharp-tailed grouse at high risk of damaging fires to reduce risk of fires.

2.6.3 Aggressively control wildfires on WDFW wildlife areas where and when they will cause lasting damage to sharp-tailed grouse habitat.

2.7 Protect essential sharp-tailed grouse habitat through easements, cooperative agreements, and acquisitions.

2.7.1 Use conservation easements or purchase of development rights agreements to keep large ranches intact and protect sharp-tailed grouse habitat.

2.7.2 Consider acquisitions of important habitat if there are willing sellers and when it provides the best option to protect and/or restore critical habitats.

2.8 Provide data, information, and technical advice to conservation districts, counties, regulatory agencies, and landowners to increase protection of sharp-tailed grouse habitat.

2.8.1 Identify public lands important for sharp-tailed grouse conservation and recovery and provide that information to managing agencies.

2.8.2 As opportunities arise, work with WDNR, tribes, BLM, and other agencies to protect sharp-tailed grouse habitat.

2.8.3 Provide technical assistance to counties to minimize the effects of development on sharp-tailed grouse habitat.

2.8.4 Update WDFW PHS maps as needed to include sharp-tailed grouse nesting, brood-rearing, and winter habitat.

2.8.5 Periodically update and revise WDFW's Priority Habitats and Species (PHS) management recommendations for the sharp-tailed grouse.

2.8.6 Provide technical assistance to counties to minimize the effects of roadside spraying and road maintenance on sharp-tailed grouse habitat, including woody riparian vegetation.

2.9 Update planning documents and policies to facilitate recovery of sharp-tailed grouse.

2.9.1 Update WDFW Wildlife Area Management Plans with current sharp-tailed grouse management needs.

2.9.2 Develop and maintain a 5-year recovery task list to help identify and prioritize the most immediate conservation needs.

2.9.3 Revise recovery objectives, recovery area map, and strategies for the sharp-tailed grouse as needed.

3. Enhance or restore sharp-tailed grouse habitat.

3.1 Analyze current habitat conditions to identify focus areas for enhancement or restoration.

3.2 Enhance or restore sharp-tailed grouse habitat on WDFW lands.

3.2.1 Enhance or restore upland sharp-tailed grouse areas, including older CRP fields, grain and hay fields using native grasses, forbs, and selected shrubs.

3.2.2 Enhance or restore riparian deciduous shrubs and trees, including seviceberry, water birch, chokecherry, hawthorn, *Rosa* spp., and aspen.

3.2.3 Control conifer invasion in meadow steppe/grassland communities using cutting, removal, and/or experimental prescribed burns, where appropriate.

3.3. Facilitate sharp-tailed grouse habitat enhancement and restoration on other public and private lands.

3.3.1 As opportunities occur, assist BLM, WDNR, TNC, and land trusts in the enhancement and restoration of healthy shrub-steppe, grasslands and riparian deciduous shrubs to improve habitat for sharp-tailed grouse.

3.3.2 Facilitate funding for habitat management for sharp-tailed grouse on BLM, WDNR, TNC, and land trusts lands.

3.3.3 Identify the best local opportunities for enhancing sharp-tailed grouse habitat on private lands.

3.3.4 Assist with securing grants for conservation easements, purchase of development rights, or habitat protection and restoration through various Farm Bill programs and other programs.

3.3.5 Provide technical assistance and materials to landowners, such as cost-share for seed mixes that enhance sharp-tailed grouse habitat value of plantings above the minimum requirements of Farm Bill conservation programs.

4. Inventory and monitor sharp-tailed grouse populations.

4.1 Monitor the status of known sharp-tailed grouse populations.

4.1.1 Conduct annual lek counts.

4.1.2 Conduct inventory surveys for new or shifting leks.

4.1.3 Collect feather, blood, or other samples as needed to monitor the genetic health of populations.

4.2 Coordinate cooperative surveys, monitoring, and data.

4.2.1 Coordinate data exchange and cooperative survey efforts with the Colville Confederated Tribes, BLM, and other cooperators.

4.2.2 Maintain a statewide database of sharp-tailed grouse survey efforts and detections

4.3 Estimate population size and monitor trend.

5. Augment existing populations and establish new populations.

5.1 Identify and prioritize population augmentation needs.

5.2 Evaluate feasibility of locations to support reintroduced populations.

5.3 Conduct augmentations and reintroductions.

5.3.1 Develop augmentation or reintroduction plans for local areas where needed.

5.3.2 Where predation is demonstrated to cause excessive nest, chick, or hen mortalities, conduct limited predator control during reintroduction or augmentation projects.

5.3.3 Conduct translocations of sharp-tailed grouse.

5.3.4 Monitor the survival and productivity of translocated individuals.

5.4 Evaluate success of augmentations and reintroductions.

5.5 Revise recovery objectives, maps, documents as needed.

6. Conduct research necessary to conserve and restore sharp-tailed grouse populations.

6.1 Investigate life history, demographics, and population dynamics of sharp-tailed grouse.

6.1.1 Investigate survival, productivity, and sources of mortality to identify vulnerable life stages and suggest means of improving survival of sharp-tailed grouse in Washington.

6.1.2 Investigate dynamics of sharp-tailed grouse populations to facilitate estimates of minimum viable populations and modeling of extinction risks.

6.2 Conduct research on habitat needs, seasonal movements, and dispersal.

6.2.1 Evaluate the nutritional value of water birch and other native species for sharp-tailed grouse.

6.2.2 Develop a landscape model of year-round habitats that can be used to evaluate potential reintroduction areas.

6. 3 Develop methods of monitoring and improving the genetic health of sharp-tailed grouse populations.

6.4 Improve methods for restoring and maintaining sharp-tail habitat, including planting and prescribed burns.

6.4.1 Improve methods of restoring native vegetation and controlling weeds.

6.4.2 Evaluate the effectiveness of prescribed burns in meadow steppe/grassland communities to control conifer invasion, maintain grassland, and improve habitat for sharp-tailed grouse.

6.5 Assess potential impacts of competition with wild turkeys.

6.6 Estimate the minimum viable population of sharp-tailed grouse and develop spatially explicit viability assessment for Washington.

7. Coordinate and cooperate with other agencies, landowners, and private groups in the conservation, protection, and restoration of sharp-tailed grouse in Washington.

7.1 Implement Farm Bill programs to benefit sharp-tailed grouse.

7.1.1 Identify priority areas in Washington where Farm Bill programs have the greatest potential to benefit sharp-tailed grouse.

7.1.2 Provide technical advice on planting requirements and management practices to enhance or restore potential sharp-tailed grouse habitat.

7.1.3 Review and comment during rule-making at the national level to ensure that Farm Bill programs continue to benefit sharp-tailed grouse in Washington and elsewhere.

7.2 Facilitate/participate information exchange and meetings to implement recovery actions and habitat restoration.

8. Develop public information and education programs.

8.1 Develop and provide identification material to hunters to minimize incidental hunting mortality.

8.2 Develop an education and outreach strategy.

8.2.1 Develop and disseminate information, education and interpretation materials about sharp-tailed grouse and recovery needs in Washington.

8.2.2 Identify media sponsors and public outreach and education partners to increase public knowledge and cooperation with recovery actions.

8.2.3 As populations recover, establish a Wildwatch video camera station at a lek, **or a controlled access, public viewing/photo blind at a lek.**

9. Secure funding for recovery activities.

9.1 Secure funding for research, translocations, education, etc.

9.2 Secure funding for habitat acquisition, improvement.

APPENDIX B

Table 1, Pygmy Rabbit and Washington Ground Squirrel Species Effects Matrix
Table 2, Sage-Grouse and Sharp-tailed Grouse Species Effects Matrix

Appendix B, Table 1. Covered Activity Effects Analysis Summary for Columbia Basin Pygmy Rabbit (CBPR) and Washington Ground Squirrel (WAGS). Conservation Practices (CP), Land Use Measures, and Species Specific Measures all from MSGCP Appendix E.

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
Dryland farming general effects		Dryland Farming general effects: maintaining existing levels of habitat fragmentation of deep-soil habitat, potentially increasing weeds and invasives; ongoing impact to deep soil habitat; bare ground may limit dispersal and increase vulnerability to predation, decreasing connectivity. Certain farming activities (e.g., equipment staging and storage, field access, pest control) on suitable, undeveloped habitats adjacent to crop fields could potentially impact the CBPR OR WAGS as a result of disturbance or damage to burrow systems and direct injury or mortality of individual animals. Injury or mortality may occur from impacts to individual CBPR OR WAGSs, through impacts to burrows, or indirectly through loss of cover resulting in predation. Mortality could occur through mowing, burning, plowing, brush/beating, predator control, moving and herding livestock in CBPR OR WAGS occupied areas, or concentrating livestock operations in occupied areas. The mortality could occur from machinery, livestock trampling, or impacts to burrows especially maternal burrows. The likelihood of killing or injuring a CBPR or WAGS from these measures is probably small, but increases as the exposed population increases.		Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	CBPR and WA GS measures require notification prior to any habitat-altering activities in known occupied habitats; and animals may be moved by WDFW or FWS. Changed circumstances requirement to monitor levels of CRP/SAFE in County; if drops by 10 percent 2 years to improve; if can't get there come back to table to analyze adequacy of GCP. If CRP/SAFE parcels are converted, remnant patches of shrub-steppe within the CRP will be maintained and protected from degradation. Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain. Avoid recreational shooting or poisoning of WAGS; contact USFWS or WDFW if threat to crops.
1.1 Dryland Ag: Conversion	Mowing native habitat	Mortality from being hit by machines. Loss of habitat, increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability.		Dryland Agriculture measures: Conversion of Conservation Cover to Active Farming 1-3; Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	CBPR and WA GS measures require 30-day minimum notification prior to any habitat-altering activities in known occupied habitats; and animals may be moved by WDFW or USFWS. Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.1 (cont.)	Burning native habitat	Mortality from being burned. Loss of habitat, increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability.		Dryland Agriculture measures: Conversion of Conservation Cover to Active Farming 1-3; Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	CBPR and WA GS measures require 30-days notification prior to any habitat-altering activities in known occupied habitats; and animals may be moved by WDFW or US FWS. Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain. In occupied WAGS habitat avoid cultivating lands that contain active ground squirrel colonies. If habitat conversion activities or CRP/SAFE takeout must be done, avoid January 21 to June 30.
1.1 (cont.)	plowing native habitat	Mortality from being hit by machines. Loss of habitat, increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability.		Dryland Agriculture measures: Conversion of Conservation Cover to Active Farming 1-3; Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	CBPR and WA GS measures require notification prior to any habitat-altering activities in known occupied habitats; and animals may be moved by WDFW or USFWS. Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
1.1 (cont.)	Mowing CRP/SAFE	Mortality from being hit by machines. Loss of habitat, increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability. Pygmy rabbits were documented using a CRP field adjacent to native shrub steppe likely for travel and foraging, and in an abandoned wheat field that was dominated by big sagebrush where burrows occurred adjacent to existing shrub-steppe.		Dryland Agriculture measures: Conversion of Conservation Cover to Active Farming 1-3; Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	CBPR and WA GS measures require notification prior to any habitat-altering activities in known occupied habitats; and animals may be moved by WDFW or FWS. Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.1 (cont.)	Burning CRP/SAFE	Mortality from burning. Loss of habitat, increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability if habitat is made less suitable or unsuitable.		Dryland Agriculture measures: Conversion of Conservation Cover to Active Farming 1-3; Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	CBPR and WA GS measures require notification prior to any habitat-altering activities in known occupied habitats; and animals may be moved by WDFW or FWS. Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
1.1 (cont.)	plowing CRP/SAFE lands	Mortality from being hit by machines. Loss of habitat, increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability.		Dryland Agriculture measures: Conversion of Conservation Cover to Active Farming 1-3; Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	CBPR and WA GS measures require notification prior to any habitat-altering activities in known occupied habitats; and animals may be moved by WDFW or FWS. Changed circumstances requirement to monitor levels of CRP/SAFE in County; if drops by 10 percent 2 years to improve; if can't get there come back to table to analyze adequacy of GCP. Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.2 Dryland Ag: Field Preparation	-Mowing burning stubble -Plowing, disking, harrowing -Roughing, -coil packing -Rock pile removal - rock picking	See general dryland farming effects. Noise/disturbance effects: possible effects but the magnitude for pygmy rabbits is not known. Removal of rocks may result in less cover for dispersing individuals. It is possible, although considered very unlikely, that farming activities on existing crop fields could directly injure or kill dispersing CBPR OR WAGS, or make them more vulnerable to predation due to a lack of cover on these developed lands. The mortality could occur from machinery. Injury or mortality may occur from impacts to individual CBPR OR WAGSs, through impacts to burrows, or indirectly through loss of cover resulting in predation. Mortality could occur through mowing, burning, plowing. Low risk of direct mortality; pygmy rabbits likely to use fields for dispersal but not for breeding or residing.	338 prescribed burning	Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain. In occupied WAGS habitat avoid cultivating lands that contain active ground squirrel colonies. If habitat conversion activities or CRP/SAFE takeout must be done, avoid January 21 to June 15 30.
1.3 Dryland Ag: Weed/Pest Control*	Sub-soiling, rod-weeding, burning	Burning affects same as for CRP burning above. Injury or mortality may occur from impacts to individual CBPR OR WAGSs, through impacts to burrows, or indirectly through loss of cover resulting in predation. Mortality could occur through burning. The mortality from machinery through impacts to burrows especially maternal burrows, resulting in impairments to breeding and reproduction. The likelihood of killing or injuring a CBPR OR WAGS from these measures is probably small, but increases as the exposed population increases.	315 herb weed control 595 pest management	Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	CBPR and WA GS: Utilize IPM practices that consider the range of treatment options.
1.4 Dryland Ag: Farm Infrastructure	Road Management	Mortality from vehicles or machinery. Increase in invasive species, or increased fragmentation and reduction in cover resulting in increased vulnerability to predation.	560 Access Road		Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.4 (cont.)	Structures (fences, etc.)	Impacts to burrows during construction resulting in harm or mortality. Increased predation risk due to providing perching substrates. Indirect effects may be positive if structures result in livestock or machinery further away from pygmy rabbit habitat.	472 Access Control use exclusions		CBPR and WA GS measures in known occupied habitats: Avoid structures that serve as perches. Survey fence lines for burrows, and limit clearing distance. Buffer for posts- distance from burrows.
1.4 (cont.)	Wildlife water Wildlife reserves	Positive effects for wildlife reserves. Potential negative effects due to predator attractant with water developments and increased predation.	574 Spring development 472 Access control/ use exclusions 327 conservation cover		
1.4 (cont.)	Irrigation systems	Loss of habitat, resulting in ongoing or increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability.	449 irrigation water management		

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.5 Dryland Ag: Crop Management	Seed treatment Conventional seeding Direct seeding Fertilization, ground Fertilization, aerial Irrigation	Mortality may occur from impacts to individual CBPR OR WAGSs through impacts to burrows, especially maternal burrows; or indirectly through loss of cover resulting in increased predation. Mortality could occur directly from machinery. The likelihood of killing or injuring a CBPR or WAGS from these measures is probably small, but increases as the exposed population increases.	328 conservation crop rotation 332 Contour buffer strips 340 Cover crop 590 Nutrient Management 449 Irrigation Water Management	Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
1.5 (cont.)	Harvesting including swathing, baling, hauling and storage Mowing/brush beating Burning Seeding Predator control	Noise/disturbance effects: possible effects but the magnitude for pygmy rabbits or WAGS is not known. Mortality from impacts to individual CBPR OR WAGSs, through impacts to burrows, especially maternal burrows, or indirectly through loss of cover resulting in predation. Mortality through mowing in or adjacent to occupied areas resulting in loss of cover and increased predation. The mortality could occur directly from machinery. The likelihood of killing or injuring a CBPR OR WAGS from these activities is probably small, but increases as the exposed population increases.	561 heavy use area protection 460 Land clearing 338 Prescribed burning 550 Range planting 512 Pasture and hayland planting 595 Pest management	Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
1.5 (cont.)	Grazing on crop fields	Removal of cover may increase vulnerability to predation; crop fields likely only used for dispersal.		Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.5 (cont.)	Conservation crops (CRP or SAFE implementation)	Positive habitat quality improvement. Some short-term adverse effects if mowing, plowing, or seeding needed to improve habitat, temporary loss of cover may make pygmy rabbits more vulnerable to predation.	327 conservation cover 643 restoration and management of rare and declining habitats 645 upland wildlife habitat management 512 Pasture and hayland planting	Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	CBPR and WA GS measures require 30-days notification prior to any habitat-altering activities in known occupied habitats; and animals may be moved by WDFW or US FWS. Changed circumstances requirement to monitor levels of CRP/SAFE in County; if drops by 10 percent 2 years to improve; if can't get there come back to table to analyze adequacy of GCP
General Ranching/ Range impacts		Livestock grazing changes habitat/ species composition, compacts soil, and modifies natural habitats such as shrub-steppe resulting in decreased habitat quality and heavy grazing can impair breeding feeding or sheltering. Impacts to cover from ranching has a negative effect on habitat quality and may increase vulnerability to predation. Burrows may be disturbed or damaged to from trampling resulting in impaired breeding	numerous		Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
2.1 Ranching: Range Improvement	Mowing/ brush beating	Mortality may occur through impacts to burrows, or indirectly through loss of cover resulting in increased predation. Mortality could occur through mowing, brush/beating, in CBPR OR WAGS occupied areas. The mortality could occur directly from machinery or through impacts to burrows, especially maternal burrows. The likelihood of killing or injuring a CBPR OR WAGS from these measures is probably small, but increases as the exposed population increases. There can be a positive impact to habitat quality if mowing decreases invasive weeds and increases native species.			Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
2.1 (cont.)	burning	Mortality from impacts to individual CBPR OR WAGSs, through impacts to burrows, especially maternal burrows. Mortality can be indirect from loss of cover resulting in increased predation. Mortality if burning occurs in CBPR OR WAGS occupied areas.	338 Prescribed Burning		Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
2.1 (cont.)	seeding	Possible short-duration chance of mortality from machinery, but seeding can result in habitat quality improvement. The likelihood of killing or injuring a CBPR OR WAGS from this activity is probably small, but increases as the exposed population increases.	550 Range Planting		
2.1 (cont.)	Predator control	Mortality may occur from impacts to individual CBPR or WAGSs through trampling of burrows. More often, predator control would be positive for the CBPR or WAGS.			
2.2 Ranching: Range Infrastructure	Road management Trail management	Noise/disturbance effects: possible effects but the magnitude for pygmy rabbits or WAGS is not known. Fragmentation will be maintained or increased resulting in decreased connectivity and impaired breeding, feeding, and sheltering. Less cover may result in increased predation. Habitat quality impact through increased invasives as a result of use of the roads and trails by vehicles or animals spreading weed seeds.	560 Access Road 575 Animal Trails and Walkways		
2.2 (cont.)	Water development	Impact through increased concentration of livestock resulting in decreased habitat quality in local area. Water may be a potential predator attractant resulting in increased predation. If water development is in occupied habitat could result in burrow trampling.	614 Watering facility 636 Water harvesting catchment 642 Water well		
2.2 (cont.)	Structures (fences, etc.)	Possible mortality if fence posts impact active burrows during construction. Fences and fence maintenance may result in a temporary loss of habitat quality but can, in the longer term, result in a betterment of habitat quality through pasture rotation or exclusion areas. Structures can provide potential perch substrate for raptors resulting in increased predation.	382 Fence 472 Access Control/Use exclusion		CBPR and WA GS measures: Avoid structures that serve as perches. Survey fence lines for burrows, and limit clearing distance. Buffer for posts- distance from burrows.

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
2.3 Ranching: Livestock Management	Grazing system	CBPR and WAGS generally tolerate light to moderate levels of grazing as long as sufficient perennial grasses and forbs remain (through May and June for WA GS, through the growing season for PR) to meet their nutritional needs. Overgrazing may adversely affect CBPR or WAGS populations by decreasing forage, through trampling burrows, and through modifying habitat that could make the animals more susceptible to predators and reduce cover. Grazing systems that better manage habitats may result in positive habitat effects.	512 Pasture and Hayland Planting 528 Prescribed grazing	Riparian Areas measures 1-9. Rangeland Agriculture measures: Grazing Guidelines 1-7; Riparian Use measures.	Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
2.3 (cont.)	Moving and herding, Water and salt distribution	Grazing rotation, moving and herding stock, and water and salt distribution resulting in livestock concentrations in occupied areas may result in temporary negative impacts and, possibly, mortality through trampling of burrows. Done carefully, these practices are also expected to result, overall, in an improvement of habitat quality. Mortality may occur indirectly through loss of cover resulting in predation. Mortality could occur through moving and herding livestock in CBPR OR WAGS occupied areas, or concentrating livestock operations in occupied areas. The mortality could occur from machinery, livestock trampling, or impacts to burrows especially maternal burrows. The likelihood of killing or injuring a CBPR OR WAGS from these measures is probably small, but increases as the exposed population increases.	472 Access Control/Use exclusion 575 Animal Trails and Walkways	Rangeland Agriculture measures: Watering Sites, Supplement Sites, and Livestock concentration measures 1-9.	Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
2.3 (cont.)	-Wintering, -confinement, -Calving, -feeding, -vaccinations --- Manure management	Mortality may occur indirectly through loss of cover resulting in predation. Mortality could occur through moving and herding livestock in CBPR OR WAGS occupied areas, or concentrating livestock operations in occupied areas. The mortality could occur from machinery, livestock trampling, or impacts to burrows especially maternal burrows. The likelihood of killing or injuring a CBPR OR WAGS from these measures is probably small, but increases as the exposed population increases. The likelihood of killing or injuring a CBPR OR WAGS from these measures is probably small, but increases as the exposed population increases. Effects to habitat are often negative in the immediate concentrated area, but across a farm as a whole the concentrated areas may allow other areas to improve in habitat quality.	561 heavy Use Area Protection 590 Nutrient Management	Rangeland Agriculture measures: Watering Sites, Supplement Sites, Livestock concentration measures 1-9	Immediately notify USFWS upon finding any dead or injured pygmy rabbits or Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
Irrigated farming general effects		Irrigated Farming maintains fragmentation; the loss of habitat and ongoing fragmentation may isolate individuals and impair breeding. Lack of cover increases the likelihood of predation resulting in mortality. Ongoing fragmentation and habitat loss results in less food availability. Certain farming activities (e.g., equipment staging and storage, field access, pest control) on suitable, undeveloped habitats adjacent to crop fields could potentially impact the CBPR OR WAGS as a result of disturbance or damage to burrow systems and direct injury or mortality of individual animals. It is possible, although considered very unlikely, that farming activities on existing crop fields could directly injure or kill dispersing CBPR or WAGS or make them more vulnerable to predation due to a lack of cover on these developed lands		Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
3.1 Irrigated Ag: Crop Maintenance	Planting prep Planting Pruning, Ripping, Seeding, Mowing Burning/ chipping Irrigation/frost control Fertilization Pollination, Thinning, Drying Harvesting,	Noise/disturbance effects: possible effects but the magnitude for pygmy rabbits is not known. Maintains fragmentation; the loss of habitat and ongoing fragmentation may isolate individuals and impair breeding. Lack of cover increases the likelihood of predation resulting in mortality. Ongoing fragmentation and habitat loss results in less food availability.	331 Contour orchard and other Fruit Areas 590 Nutrient Management 391 Riparian forest buffer 422 Hedgerow planiting	Irrigated Agriculture measures: Adjacent habitat; Lead soils; Food Attractant. Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	
3.2 Irrigated Ag: Weed/Pest Control*	Mowing	Decreased cover increases the likelihood of predation resulting in mortality.	595 Pest Management		CBPR and WA GS: Utilize IPM practices that consider the range of treatment options.
3.3 Irrigated Ag: Infrastructure	Trellis management Fence management Road & trail management	Lack of cover increases the likelihood of predation resulting in mortality. Ongoing fragmentation and habitat loss results in less food availability.	472 Access Control/Use exclusion		

Land Use; Activity Number/ Category	Covered Activities	Effects/Impacts	Example of CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
3.3 (cont.)	Irrigation systems from ground-water sources,	Loss of habitat, increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability.	428 Irrigation water ditch or canal lining 430 Irrigation Water conveyance pipeline 441 Irrigation system, micro-irrigation 449 Irrigation Water Management 642 Water well	Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	
3.3 (cont.)	-crop-protection netting, -wind machines -water machines	Noise/disturbance effects: possible effects but the magnitude for pygmy rabbits is not known.			

Appendix B, Table 2. Covered Activity Effects Analysis summary for Sharp-tailed Grouse and Sage-Grouse. Conservation Practices (CP), Land Use Measures, and Species Specific Measures all from MSGCP Appendix E.

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
Dryland farming general effects		Dryland Farming general effects: maintaining existing levels of habitat fragmentation of deep-soil habitat, potentially increasing weeds and invasives; ongoing impact to deep soil habitat; bare ground may limit dispersal and increase vulnerability to predation, decreasing connectivity and impairing breeding, feeding, or sheltering. Dryland farming will continue to till land and continue to perpetuate a fragmented landscape, resulting in decreased cover and connectivity. Irrigated agriculture will have the same ongoing fragmentation effect. Certain farming activities (e.g., equipment staging and storage, field access, pest control) on suitable, undeveloped habitats adjacent to crop fields could potentially impact the grouse through direct injury or mortality of individual animals. Mortality may occur from impacts to individual grouse indirectly through loss of cover resulting in predation. Mortality could occur through mowing, burning, plowing, brush/beating, predator control, moving and herding livestock in occupied areas, or concentrating livestock operations in occupied areas. The mortality could occur from machinery or trampling. The likelihood of killing or injuring a grouse from these measures is probably small, but increases as the exposed population increases.		Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	Changed circumstances requirement to monitor levels of CRP/SAFE in County; if drops by 10 percent 2 years to improve; if can't get there come back to table to analyze adequacy of GCP. Immediately notify USFWS upon finding any dead or injured sharp-tailed grouse or sage grouse on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.1 Dryland Agriculture: Conversion	Mowing native habitat. Plowing native habitat. Burning native habitat. Mowing CRP/SAFE lands. Plowing CRP /SAFE lands. Burning CRP/SAFE lands.	Mortality from being hit by machines. Loss of habitat. Increased fragmentation that may isolate individuals and impair breeding, feeding, or sheltering or make individuals more vulnerable to predation. Less food availability. Abandonment of nests resulting in loss of fecundity or impaired breeding through nest abandonment or destruction or behavioral disruption. Noise/disturbance effects. Mortality from being burned.		Dryland Agriculture measures: Conversion of Conservation Cover to Active Farming 1-3; Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	In likely occupied habitat CRP/SAFE takeout or other conversion shall not occur April 1 to July31 for sharp-tailed grouse, March 15 to July 14 for sage grouse. Implement fence placement and marking restrictions in and near leks. In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise). Changed circumstances requirement to monitor levels of CRP/SAFE in County; if drops by 10 percent 2 years to improve; if can’t get there come back to table to analyze adequacy of GCP.

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.2 Dryland Agriculture: Field Preparation.	Mowing stubble. Burning stubble. Plowing/ Disking/ harrowing. Roughing. Rock pile removal. Rock picking. Coil packing.	Mortality from being hit by machines or being burned. Loss of habitat. Increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability. Abandonment of nests, destruction of nests resulting in loss of fecundity through nest abandonment or behavioral disruption Noise/disturbance effects. Haying and other farming operations that use heavy equipment can directly kill or injure adult and juvenile grouse especially brooding females and their young or eggs. If only the female is killed or injured any young or eggs are likely to die due to lack of parental care. .	338 prescribed burning	Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise).

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.3 Dryland Agriculture: Weed/Pest control*.	Sub-soiling. Rod-weeding. Burning.	Mortality from being hit by machines or being burned. Loss of habitat or cover. Increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability. Abandonment of nests or destruction of nests resulting in loss of fecundity through nest abandonment or behavioral disruption. Noise/disturbance effects.	595 Pest Management 315 Herbaceous Weed Control	Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise).

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.4 Dryland Agriculture: Infrastructure	Road management.	Mortality from being hit by machines. Loss of habitat. Increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability. Abandonment of nests or destruction of nests resulting in loss of fecundity through nest abandonment or behavioral disruption. Noise/disturbance effects. Potential increase in invasive species, or increased fragmentation and vulnerability to predation.	560 Access Road		In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise).

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.4 (cont.)	Structures (fences, etc.)	Potential impacts to nests during construction resulting in mortality. Abandonment of nests or destruction of nests resulting in loss of fecundity through nest abandonment or behavioral disruption. Potential to increase predation risk due to providing perching substrates. Indirect effects may be positive if result in livestock or machinery further away from habitat. Fences used for livestock management, especially those in certain high-risk locations can cause direct mortality to grouse from collision. Vertical structures such as telephone and power lines and poles serve as raptor perches and therefore can indirectly contribute to injury and death to sage-grouse from avian predators.	472 Access Control Use Exclusion		Implement fence placement and marking restrictions in and near leks.

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.4 (cont.)	Wildlife reserves. Wildlife water.	Positive for wildlife reserves. Potential negative due to predator attractant with water developments. Sage grouse can drown in livestock water tanks when they use them as a water source. Standing water sources including stock-tanks and ponds managed for livestock watering can attract mosquitoes and increase the risk of West Nile virus outbreaks.	574 Spring development. 472 Access control use exclusions. 327 Conservation Cover		

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.4 (cont.)	Irrigation systems.	Loss of habitat, increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability. Standing water sources including stock-tanks and ponds managed for livestock watering can attract mosquitoes and increase the risk of West Nile virus outbreaks.	449 Irrigation Water Management		In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise).
1.5 Dryland Agriculture: Crop Management	Seed treatment Conventional seeding. Direct seeding Fertilization-ground Fertilization-aerial Irrigation	Mortality may occur indirectly through loss of cover resulting in predation. Mortality could occur from machinery. Nest disturbance or loss. Noise/disturbance effects possible. Farming operations that use heavy equipment can directly kill or injure adult and juvenile grouse especially brooding females and their young or eggs. If only the female is killed or injured any young or eggs are likely to die due to lack of parental care.	328 conservation crop rotation 332 Contour Buffer Strips 340 Cover Crop 590 Nutrient Management 449 Irrigation Water Management 590 Nutrient management	Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise).

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.5 (cont.)	Harvesting Swathing Baling Hauling Storage Grazing on crop fields.	Noise/disturbance effects possible. Mortality may occur from impacts to individual or indirectly through loss of cover resulting in predation. Destruction of nests. Noise/disturbance effects possible. Mortality may occur from impacts to individual or indirectly through loss of cover resulting in predation. Abandonment or destruction of nests resulting in loss of fecundity through nest abandonment or behavioral disruption. Haying and other farming operations that use heavy equipment can directly kill or injure adult and juvenile sage-grouse especially brooding females and their young or eggs. If only the female is killed or injured any young or eggs are likely to die due to lack of parental care.	561 Heavy Use Area Protection		In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise). In occupied sharp-tailed grouse nesting habitat retain a residual cover of perennial grasses and forbs of at least 20 cm (8 in) for cover. See seasonal timing restrictions described in Appendix E in MSGCP.

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.5 (cont.)	Conservation crops (CRP or SAFE) implementation	Benefit to grouse through increased habitat, food availability.	327 conservation cover 643 restoration and management of rare and declining habitats 645 upland wildlife habitat management 512 Pasture and Hayland planting	Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise). Changed circumstances requirement to monitor levels of CRP/SAFE in County; if drops by 10 percent 2 years to improve; if can't get there come back to table to analyze adequacy of GCP

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
1.5 (cont.)	Mowing/brush beating	Mortality. Injury. Loss of fecundity through nest abandonment or destruction or behavioral disruption.	460: Land Clearing		In occupied sharp-tailed grouse nesting habitat retain a residual cover of perennial grasses and forbs of at least 20 cm (8 in) for cover. See seasonal timing restrictions described in Appendix E in MSGCP. In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise).
1.5 (cont.)	Burning Seeding Predator control	Mortality. Injury. Loss of fecundity through nest abandonment or destruction or behavioral disruption	338: Prescribed burning 550 Range Planting 512 Pasture and Hayland Planting 595 Pest Management		In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise).

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
General Ranching/ Range impacts		Livestock changes habitat/ species composition, compacts soil, and modifies natural habitats such as shrub-steppe. Impacts to forage and cover from ranching, negative effect on habitat quality that may impair breeding or sheltering. Potential disturbance or damage to nests. Heavy livestock grazing can negatively affect covered species' habitats through increasing sage densities while reducing native grasses, reducing herbaceous cover and diversity, and increasing cover of non-native annual grasses and forbs. Concentration of livestock that results in compaction of soils and increased bare ground can degrade nesting and brood-rearing habitat and increase the risk of establishing invasive weeds (Mack and Thompson 1982, pg. 766; Miller and Eddleman 2000, pg. 24).	numerous	General Grazing guidelines and Riparian use guidelines	Immediately notify USFWS upon finding any dead or injured sharp-tailed grouse or sage grouse on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
2.1 Ranching: Range Improvement	Mowing/brush beating; Burning/ seeding, and Predator control	Rangeland treatments may temporarily reduce sagebrush cover in order to inter-seed with desired grasses and forbs to improve sage-grouse habitat, resulting in a short term loss but long term gain in sage-grouse habitat.	550 Range planting		

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
2.2 Rangeland: Range Infrastructure	Road management Trail management Water development Structures (fences, etc.)	Mortality from being hit by machines. Loss of habitat or cover. Ongoing fragmentation that may isolate individuals or make them more vulnerable to predation. Abandonment of nests resulting in loss of fecundity through nest abandonment or behavioral disruption. Noise/disturbance effects. Grouse can drown in livestock water tanks when they use them as a water source. Construction of new buildings, fences, power lines for ranch operations are likely to decrease habitat quantity and/or quality. Standing water sources including stock-tanks and ponds managed for livestock watering can attract mosquitoes and increase the risk of West Nile virus outbreaks.	560 Access Road 575: Animal Trails and Walkways 614 Watering facility 636 Water harvesting cachement 642 Water well 382 Fence 472 Access control/use exclusion	Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants. Recreational Use; Non-Agricultural Vehicle use restrictions 1-7.	In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise). Implement fence placement and marking restrictions in and near leks.

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
2.3 Rangeland: Livestock Management	Grazing system Moving and herding Water distribution Salt distribution Wintering Confinement Calving Feeding Vaccinations Manure management	Noise/disturbance effects possible. Mortality may occur from impacts to individual or indirectly through loss of cover resulting in predation. Heavy livestock grazing can negatively affect covered species' habitats through increasing sage densities while reducing native grasses, reducing herbaceous cover and diversity, and increasing cover of non-native annual grasses and forbs. Concentration of livestock that results in compaction of soils and increased bare ground can degrade nesting and brood-rearing habitat and increase the risk of establishing invasive weeds (Mack and Thompson 1982, pg. 766; Miller and Eddleman 2000, pg. 24). Livestock management activities such as moving cattle to different areas may cause sage-grouse to flush or otherwise disrupt their behavior. In the majority of instances this disturbance is expected to be of very short duration such that it does not rise to the level of take.	528 Prescribed grazing 512 Pasture and hayland planting 561 Heavy use area protection 590 Nutrient management	Riparian Areas measures 1-9. Rangeland Agriculture measures: Grazing Guidelines 1-7; Riparian Use.	In sharp-tailed grouse likely occupied nesting habitats: Where appropriate retain a residual cover of perennial grasses and forbs of at least 20 cm (8 in) for cover during the nesting season (April 15 1 through June 30). In sage-grouse likely occupied nesting habitats: In grazed pastures, implement measures to promote nesting cover (through appropriate rotations, stocking rates, rest, and/or deferment schedules).
Irrigated Farming general effects		Irrigated Farming: contributes to maintaining existing levels of fragmentation. Loss of habitat, increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability. Certain farming activities (e.g., equipment staging and storage, field access, pest control) on suitable, undeveloped habitats adjacent to crop fields could impact the grouse as a result of disturbance or nests. Potential for disturbance of nesting or leks near irrigated crop fields.		Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	Immediately notify USFWS upon finding any dead or injured sharp-tailed grouse or sage grouse on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
3.1 Irrigated Agriculture: Crop Maintenance	Planting preparation Tree planting Summer pruning Flail mowing Ripping Tree removal Waste burning Waste chipping Seeding cover crop Irrigation and/or frost control Fertilization Pollination Thinning Helicopter fruit drying Harvesting	Mortality from being hit by machines Loss of habitat, Increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability. Abandonment of nests resulting in loss of fecundity through nest abandonment or behavioral disruption abandonment of nests. Noise/disturbance effects.	391: Riparian forest buffer. 422 Hedgerow planting. 472: Access Control Use Exclusion 331 Contour orchard and other Fruit Areas 590 Nutrient Management	Irrigated Agriculture measures: Adjacent habitat; Lead soils; Food Attractant. Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.	In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise). Implement fence placement and marking restrictions in and near leks.
3.2 Irrigated Agriculture: Weed/Pest Control	Mowing	Noise/disturbance effects possible. Mortality may occur from impacts to individual or indirectly through loss of cover resulting in predation. Abandonment of nests or destruction of nests resulting in loss of fecundity through nest abandonment or behavioral disruption.	595 Pest management		Retain a residual cover of perennial grasses and forbs of at least 20 cm (8 in) for cover.

Land Use: Activity Number/ Category	Covered Activities	Effects/Impacts	Example CP	Minimized by Land Use Measure	Minimized by Species-Specific measures, or changed circumstances measures
3.3 Irrigated Agriculture: Infrastructure	Trellis management Fence management Road management Irrigation systems Netting Wind machines Water machines	Mortality from being hit by machines. Loss of habitat. Increased fragmentation that may isolate individuals or make them more vulnerable to predation. Less food availability. Abandonment of nests resulting in loss of fecundity through nest abandonment or behavioral disruption. Noise/disturbance effects. Grouse can drown in livestock water tanks when they use them as a water source. Standing water sources including stock-tanks and ponds managed for livestock watering can attract mosquitoes and increase the risk of West Nile virus outbreaks. West Nile virus is known to injure or kill sage-grouse (Naugle et al 2005, Pg. 620) and other grouse.	472: Access control/Use exclusion 449: Irrigation Water Management 560 Access Road 428 Irrigation water ditch or canal lining 430 Irrigation Water conveyance pipeline 441 Irrigation system, micro-irrigation 642 Water well		In and near leks, minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season; in and near leks avoid disturbance to occupied leks. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise). Implement fence placement and marking restrictions in and near leks.

APPENDIX C

Table 1, CBPR recovery vs MSGCP matrix
Table 2, Washington Ground Squirrel vs MSGCP matrix
Table 3, Sharp-tailed Grouse vs MSGCP matrix
Table 4, Sage-Grouse vs MSGCP matrix

Appendix C Table 1. List of Columbia Basin Pygmy Rabbit (CBPR, pygmy rabbit) recovery actions that are addressed by private landowners through the MSGCP in Douglas County:

Recommended Recovery or Conservation Strategies for Columbia Basin Pygmy Rabbit **Source: U.S. Fish and Wildlife Service. 2012. Recovery Plan for the Columbia Basin Distinct Population Segment of the Pygmy Rabbit (*Brachylagus idahoensis*). Portland, Oregon. ix + 109 pp.**	**How the MSGCP addresses these**
Recovery actions in the CBPR recovery plan (USFWS 2012) include: **Action 3: Survey for, monitor, and assess free-ranging CBPR.** 3.1 – Search for any remaining wild subpopulations. 3.1.3 – Continue to contact landowners and managers within the highest priority area(s) and pursue conservation agreements to undertake surveys and, as appropriate, implement monitoring and management measures for the Columbia Basin pygmy rabbit.	The MSGCP is a type of conservation agreement, and for Permittees, and as consistent with the BMPs added to farm plans, will allow surveys, monitoring, and management for pygmy rabbits (see below).
3.2 – Monitor free-ranging subpopulations and document their status. 3.2.1 – Monitor the survival and movements of all captive-bred, enclosure-bred, and translocated wild pygmy rabbits released within the recovery emphasis areas (see Action 2.4). 3.2.2 – Track and manage released pygmy rabbits that may disperse beyond recovery emphasis areas (also see Action 6).	While Permittees are not required to conduct pygmy rabbit monitoring, the Species-specific measures require cooperation with monitoring efforts as follows: • Provide USFWS and WDFW access to enrolled properties through a mutually-agreeable notification process to survey for and monitor any pygmy rabbits present. • Notify USFWS at least 30 days prior to undertaking any habitat-altering activity (such as conversion of CRP or SAFE lands) that could result in authorized incidental take of pygmy rabbits. Provide the USFWS and WDFW the opportunity to

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3.2 (cont.)	translocate any affected pygmy rabbits to suitable alternate site(s) prior to implementation of those activities. • Immediately notify USFWS upon finding any dead or injured pygmy rabbits on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
Action 4: Protect free-ranging CBPR. 4.3 – Identify and minimize the effects of human activities on Columbia Basin pygmy rabbits at recovery emphasis areas and, as feasible (i.e., contingent on conservation agreement conditions), intervening properties. A variety of land management activities have the potential to negatively affect pygmy rabbits. Further investigation and adaptive management measures to address potential risks from various land management activities will be undertaken as opportunities arise. For example, additional information will help clarify the compatibility of various recreational activities (e.g., hunting), infrastructure management (e.g., roads, power lines), grazing plans, fire control measures, and research investigations with pygmy rabbit recovery objectives. 4.3.1 – Avoid development of new, or expansion of existing roads and trails, and restore habitats on obsolete roads and trails at occupied sites.	*Implement BMPs for all agricultural uses, including:* *Recreational Use: Non-Agricultural Motorized Vehicle Use, Hunting, Fishing, Wildlife Viewing* 1. Restrict recreational use during critical mating, nesting, and brood-rearing periods, especially near sharp-tailed grouse leks (March1 to June 30) and sage grouse leks (February 1 to June 30). 2. Ensure proper use of gates and other livestock management devices. 3. Minimize motorized access. 4. Consider potential impacts on wildlife, site habitat features, ranch operations and quality of life before permitting hunting and recreation. Educate visitors about limits, rules, and cautions needed to make sure their land use has minimum impact on habitat, wildlife resources, forage production, and ranch operation.

Recommended Recovery or Conservation Strategies for Columbia Basin Pygmy Rabbit **Source: U.S. Fish and Wildlife Service. 2012. Recovery Plan for the Columbia Basin Distinct Population Segment of the Pygmy Rabbit (*Brachylagus idahoensis*). Portland, Oregon. ix + 109 pp.**	**How the MSGCP addresses these**
4.3.2 – Protect burrow complexes at occupied sites from disturbances and direct impacts due to existing and proposed land use practices (e.g., grazing management, recreational use, research projects), except under experimental conditions designed to further evaluate the practice(s).	5. Minimize visitor vehicle traffic on ranch roads to prevent noxious weed introduction. 6. Develop educational information about Covered Species that Applicants/Permittees can share with hunters. 7. Washington ground squirrels are a protected species under state law and should not be subjected to recreational shooting by the landowner or the public. In situations where the landowner believes that the squirrels pose a threat to crops, the landowner should contact USFWS and/or WDFW to discuss non-lethal options for resolving the problem. Species-Specific measures: • Avoid constructing new structures that serve as perches or nest sites for avian predators (e.g., windmills). • Survey fence lines to locate active burrows. Limit clearing of fence line to 8’ width by hand or mower. No mowing or brush removal within 30’ of a burrow. • No in-ground posts (metal or wood) within 30’ of a burrow. Use rock jacks or figure 4 braces within 30’ of a burrow and no posts of any kind within 10’ of burrow. Limit activities to late summer and fall (avoid breeding, rearing period, and winter high stress period).

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4.3.2 (cont.)	• Utilize Integrated Pest Management practices that consider the range of treatment options (including: biological agents, mechanical, hand pulling, grazing practices).
4.4 – Enforce Federal regulations that protect CBPR from unauthorized "take" (see Glossary).	BMPs specific to CBPR • Provide USFWS and WDFW access to enrolled properties through a mutually-agreeable notification process to survey for and monitor any pygmy rabbits present. • Notify USFWS at least 30 days prior to undertaking any habitat-altering activity (such as conversion of CRP or SAFE lands) that could result in authorized incidental take of pygmy rabbits. Provide the USFWS and WDFW the opportunity to translocate any affected pygmy rabbits to suitable alternate site(s) prior to implementation of those activities. • Immediately notify USFWS upon finding any dead or injured pygmy rabbits on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.
Action 5: Manage habitats at recovery emphasis areas and intervening properties. 5.1 – Continue to investigate and refine estimates of the quantity and quality of habitats needed to support a viable subpopulation of free-ranging Columbia Basin pygmy rabbits (also see Action 3.5). 5.1.1 – Document habitat use patterns of free-ranging Columbia Basin pygmy rabbits at recovery emphasis areas (e.g., forage selection,	In addition to implementing BMPs on enrolled private land, the MSGCP requires ongoing county-wide assessments of CRP/SAFE and HCA lands, and has a changed-circumstances trigger to revisit the GCP if these lands decrease across the county by 10% or greater (per changed circumstances #1). The MSGCP developed an initial HSI model, and will do another model run at the county-scale at the beginning of the GCP implementation and during implementation to evaluate habitat

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condition, and quality; cover requirements; seasonal movements). 5.1.2 – As feasible (i.e., contingent on conservation agreement conditions), evaluate contributions to recovery emphasis areas from available habitats on intervening properties, including any that are managed pursuant to programs administered by USDA (e.g., Conservation Reserve Program). In the past, Columbia Basin pygmy rabbits have been observed using lands enrolled under the Conservation Reserve Program directly adjacent to shrub steppe habitat. However, it is currently unknown how and to what extent reestablished subpopulations of Columbia Basin pygmy rabbits may use these lands or other altered habitats within or adjacent to recovery emphasis areas, or which components of these sites may function as pygmy rabbit habitat. 5.1.3 – Develop and continue to refine criteria for evaluating and establishing appropriate management and habitat conditions for pygmy rabbit dispersal corridors. Criteria based upon appropriate management and habitat conditions will be needed to evaluate the potential contributions of intervening properties to facilitate dispersal and/or expansion of free-	changes. BMPs will be implemented on Permittees lands, and can be revised as needed if monitoring or other information shows need. Implement BMPs for all agricultural uses: Maintain Remnants 1. Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants. Conversion of Conservation Cover to Active Farming 1. If CRP/SAFE or other conservation contracts cannot be maintained due to program changes, enroll these conservation lands into other Federal Farm Bill conservation program such as State Acres for Wildlife Enhancement (SAFE), Grassland Reserve Program (GRP), or other similar programs if available. 2. Maintain original remnant patches of shrub-steppe within CRP/SAFE fields when converting back to crops 3. To minimize the disturbance to Covered Species using CRP/SAFE, ensure that conversion does not occur

Recommended Recovery or Conservation Strategies for Columbia Basin Pygmy Rabbit **Source: U.S. Fish and Wildlife Service. 2012. Recovery Plan for the Columbia Basin Distinct Population Segment of the Pygmy Rabbit (*Brachylagus idahoensis*). Portland, Oregon. ix + 109 pp.**	**How the MSGCP addresses these**
ranging subpopulations beyond recovery emphasis areas. 5.1.4 – Develop and refine habitat models (e.g., Habitat Suitability Index) for Columbia Basin pygmy rabbits at both local and landscape scales. Efforts to develop and refine habitat models for Columbia Basin pygmy rabbits will allow for improvements in identified recovery actions and management of available habitats. 5.1.5 – Through coordination with the SAG and other stakeholder parties, solicit expertise (e.g., biological, ecological, management) to identify and prioritize appropriate research objectives and methodologies that will inform continuing development and refinement of habitat and population estimators and modeling exercises.	within species-specific timing restrictions in Table E-3.
5.2 – Protect habitats at recovery emphasis areas and intervening properties (see RA 6). 5.2 – Protect habitats at recovery emphasis areas and, as feasible, intervening properties (see Action 6). 5.2.1 – Monitor changes in habitats through remote sensing, ground surveys, and mapping. A variety of remote sensing techniques have been developed to assess relative habitat quantity. These techniques are being implemented at several sites in the Columbia	Maintain Remnants 1. Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants. Conversion of Conservation Cover to Active Farming 1. If CRP/SAFE or other conservation contracts cannot be maintained due to program changes, enroll these conservation lands into other Federal Farm Bill conservation program such as State Acres for Wildlife

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Basin. Ground-based sampling to monitor habitat quality was conducted in the past, and will continue to be conducted at various intervals (e.g., 5 to 10 years) unless more effective techniques are developed. Habitat maps will be produced for recovery emphasis areas and other potentially used intervening properties pursuant to any existing conservation agreements.	Enhancement (SAFE), Grassland Reserve Program (GRP), or other similar programs if available. 2. Maintain original remnant patches of shrub-steppe within CRP/SAFE fields when converting back to crops 3. To minimize the disturbance to Covered Species using CRP/SAFE, ensure that conversion does not occur within species-specific timing restrictions in Table E-3.
5.2.2 – Continue to work with local landowners and managers to develop fire management plans and, as appropriate, implement measures to reduce the risk of catastrophic loss of important shrub steppe habitat (e.g., provide firebreaks, monitor and control ignition sources, develop agreements with local fire districts). A fire management plan has been developed or is in the process of being developed for each of the currently identified recovery emphasis areas. Firebreaks have been constructed and are currently maintained at the Sagebrush Flat Wildlife Area.	*Implement BMPs for all agricultural uses, including:* *Wildfire Management* 1. Develop fire management plans with local fire districts. 2. Manage mechanical firebreaks and backfires to minimize impacts to Covered Species and supporting habitats. 3. Along with local fire districts, identify habitats that need special consideration during wildfire control and discuss special control techniques. Identify areas where fire control is not a critical issue. 4. Use mechanical firebreaks and backfires to minimize the adverse effects of wildfire control on critical habitats. 5. Group land units into control, limited control, and minimal wildfire control areas.
5.3 – Investigate and implement enhancement and restoration measures to improve habitat quantity and quality for CBPRs.	The MSGCP expects improvement to habitat quality through

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As ongoing research improves our understanding of shrub steppe habitat components required by free-ranging Columbia Basin pygmy rabbits, adaptive management measures (e.g., plantings, invasive species removal and control) will be implemented, as available, to appropriately manipulate available habitats.	implementation of BMPs. BMPs may be revised over time if indicated by monitoring or other research.
5.4 – Document methods, treatments, timing, and results of all habitat enhancement, restoration, and protection projects undertaken for CBPR. 5.4 – Document methods, treatments, timing, and results of all habitat enhancement, restoration, and protection projects undertaken for free-ranging Columbia Basin pygmy rabbits and maintain those records to facilitate long-term habitat monitoring. Maintaining adequate records will allow future assessments of what specific management measures contribute to successful shrub steppe habitat manipulation projects.	Under the MSGCP Farm level effectiveness will be monitored through self-reporting, spot checks, photo monitoring, residue monitoring, biennial rangeland surveys, and other efforts (see AMMP in chapter 4, MSGCP). The FCCD will provide an annual report of the implementation status and monitoring results for the MSGCP (p.82, Ch.4, MSGCP).
5.6 – As feasible through conservation agreements (see Action 6), incentives, conservation easements, and/or willing acquisition or exchange, increase the size of recovery emphasis areas or otherwise develop and implement habitat protection	Depending on the locations of Permittees' lands, they may contribute to CBPR dispersal corridors.

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measures at key occupied sites and/or identified dispersal corridors beyond established recovery emphasis area boundaries. While intervening properties may not be actively managed to conserve the Columbia Basin pygmy rabbit, they may nevertheless contribute to recovery efforts (see Recovery Strategy). Early identification of future needs and available options for managing additional habitat for reestablished Columbia Basin pygmy rabbit subpopulations will be important for achieving the identified recovery objectives. The successful implementation of conservation agreements and proactive management measures may play an important role in providing sufficient habitats for recovery, and will increase public awareness and support for the Columbia Basin pygmy rabbit recovery program.	
Action 6: Pursue conservation agreements for the Columbia Basin pygmy rabbit with landowners and managers of intervening properties within the population's historical distribution.	Measures to be implemented for the CBPR for the MSGCP build upon those expected in the CBPR Safe Harbor Agreement. Therefore, a landowner may hold permits under both agreements.
6.2 – Develop and provide guidelines and technical assistance to interested landowners and managers to address management practices that could potentially affect free-ranging Columbia Basin pygmy rabbits (e.g., grazing regimes, recreational activities, restoration projects).	*Rangeland Agriculture* *Grazing Guidelines*

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6.2 (cont.)	*Note: The standard grazing guidelines and species- specific measures below provide prescriptions with the goal of producing or maintaining habitat for covered species' life history needs, including providing for cover, forage, and reproduction habitat. Other alternative grazing rotations or prescriptions might be acceptable, as long as they met similar expectations, including utilization rates, stubble heights, and distribution and timing that encourages plant productivity and vigor, seed production, photosynthesis, recovery and re-growth. Alternative grazing prescriptions may need more stringent monitoring plans that are developed and implemented to ensure that expectations are being met. If expectations are not met, the grazing prescriptions may need to be modified as implementation proceeds.* The following will promote better habitat and encourage plant productivity and vigor, seed production, photosynthesis, recovery and re-growth. 1. Develop a grazing management plan that accounts for the intensity of grazing and the timing of both grazing periods and recovery periods. The plan should include: 2. Graze a pasture no more than once every third year during the critical period for key bunchgrass species (boot stage through seed formation: typically May 15 to July15). 3. Manage utilization to achieve:

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6.2 (cont.)	a. No more than 50 percent utilization during the growing season b. No more than 60 percent utilization during the dormant season. 4. Maintain a minimum stubble height of 5" at all times on desirable bunchgrasses on average in a pasture. Note that a stubble height of 8" is better than 5" in appropriate growing sites. 5. Manage livestock distribution to minimize overgrazing, especially during drought. Tools such as fencing, the placement of water & salt, and riding can be used. 6. During winter, use one smaller sacrifice area for feeding to minimize impacts to shrub-steppe and other habitats. 7. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals, unless a grazing system is implemented which has a high rest to grazing period ratio which allows for adequate recovery following heavier use. *Riparian Use* 1. Allow early spring grazing only in existing riparian pasture and manage access. 2. Exclude use in undisturbed riparian areas. 3. Manage livestock to limit access on riparian areas by controlling length of grazing period and time of year or by utilizing exclusionary practices. 4. Use off-stream watering sites or selective herd management to promote livestock use of uplands.

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6.2 (cont.)	5. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals, unless a grazing system is implemented which has a high rest to grazing period ratio which allows for adequate recovery following heavier use. *Watering Sites, Supplement Sites, Livestock Concentrations* 1. Locate watering facilities away from riparian zones as much as is practicable; ensure escape devices for small wildlife (such as a boards or ramps). 2. Ensure that any livestock watering diversions do not restrict fish passage nor impede water volume flow. 3. If riparian crossing location is the only option, harden crossing and manage access. 4. Locate salt licks away from riparian or wetland areas. 5. Avoid livestock concentrations or travel routes on sensitive areas. 6. Protect sensitive areas, such as riparian habitat, occupied Columbia Basin pygmy rabbit habitat, Washington ground squirrel colonies, greater sage-grouse/Columbian sharp-tail grouse leks, and rare plant populations from unnecessary impacts caused by livestock concentrations. Possible management practices include: a. Locating mineral supplements, water troughs and supplemental feeding sites on shallow, gravelly, or rocky soils or rocky areas away from sensitive areas, b. Implementing exclusion fencing. 7. Manage livestock to maintain water quality goals by

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6.2 (cont.)	minimizing concentrated animal use near streams or in upland areas where surface water drains across these sites and carries excess nutrients downslope to surface water. 8. To minimize fertilizer loss to ground water or surface flow, use fertilizers in hay fields at an agronomic level that provides plant benefit but is not in excess of plant needs. 9. Maintain chemical use on livestock and rangelands at a level that is effective, but not in amounts or in areas that would cause contamination of soil, forage, water, wildlife or habitat. *Recreational Use: Non-Agricultural Motorized Vehicle Use, Hunting, Fishing, Wildlife Viewing* 1. Restrict recreational use during critical mating, nesting, and brood-rearing periods, especially near sharp-tailed grouse leks (March1 to June 30) and sage grouse leks (February 1 to June 30). 2. Ensure proper use of gates and other livestock management devices. 3. Minimize motorized access. 4. Consider potential impacts on wildlife, site habitat features, ranch operations and quality of life before permitting hunting and recreation. Educate visitors about limits, rules, and cautions needed to make sure their land use has minimum impact on habitat, wildlife resources, forage production, and ranch operation. 5. Minimize visitor vehicle traffic on ranch roads to prevent

Recommended Recovery or Conservation Strategies for Columbia Basin Pygmy Rabbit **Source: U.S. Fish and Wildlife Service. 2012. Recovery Plan for the Columbia Basin Distinct Population Segment of the Pygmy Rabbit (*Brachylagus idahoensis*). Portland, Oregon. ix + 109 pp.**	**How the MSGCP addresses these**
6.2 (cont.)	noxious weed introduction. 6. Develop educational information about Covered Species that Applicants/Permittees can share with hunters.
6.3 – Assist interested non-Federal and non-WDFW landowners and managers with development of new HCPs, or otherwise assist with participation in existing HCPs, with regard to management practices that may result in the incidental take of free-ranging Columbia Basin pygmy rabbits. 6.3.1 – Develop measures to minimize and mitigate incidental take of Columbia Basin pygmy rabbits to the maximum extent practicable. Appropriate management guidelines will be developed and incorporated into a multi-species HCP that is currently being developed by the Foster Creek Conservation District. If finalized, incorporation of these guidelines will ensure that impacts to the Columbia Basin pygmy rabbit resulting from otherwise lawful activities conducted on private agricultural lands in Douglas County are mitigated to the maximum extent practicable. These guidelines will also assist with management considerations for Columbia Basin pygmy rabbits that may occur on private, agricultural lands throughout the population's historical distribution. 6.3.2 – Assist landowners and managers interested in participating in new or existing HCPs.	The MSGCP addresses the need for an HCP that covers CBPR in Douglas County. Additional agreements or HCPs may be needed in other Counties, or for other activities.

Recommended Recovery or Conservation Strategies for Columbia Basin Pygmy Rabbit **Source: U.S. Fish and Wildlife Service. 2012. Recovery Plan for the Columbia Basin Distinct Population Segment of the Pygmy Rabbit (*Brachylagus idahoensis*). Portland, Oregon. ix + 109 pp.**	**How the MSGCP addresses these**
6.5 – – Continue to identify and secure funding sources to assist interested landowners and managers with development of conservation agreements, implementation of recovery actions, and/or to otherwise provide incentives for participating in conservation efforts for the Columbia Basin pygmy rabbit (also see Action 8).	The MSGCP does not provide a source of funding.

Appendix C Table 2. List of recovery or conservation strategies for Washington Ground Squirrel that are addressed by private landowners through MSGCP in Douglas County:

Recommended Recovery or Conservation Strategies for Washington Ground Squirrel that can be addressed by private landowners **Sources:** **USFWS 2012 Candidate Assessment for Washington ground squirrel (USFWS 2012 p.16-17**	**How the MSGCP addresses these**
<u>Protection and maintain populations</u> • Maintain populations as individual units where possible to prevent loss of genetic variation. • Monitor habitat and populations in both Oregon and Washington and survey areas of potential habitat for squirrel sites. • Use translocation either 1) as a last resort from areas that will be developed, 2) to augment sites experiencing inbreeding depression, or 3) to reintroduce squirrels to unoccupied suitable habitat. This alternative should be used with caution, and its effects should be closely monitored to determine whether it is successful. • Post, replace, and augment signs and patrol state and Federal property to increase public awareness regarding the species' status and protection where appropriate. • Encourage the reduction of shooting and poisoning, and enforce prohibition against shooting and poisoning where applicable. • Increase public education about the species and threats. • Encourage private landowners,	*Implement BMPs for all agricultural uses, including:* *Recreational Use: Non-Agricultural Motorized Vehicle Use, Hunting, Fishing, Wildlife Viewing* 1. Restrict recreational use during critical mating, nesting, and brood-rearing periods, especially near sharp-tailed grouse leks (March1 to June 30) and sage grouse leks (February 1 to June 30). 2. Ensure proper use of gates and other livestock management devices. 3. Minimize motorized access. 4. Consider potential impacts on wildlife, site habitat features, ranch operations and quality of life before permitting hunting and recreation. Educate visitors about limits, rules, and cautions needed to make sure their land use has minimum impact on habitat, wildlife resources, forage production, and ranch operation. 5. Minimize visitor vehicle traffic on ranch roads to prevent noxious weed introduction. 6. Develop educational information about Covered Species that Applicants/Permittees can share with hunters. 7. Washington ground squirrels are a protected species under

Recommended Recovery or Conservation Strategies for Washington Ground Squirrel that can be addressed by private landowners **Sources:** **USFWS 2012 Candidate Assessment for Washington ground squirrel (USFWS 2012 p.16-17**	**How the MSGCP addresses these**
organizations, and government land agencies to monitor and/or provide species protection. • Develop candidate conservation agreements for the Washington ground squirrel in Washington and Oregon to implement a variety of conservation measures on private and public lands.	state law and should not be subjected to recreational shooting by the landowner or the public. In situations where the landowner believes that the squirrels pose a threat to crops, the landowner should contact USFWS and/or WDFW to discuss non-lethal options for resolving the problem. BMP specific to Washington ground squirrel in occupied habitats: • Avoid grazing during Washington ground squirrel active season (typically from April 1 until June 30 when Washington ground squirrels enter their extended period of dormancy, or when documented to enter summer dormancy). • Notify USFWS at least 30 days prior to undertaking any habitat-altering activity (such as conversion of CRP or SAFE lands) that could result in authorized incidental take of Washington Ground Squirrels. Provide the USFWS and WDFW the opportunity to translocate any affected Washington Ground Squirrels to suitable alternate site(s) prior to implementation of those activities. USFWS or WDFW staffs are unlikely to undertake unplanned translocations of ground squirrels unless a significant population of squirrels is present on the conversion site or the species becomes federally listed. • Immediately notify USFWS upon finding any dead or injured Washington Ground Squirrels on enrolled property, or immediately contact an appropriate representative of

Recommended Recovery or Conservation Strategies for Washington Ground Squirrel that can be addressed by private landowners **Sources:** **USFWS 2012 Candidate Assessment for Washington ground squirrel (USFWS 2012 p.16-17**	**How the MSGCP addresses these**
<u>Protection and maintain populations *(cont.)*</u>	USFWS or WDFW for assistance if identification of the specimen is uncertain. • Avoid cultivating lands that contain active ground squirrel colonies. If habitat conversion activities or CRP/SAFE takeout must be done, avoid January 21 to June 30. • Notify USFWS at least 30 days prior to undertaking any habitat-altering activity (such as conversion of CRP or SAFE lands) that could result in authorized incidental take of Washington Ground Squirrels. Provide the USFWS and WDFW the opportunity to translocate any affected Washington Ground Squirrels to suitable alternate site(s) prior to implementation of those activities. USFWS or WDFW staffs are unlikely to undertake unplanned translocations of ground squirrels unless a significant population of squirrels is present on the conversion site or the species becomes federally listed. •
<u>Monitoring habitat</u> • Combine monitoring or surveying where similar survey efforts are implemented (e.g., pygmy rabbit, sage grouse, or hawk surveys).	In addition to implementing measures on private land, the MSGCP requires ongoing county-wide assessments of CRP and HCA lands, and has a changed-circumstances trigger to revisit the GCP if these lands decrease across the county by 10% or greater (per changed circumstances #1). The MSGCP developed an initial HSI model, and will do another model run at the beginning of the GCP implementation.

Recommended Recovery or Conservation Strategies for Washington Ground Squirrel that can be addressed by private landowners **Sources:** **USFWS 2012 Candidate Assessment for Washington ground squirrel (USFWS 2012 p.16-17**	**How the MSGCP addresses these**
<u>Maintain and restore habitat</u> • Explore methods to restore developed areas to native condition and monitor results.	*Conversion of Conservation Cover to Active Farming* 1. If CRP/SAFE or other conservation contracts cannot be maintained due to program changes, enroll these conservation lands into other Federal Farm Bill conservation program such as Grassland Reserve Program (GRP), Agriculture Conservation Easement Program (ACEP), or other similar Federal, State, or other similar programs if available. 2. Maintain original remnant patches of shrub-steppe within CRP/SAFE fields when converting back to crops. 3. To minimize the disturbance to Covered Species using CRP/SAFE, ensure that conversion does not occur within species-specific timing restrictions in Table E-3.
<u>Maintain habitat and remnants</u> • Maintain remaining areas of suitable habitat and restore degraded habitat using a variety of tools appropriate for site-specific needs (e.g., thinning, mechanical treatment, burning or fire suppression, reseeding and plugging of native species). • Create or maintain corridors between occupied sites to facilitate dispersal and genetic exchange among colonies (ODFW 2006). This may be achieved using widely spaced piles of wood or stones (Sherman and Shellman Sherman 2005).	*Implement BMPs for all agricultural uses:* *Maintain Remnants* 1. Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants. *Additional BMPs to be applied in known occupied habitats:* • Avoid constructing new structures that serve as perches or nest sites for avian predators (e.g., windmills).

Recommended Recovery or Conservation Strategies for Washington Ground Squirrel that can be addressed by private landowners **Sources:** **USFWS 2012 Candidate Assessment for Washington ground squirrel (USFWS 2012 p.16-17**	**How the MSGCP addresses these**
Maintain habitat and remnants *(cont.)*	• Survey fence lines to locate active burrows. Limit clearing of fence line to 8' width by hand or mower. No mowing or brush removal within 30' of a burrow. • No in-ground posts (metal or wood) within 30' of a burrow. Use rock jacks or figure 4 braces within 30' of a burrow and no posts of any kind within 10' of burrow. Limit activities to late summer and fall (avoid breeding, rearing period, and winter high stress period). • Utilize Integrated Pest Management practices that consider the range of treatment options (e.g., herbicide, biological agents, mechanical, hand pulling, and grazing practices). *Rangeland Agriculture* *Grazing Guidelines* *Note: The standard grazing guidelines and species- specific measures below provide prescriptions with the goal of producing or maintaining habitat for covered species' life history needs, including providing for cover, forage, and reproduction habitat. Other alternative grazing rotations or prescriptions might be acceptable, as long as they met similar expectations, including utilization rates, stubble heights, and distribution and timing that encourages plant productivity and vigor, seed production, photosynthesis, recovery and re-growth. Alternative grazing prescriptions may need more stringent*

Recommended Recovery or Conservation Strategies for Washington Ground Squirrel that can be addressed by private landowners **Sources:** **USFWS 2012 Candidate Assessment for Washington ground squirrel (USFWS 2012 p.16-17**	**How the MSGCP addresses these**
Maintain habitat and remnants *(cont.)*	*monitoring plans that are developed and implemented to ensure that expectations are being met. If expectations are not met, the grazing prescriptions may need to be modified as implementation proceeds.* The following will promote better habitat and encourage plant productivity and vigor, seed production, photosynthesis, recovery and re-growth. 1. Develop a grazing management plan that accounts for the intensity of grazing and the timing of both grazing periods and recovery periods. The plan should include: 2. Graze a pasture no more than once every third year during the critical period for key bunchgrass species (boot stage through seed formation: typically May 15 to July15). 3. Manage utilization to achieve: a. No more than 50 percent utilization during the growing season b. No more than 60 percent utilization during the dormant season. 4. Maintain a minimum stubble height of 5" at all times on desirable bunchgrasses on average in a pasture. Note that a stubble height of 8" is better than 5" in appropriate growing sites. 5. Manage livestock distribution to minimize overgrazing, especially during drought. Tools such as fencing, the placement of water & salt, and riding can be used.

Recommended Recovery or Conservation Strategies for Washington Ground Squirrel that can be addressed by private landowners **Sources:** **USFWS 2012 Candidate Assessment for Washington ground squirrel (USFWS 2012 p.16-17**	**How the MSGCP addresses these**
Maintain habitat and remnants *(cont.)*	6. During winter, use one smaller sacrifice area for feeding to minimize impacts to shrub-steppe and other habitats. 7. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals, unless a grazing system is implemented which has a high rest to grazing period ratio which allows for adequate recovery following heavier use. *-Riparian Use* 1. Allow early spring grazing only in existing riparian pasture and manage access. 2. Exclude use in undisturbed riparian areas. 3. Manage livestock to limit access on riparian areas by controlling length of grazing period and time of year or by utilizing exclusionary practices. 4. Use off-stream watering sites or selective herd management to promote livestock use of uplands. 5. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals, unless a grazing system is implemented which has a high rest to grazing period ratio which allows for adequate recovery following heavier use. *Watering Sites, Supplement Sites, Livestock Concentrations* 1. Locate watering facilities away from riparian zones as much as is practicable; ensure escape devices for small wildlife (such as a boards or ramps).

Recommended Recovery or Conservation Strategies for Washington Ground Squirrel that can be addressed by private landowners **Sources:** **USFWS 2012 Candidate Assessment for Washington ground squirrel (USFWS 2012 p.16-17**	**How the MSGCP addresses these**
Maintain habitat and remnants *(cont.)*	2. Ensure that any livestock watering diversions do not restrict fish passage nor impede water volume flow. 3. If riparian crossing location is the only option, harden crossing and manage access. 4. Locate salt licks away from riparian or wetland areas. 5. Avoid livestock concentrations or travel routes on sensitive areas. 6. Protect sensitive areas, such as riparian habitat, occupied Columbia Basin pygmy rabbit habitat, Washington ground squirrel colonies, greater sage-grouse/Columbian sharp-tail grouse leks, and rare plant populations from unnecessary impacts caused by livestock concentrations. Possible management practices include: a. Locating mineral supplements, water troughs and supplemental feeding sites on shallow, gravelly, or rocky soils or rocky areas away from sensitive areas, b. Implementing exclusion fencing. 7. Manage livestock to maintain water quality goals by minimizing concentrated animal use near streams or in upland areas where surface water drains across these sites and carries excess nutrients downslope to surface water. 8. To minimize fertilizer loss to ground water or surface flow, use fertilizers in hay fields at an agronomic level that provides plant benefit but is not in excess of plant needs. 9. Maintain chemical use on livestock and rangelands at a level that is effective, but not in amounts or in areas that would

Recommended Recovery or Conservation Strategies for Washington Ground Squirrel that can be addressed by private landowners **Sources:** **USFWS 2012 Candidate Assessment for Washington ground squirrel (USFWS 2012 p.16-17**	**How the MSGCP addresses these**
<u>Maintain habitat and remnants *(cont.)*</u>	cause contamination of soil, forage, water, wildlife or habitat.
<u>Manage wildfires</u> • Maintain remaining areas of suitable habitat and restore degraded habitat using a variety of tools appropriate for site-specific needs (e.g., thinning, mechanical treatment, burning or fire suppression, reseeding and plugging of native species). • Re-establish normal fire cycles to encourage patchy (versus widespread) fire events. The appropriateness of this measure will depend on the site and methods used. Use of fire without subsequent seeding with natives may increase the amount of cheatgrass and other non-native species.	*Implement BMPs for all agricultural uses, including:* *Wildfire Management* 1. Develop fire management plans with local fire districts. 2. Manage mechanical firebreaks and backfires to minimize impacts to Covered Species and supporting habitats. 3. Along with local fire districts, identify habitats that need special consideration during wildfire control and discuss special control techniques. Identify areas where fire control is not a critical issue. 4. Use mechanical firebreaks and backfires to minimize the adverse effects of wildfire control on critical habitats. 5. Group land units into control, limited control, and minimal wildfire control areas.

Appendix C Table 3. List of Sharp-tailed grouse recovery or conservation strategies that are addressed by private landowners through MSGCP in Douglas County.

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
1. Protect sharp-tailed grouse populations. 1.1. Reduce the collision hazards posed by wires and fences in sharp-tailed grouse habitat. 1.1 Promote removal of fences, powerlines, cables, and poles that are no longer in use. 1.2 Mark existing fences in areas occupied by sharp-tailed grouse to increase visibility. 1.3 Modify existing fences to minimize collision hazard. 1.4 Minimize proliferation of additional power lines, towers, and fences.	*BMPs specific to grouses for activities in or Near Leks:* • Plan and design placement of new fences away from occupied and historic leks. If this is not possible, adequately mark fences to increase visibility. Identify existing fences that are nearby to an occupied or historic lek and consider removing or relocating the fence to a site further from the lek. At a minimum, mark all existing fences within ¼ mile from an occupied or historic lek, or in high risk areas where collisions are likely or known to occur. Use NRCS, SGI, or other appropriate national or local fence collision tools to prioritize fence marking. *Implement BMPs for all agricultural uses, including:* *Recreational Use: Non-Agricultural Motorized Vehicle Use, Hunting, Fishing, Wildlife Viewing* 1. Restrict recreational use during critical mating, nesting, and brood-rearing periods, especially near sharp-tailed grouse leks (March1 to June 30) and sage grouse leks (February 1 to June 30). 2. Ensure proper use of gates and other livestock management devices. 3. Minimize motorized access. 4. Consider potential impacts on wildlife, site habitat features, ranch operations and quality of life before permitting hunting

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
1. Protect sharp-tailed grouse populations. ***(cont.)***	and recreation. Educate visitors about limits, rules, and cautions needed to make sure their land use has minimum impact on habitat, wildlife resources, forage production, and ranch operation. 5. Minimize visitor vehicle traffic on ranch roads to prevent noxious weed introduction. 6. Develop educational information about Covered Species that Applicants/Permittees can share with hunters. BMPs specific to grouses for activities in or Near Leks: • Minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks during the spring breeding season (March through June for sharp-tailed grouse; and February 20 through June for sage grouse). • Between March through June for sharp-tailed grouse, and February 20 through May 15 for sage grouse and within 0.5 mile of known leks, schedule essential springtime agricultural activities near leks to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise). At those times and locations, avoid physical, mechanical, and loud noise disturbances.
1.2 Identify and minimize other human-related and natural sources of mortality. 1.2.3 Minimize destruction of nests during haying and tilling and by livestock trampling. 1.2.5 Reduce sources of disease vectors such as mosquitos.	• Immediately notify USFWS upon finding any dead or injured sharp-tailed grouse or sage grouse on enrolled property, or immediately contact an appropriate representative of USFWS or WDFW for assistance if identification of the specimen is uncertain.

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
1.3 Reduce predation by human-associated predators. 1.3.1 Where feasible, eliminate poles, posts and structures used for nesting. 1.3.2 Existing utility poles should be modified with perch guards to prevent use as raptor perch sites. 1.3.3 Promote removal of human-related food sources for corvids, raptors, and carnivores.	The only measure addressing food sources is below, for irrigated lands. *Food Attractant* 1. Within orchard or other irrigated crops, minimize the attractiveness of the food source to wildlife. As appropriate, use avoidance measures such as reflective materials, noise generators, and barrier netting.
2. Protect sharp-tailed grouse habitat.	The goal of the MSGCP is to maintain and improve existing shrub-steppe habitat, and many of the BMPs listed above and below in this matrix will address these issues. *Maintain Remnants* 1. Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants. *Irrigated Agriculture* *Adjacent Habitat* 1. Maintain adjacent non-farmed lands in natural habitats to benefit of Covered Species. For activities in or near leks: • Minimize impacts to Greater sage-grouse and Columbian

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
2. Protect sharp-tailed grouse habitat. ***(cont.)***	sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season (may vary by site but typically March through June for sharp-tailed grouse; and February 20 through June for sage grouse). • Avoid disturbance to occupied leks. Typical season is between March through June for sharp-tailed grouse, and February 20 through May 15 for sage grouse. Within 0.5 mile of known leks, schedule essential springtime agricultural activities to occur in the middle of the day (avoid activities from one hour before sunset to 3 hours after sunrise). At those times and locations, avoid physical, mechanical, and loud noise disturbances.
2. Protect sharp-tailed grouse habitat. ***(cont.)*** 2.3 Manage riparian and meadow habitats on public lands to support sharp-tailed grouse. 2.4 Discourage expansion of roads and transmission lines on public lands in sharp-tailed grouse recovery units.	Riparian Areas 1. Increase variety of native tree/shrub species and age classes within riparian areas. Develop riparian habitat with age class variety, plant species variety, and age diversity of shrub and tree canopy layers. Possible management practices: a. Implement rotation and deferred grazing strategies within riparian areas that produce a diversity of age, species, and life forms within riparian habitat areas, resulting in a properly functioning condition. Deferred and rotation grazing systems that provide extended periods of rest are needed to produce appropriate vegetation age classes when they are missing. b. Use fencing to control livestock use periods. c. Monitor herbicide applications. d. Avoid overspray of herbicides within riparian

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
2. Protect sharp-tailed grouse habitat. ***(cont.)***	areas. 2. Manage existing riparian habitat to allow it to reach its full site potential and function. 3. Restore range riparian habitat to support Covered Species. 4. Protect springs, seeps, and wet meadows within and adjacent to sagebrush stands from over-grazing. 5. Manage lands to provide good water quality and riparian conditions in seeps, wetlands, springs, creeks, rivers, lakes. 6. Maintain snags or potential snags, including large old cottonwoods, in riparian areas. 7. Maintain riparian flood plain and associated shrub habitat. 8. Avoid cutting or removing willows or other species important for sharp-tailed grouse wintering, including water birch, hawthorn, serviceberry, chokecherry, etc. 9. Consider removing exotic white poplar (*Populus alba*) where it is crowding out water birch and other native riparian species (Stinson and Schroeder 2012, p. 53). *Recreational Use: Non-Agricultural Motorized Vehicle Use, Hunting, Fishing, Wildlife Viewing* 1. Restrict recreational use during critical mating, nesting, and brood-rearing periods, especially near sharp-tailed grouse leks (March1 to June 30) and sage grouse leks (February 1 to June 30). 2. Ensure proper use of gates and other livestock management devices. 3. Minimize motorized access. 4. Consider potential impacts on wildlife, site habitat features, ranch operations and quality of life before permitting hunting and recreation. Educate visitors about

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
2. Protect sharp-tailed grouse habitat. ***(cont.)***	limits, rules, and cautions needed to make sure their land use has minimum impact on habitat, wildlife resources, forage production, and ranch operation. 5. Minimize visitor vehicle traffic on ranch roads to prevent noxious weed introduction. 6. Develop educational information about Covered Species that Applicants/Permittees can share with hunters.
2.5 Facilitate management of private agricultural and rangelands that is compatible with the conservation of sharp-tailed grouse.	*<u>Rangeland Agriculture</u>* *Grazing Guidelines* *Note: The standard grazing guidelines and species- specific measures below provide prescriptions with the goal of producing or maintaining habitat for covered species' life history needs, including providing for cover, forage, and reproduction habitat. Other alternative grazing rotations or prescriptions might be acceptable, as long as they met similar expectations, including utilization rates, stubble heights, and distribution and timing that encourages plant productivity and vigor, seed production, photosynthesis, recovery and re-growth. Alternative grazing prescriptions may need more stringent monitoring plans that are developed and implemented to ensure that expectations are being met. If expectations are not met, the grazing prescriptions may need to be modified as implementation proceeds.* The following will promote better habitat and encourage plant productivity and vigor, seed production, photosynthesis,

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
2. Protect sharp-tailed grouse habitat. ***(cont.)***	recovery and re-growth. 1. Develop a grazing management plan that accounts for the intensity of grazing and the timing of both grazing periods and recovery periods. The plan should include: 2. Graze a pasture no more than once every third year during the critical period for key bunchgrass species (boot stage through seed formation: typically May 15 to July15). 3. Manage utilization to achieve: a. No more than 50 percent utilization during the growing season b. No more than 60 percent utilization during the dormant season. 4. Maintain a minimum stubble height of 5" at all times on desirable bunchgrasses on average in a pasture. Note that a stubble height of 8" is better than 5" in appropriate growing sites. 5. Manage livestock distribution to minimize overgrazing, especially during drought. Tools such as fencing, the placement of water & salt, and riding can be used. 6. During winter, use one smaller sacrifice area for feeding to minimize impacts to shrub-steppe and other habitats. 7. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals, unless a grazing system is implemented which has a high rest to grazing period ratio which allows for adequate recovery following heavier use. *Riparian Use* 1. Allow early spring grazing only in existing riparian pasture

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
2. Protect sharp-tailed grouse habitat. ***(cont.)***	and manage access. 2. Exclude use in undisturbed riparian areas. 3. Manage livestock to limit access on riparian areas by controlling length of grazing period and time of year or by utilizing exclusionary practices. 4. Use off-stream watering sites or selective herd management to promote livestock use of uplands. 5. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals, unless a grazing system is implemented which has a high rest to grazing period ratio which allows for adequate recovery following heavier use. *Watering Sites, Supplement Sites, Livestock Concentrations* 1. Locate watering facilities away from riparian zones as much as is practicable; ensure escape devices for small wildlife (such as a boards or ramps). 2. Ensure that any livestock watering diversions do not restrict fish passage nor impede water volume flow. 3. If riparian crossing location is the only option, harden crossing and manage access. 4. Locate salt licks away from riparian or wetland areas. 5. Avoid livestock concentrations or travel routes on sensitive areas. 6. Protect sensitive areas, such as riparian habitat, occupied Columbia Basin pygmy rabbit habitat, Washington ground squirrel colonies, greater sage-grouse/Columbian sharp-tail grouse leks, and rare plant populations from unnecessary impacts caused by livestock concentrations. Possible management practices include:

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
2. Protect sharp-tailed grouse habitat. ***(cont.)***	a. Locating mineral supplements, water troughs and supplemental feeding sites on shallow, gravelly, or rocky soils or rocky areas away from sensitive areas, b. Implementing exclusion fencing. 7. Manage livestock to maintain water quality goals by minimizing concentrated animal use near streams or in upland areas where surface water drains across these sites and carries excess nutrients downslope to surface water. 8. To minimize fertilizer loss to ground water or surface flow, use fertilizers in hay fields at an agronomic level that provides plant benefit but is not in excess of plant needs. 9. Maintain chemical use on livestock and rangelands at a level that is effective, but not in amounts or in areas that would cause contamination of soil, forage, water, wildlife or habitat. In occupied or likely occupied nesting habitats with grazing, where appropriate retain a residual cover of perennial grasses and forbs of at least 20 cm (8 in) for cover during the nesting season (April 15 1 through June 30).
2.5.1 Promote the protection of remnant areas of native grassland and shrub-steppe. 2.5.2 Discourage burning of CRP and vegetation along the edges of farm fields and roadsides where patches of shrub-steppe may be burned in the process. 2.5.3 Work with landowners to avoid impacts on grouse nests and young broods when converting former CRP fields to grain.	*Maintain Remnants* 1. 1. Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants. *<u>Dryland Agriculture</u>*

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
2. Protect sharp-tailed grouse habitat. ***(cont.)***	*Conversion of Conservation Cover to Active Farming* 1. If CRP/SAFE or other conservation contracts cannot be maintained due to program changes, enroll these conservation lands into other Federal Farm Bill conservation program such as Grassland Reserve Program (GRP), Agriculture Conservation Easement Program (ACEP), or other similar Federal, State, or other similar programs if available. 2. Maintain original remnant patches of shrub-steppe within CRP/SAFE fields when converting back to crops. 3. To minimize the disturbance to Covered Species using CRP/SAFE, ensure that conversion does not occur within species-specific timing restrictions in Table E-3. *Erosion* 1. Farm plans/GCP Site Plans will include erosion control measures to reduce sheet, rill and gully erosion at field edges by trapping sediment and reducing surface runoff. For Sharp-tailed Grouse Areas in areas with Leks or Adjacent to Leks or within likely occupied habitat: CRP/SAFE takeout or other conversion activities shall not occur April 1 to July31 In occupied Nesting Habitat, Retain a residual cover of perennial grasses and forbs of at least 20 cm (8 in) for cover during the nesting season (April 15 1 through June 30).
2.5.4 Discourage use of insecticides and herbicides in grouse brood-rearing habitats and spraying practices that damage areas of native steppe.	Pest Management and Weed Management 1. Integrate pest management techniques. Design control methods to target pest species only.

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
2. Protect sharp-tailed grouse habitat. ***(cont.)***	2. Implement integrated weed management plans to ensure timely elimination of invasive plants to prevent their spread to adjacent habitats. 3. Encourage biological control of weeds. Additional voluntary measures for pesticides are provided in Appendix E of MSGCP.
2.6 Protect shrub-steppe habitat by reducing the risk and effects of wildfires. 2.6.2 Work with owners of private lands near and adjacent to WDFW and other public lands essential to sharp-tailed grouse at high risk of damaging fires to reduce risk of fires.	Wildfire Management 1. Develop fire management plans with local fire districts. 2. Manage mechanical firebreaks and backfires to minimize impacts to Covered Species and supporting habitats. 3. Along with local fire districts, identify habitats that need special consideration during wildfire control and discuss special control techniques. Identify areas where fire control is not a critical issue. 4. Use mechanical firebreaks and backfires to minimize the adverse effects of wildfire control on critical habitats. 5. Group land units into control, limited control, and minimal wildfire control areas.
2.7 Protect essential sharp-tailed grouse habitat through easements, cooperative agreements, and acquisitions. 2.7.1 Use conservation easements or purchase of development rights agreements to keep large ranches intact and protect sharp-tailed grouse habitat. 2.7.2 Consider acquisitions of important habitat if there	Easements or acquisitions are not required by the MSGCP.

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
are willing sellers and when it provides the best option to protect and/or restore critical habitats.	
2.8 Provide data, information, and technical advice to conservation districts, counties, regulatory agencies, and landowners to increase protection of sharp-tailed grouse habitat.	WDFW commits to provide assistance in implementation of the MSGCP as described in Appendix A of the MSGCP.
3. Enhance or restore sharp-tailed grouse habitat. 3.1 Analyze current habitat conditions to identify focus areas for enhancement or restoration. 3.3. Facilitate sharp-tailed grouse habitat enhancement and restoration on other public and private lands.	The goal of the MSGCP is to maintain and improve existing shrub-steppe habitat, and many of the BMPs listed above and below in this matrix will address these issues.
7. Coordinate and cooperate with other agencies, landowners, and private groups in the conservation, protection, and restoration of sharp-tailed grouse in Washington. 7.1 Implement Farm Bill programs to benefit sharp-tailed grouse. 7.1.1 Identify priority areas in Washington where Farm Bill programs have the greatest potential to benefit sharp-tailed grouse. 7.1.2 Provide technical advice on planting requirements and management practices to enhance or restore potential sharp-tailed grouse habitat. 7.1.3 Review and comment during rule-making at the national level to ensure that Farm Bill programs continue to benefit sharp-tailed grouse in Washington and elsewhere.	WDFW commits to provide assistance in implementation of the MSGCP as described in Appendix A of the MSGCP. In addition to implementing measures on private land, the MSGCP requires ongoing county-wide assessments of CRP and HCA lands, and has a changed-circumstances trigger to revisit the GCP if these lands decrease across the county by 10% or greater. The MSGCP developed an initial HSI model, and will do another model run at the beginning of the GCP implementation. <u>*Dryland Agriculture*</u> *Conversion of Conservation Cover to Active Farming* 1. If CRP/SAFE or other conservation contracts cannot be maintained due to program changes, enroll these

Recommended Recovery or Conservation Strategies for Sharp-tailed Grouse that can be addressed by private landowners **Source:** **Washington's Sharp-tailed Grouse recovery Plan (Stinson and Schroeder 2012 p. 97-116)**	**How the MSGCP addresses these**
7.2 Facilitate/participate information exchange and meetings to implement recovery actions and habitat restoration.	conservation lands into other Federal Farm Bill conservation program such as Grassland Reserve Program (GRP), Agriculture Conservation Easement Program (ACEP), or other similar Federal, State, or other similar programs if available. 2. Maintain original remnant patches of shrub-steppe within CRP/SAFE fields when converting back to crops. 3. To minimize the disturbance to Covered Species using CRP/SAFE, ensure that conversion does not occur within species-specific timing restrictions in Table E-3. *BMPs specific to sage grouse in Areas with Leks or Adjacent to Leks or in likely occupied habitats:* • *CRP/SAFE takeout or other conversion activities not to occur between March 15 and July 14.*

Appendix C Table 4. List of Sage-grouse recovery or conservation strategies that are addressed by private landowners through MSGCP in Douglas County.

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
<u>Protection of Sage grouse from disturbance</u> • Protect sage-grouse populations. (Item 2; WA RP) • Protect active sage-grouse leks from human disturbance. 2.1 WA RP • Avoid potentially disturbing activities such as farming, mining, and recreation near leks (-2 km) between the hours of 1800 and 0900 during February-April. 2.1.2 WA RP • Protect nesting and brood rearing areas from disturbance. o Wherever possible, prevent disturbance in sage-grouse nesting and brood rearing habitat between 1 March and 15 June, including development, blasting, military training, livestock trail use, falconry, off-road vehicle use, recreation, and training of hunting dogs (2.2 WA RP)	*Implement BMPs for all agricultural uses, including:* *Recreational Use: Non-Agricultural Motorized Vehicle Use, Hunting, Fishing, Wildlife Viewing* 1. Restrict recreational use during critical mating, nesting, and brood-rearing periods, especially near sharp-tailed grouse leks (March1 to June 30) and sage grouse leks (February 1 to June 30). 2. Ensure proper use of gates and other livestock management devices. 3. Minimize motorized access. 4. Consider potential impacts on wildlife, site habitat features, ranch operations and quality of life before permitting hunting and recreation. Educate visitors about limits, rules, and cautions needed to make sure their land use has minimum impact on habitat, wildlife resources, forage production, and ranch operation. 5. Minimize visitor vehicle traffic on ranch roads to prevent noxious weed introduction. 6. Develop educational information about Covered Species that Applicants/Permittees can share with hunters. BMPs specific to grouses for activities in or Near Leks: • Minimize impacts to Greater sage-grouse and Columbian sharp-tail grouse leks and nesting habitats during the spring breeding season and nesting season (may vary by site but

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
<u>Protection of Sage grouse from disturbance *(cont.)*</u>	typically March through June for sharp-tailed grouse; and February 20 through June for sage grouse). • Avoid disturbance to occupied leks. Typical season is between March through June for sharp-tailed grouse, and February 20 through May 15 for sage grouse. Within 0.5 mile of known leks, schedule essential springtime agricultural activities near leks to occur in the middle of the day (avoid activities from one hour before sunset sunrise to 3 hours after sunrise). At those times and locations, avoid physical, mechanical, and loud noise disturbances.
<u>Reducing the likelihood of collision with structures</u> • Reduce the collision and predation hazards posed by poles, wires, and fences. 2.4 WA RP • Remove unneeded fences in sage-grouse use areas. (WA RP) 2.4.3 • Avoid or reduce the impact of range management structures on sage-grouse (COT). o Range management structures should be designed and placed to be neutral or beneficial to sage-grouse. o Structures that are currently contributing to negative impacts to either sage-grouse or their habitats should be removed or modified to remove the threat. • Minimize the impact of fences on sage-grouse populations. (COT).	BMPs specific to grouses for activities in or Near Leks: Plan and design placement of new fences away from occupied and historic leks. If this is not possible, adequately mark fences to increase visibility. Identify existing fences that are nearby to an occupied or historic lek and consider removing or relocating the fence to a site further from the lek. At a minimum, mark all existing fences within ¼ mile from an occupied or historic lek, or in high risk areas where collisions are likely or known to occur. Use NRCS, SGI, or other appropriate national or local fence collision tools to prioritize fence marking.

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
o Mark fences that are in high risk areas for collision (Stevens *et al.* 2012) with permanent flagging or other suitable device to reduce sage-grouse collisions on flat to gently rolling terrain in areas of moderate to high fence densities (i.e., more than 1 km of fence per km^2) located within 2 kms of occupied leks. o Identify and remove unnecessary fences. o Placement of new fences and livestock management facilities (including corrals, loading facilities, water tanks and windmills) should consider their impact on sage- grouse and, to the extent practicable, be placed at least 1 km from occupied leks (Stevens *et al*. 2012).	
<u>Maintaining or improving riparian habitats</u> • Manage riparian habitats on public lands to support sage-grouse conservation. 4.5 WA RP. • Promote recovery of vegetation in riparian zones degraded by past over-grazing. 4.5.1 WA RP • Avoid moderate to heavy livestock grazing, road development, and human disturbance in wet meadows. 4.5.2 WA RP	*<u>Implement BMPs, including, for All Agricultural Uses:</u>* *Riparian Areas* 1. Increase variety of native tree/shrub species and age classes within riparian areas. Develop riparian habitat with age class variety, plant species variety, and age diversity of shrub and tree canopy layers. Possible management practices: a. Implement rotation and deferred grazing strategies within riparian areas that produce a diversity of age, species, and life forms within riparian habitat areas, resulting in a properly functioning condition. Deferred and rotation

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
<u>Maintaining or improving riparian habitats *(cont.)*</u>	grazing systems that provide extended periods of rest are needed to produce appropriate vegetation age classes when they are missing. b. Use fencing to control livestock use periods. c. Monitor herbicide applications. d. Avoid overspray of herbicides within riparian areas. 2. Manage existing riparian habitat to allow it to reach its full site potential and function. 3. Restore range riparian habitat to support Covered Species. 4. Protect springs, seeps, and wet meadows within and adjacent to sagebrush stands from over-grazing. 5. Manage lands to provide good water quality and riparian conditions in seeps, wetlands, springs, creeks, rivers, lakes. 6. Maintain snags or potential snags, including large old cottonwoods, in riparian areas. 7. Maintain riparian flood plain and associated shrub habitat. 8. Avoid cutting or removing willows or other species important for sharp-tailed grouse wintering, including water birch, hawthorn, serviceberry, chokecherry, etc. 9. Consider removing exotic white poplar (*Populus alba*) where it is crowding out water birch and other native riparian species (Stinson and Schroeder 2012, p. 53).
<u>Monitoring habitat</u> • Monitor changes in sage-grouse habitat through remote sensing and mapping. 4.7 WA RP	In addition to implementing measures on private land, the MSGCP requires ongoing county-wide assessments of CRP and HCA lands, and has changed-circumstances triggers to revisit the GCP if these lands decrease across the county by 10% or greater.

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
Monitoring habitat *(cont.)*	The MSGCP developed an initial HSI model, and will do another model run at the beginning of the GCP implementation.
Maintain and restore habitat • Maintain and restore healthy, native sagebrush plant communities. (COT) o Retain all remaining large intact sagebrush patches, particularly at low elevations. o Reduce or eliminate disturbances that promote the spread of these invasive species, such as reducing fires to a "normal range" of fire activity for the local ecosystem, employing grazing management that maintains the perennial native grass and shrub community appropriate to the local site, reducing impacts from any source that allows for the invasion by these species into undisturbed sagebrush habitats, and precluding the use of treatments intended to remove sagebrush. o Monitor and control invasive vegetation post-wildfire for at least three years. o Require best management practices for construction projects in and adjacent to sagebrush habitats to prevent invasion. o Restore altered ecosystems such that non-native invasive plants are reduced to levels that do not put the area at risk of conversion if a catastrophic event were to occur. This is especially important within Wyoming big sagebrush communities as these cover	The goal of the MSGCP is to maintain and improve existing shrub-steppe habitat, and many of the BMPs listed above and below in this matrix will address these issues.

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
types are the most at risk to displacement by cheatgrass (Wisdom *et al.* 2005). While complete elimination of non-native invasive plants would be ideal, we acknowledge that this is unlikely given our current understanding of underlying ecological processes, shifts in climate, and lack of resources. • Promote removal of old fences, unused equipment, and refuse from shrub-steppe remnants. 7.1.4 WA RP	
<u>Farm Bill Programs</u> • Facilitate and promote the use of incentives, such as Farm Bill conservation programs, to benefit sage-grouse. 6 WA RP. • Assist landowners by providing information, advice, or materials for implementing incentive programs available for habitat protection and restoration. 6.1 WA RP • Avoid further loss of sagebrush habitat for agricultural activities (both plant and animal production) and prioritize restoration. In areas where taking agricultural lands out of production has benefited sage-grouse, the programs supporting these actions should be targeted and continued (e.g. CRP/SAFE). Threat amelioration activities should, at a minimum, be prioritized within PACs, but should be considered in all sage-grouse habitats. o Revise Farm Bill policies and commodity programs that facilitate ongoing conversion of native habitats to marginal croplands (e.g.,	*<u>Implement BMPs for all agricultural uses, including:</u>* *<u>Dryland Agriculture</u>* *Conversion of Conservation Cover to Active Farming* 1. If CRP/SAFE or other conservation contracts cannot be maintained due to program changes, enroll these conservation lands into other Federal Farm Bill conservation program such as Grassland Reserve Program (GRP), Agriculture Conservation Easement Program (ACEP), or other similar Federal, State, or other similar programs if available. 2. Maintain original remnant patches of shrub-steppe within CRP/SAFE fields when converting back to crops. 3. To minimize the disturbance to Covered Species using CRP/SAFE, ensure that conversion does not occur within species-specific timing restrictions in Table E-3.

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
through the addition of a 'Sodsaver' provision), to support conservation of remaining sagebrush-steppe habitats. o Continue and expand incentive programs that encourage the maintenance of sagebrush habitats. o Develop criteria for set-aside programs which stop negative habitat impacts and promote the quality and quantity sage-grouse habitat. o If lands that provide seasonal habitats for sage-grouse are taken out of a voluntary program, such as CRP or SAFE, precautions should be taken to ensure withdrawal of the lands minimizes the risk of direct take of sage-grouse (e.g., timing to avoid nesting season). Voluntary incentives should be implemented to increase the amount of sage-grouse habitats enrolled in these programs.	BMPs specific to sage grouse in Areas with Leks or Adjacent to Leks or in likely occupied habitats: • CRP/SAFE takeout or other conversion activities not to occur between March 15 and July 14.
<u>Maintain habitat and remnants</u> • Facilitate management of agricultural and range-lands that is compatible with the conservation of sage-grouse. 7.WA RP • Promote the protection of remnant areas of native shrub-steppe. 7.1 WA RP • Encourage the protection of remnant shrub-steppe by providing information about the importance of shrub-	*Implement BMPs for all agricultural uses:* *Maintain Remnants* 1. Maintain, enhance, and protect from degradation remnant patches of shrub-steppe interspersed in CRP/SAFE and cropland. Rock piles that do not support shrub-steppe vegetation are not considered remnants.

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
steppe remnants in the matrix of CRP and croplands. 7.1.1 WA RP • Avoid sagebrush removal or manipulation in sage-grouse breeding or wintering habitats. Exceptions to this can be considered where minor habitat losses are sustained while implementing other habitat improvement or maintenance efforts (e.g., juniper removal) and in areas used as late summer brood habitat (Connelly *et al.* 2000). Appropriate regulatory and incentive-based mechanisms must be implemented to preclude sagebrush removal and manipulation for all other purposes. (COT) • Discourage removal of sagebrush from known sage-grouse wintering areas and areas that provide escape cover in breeding habitat, especially within 3 km of leks. 7.2.3 WA RP • Work with landowners to protect the most important sage-grouse habitat on private land. 5 WA RP	
<u>Manage rangelands to improve habitat</u> • Work with range managers interested in sage-grouse conservation to utilize range management practices that result in increased habitat value for sage-grouse. 7.2 WA RP • Support range management practices that result in retention of residual perennial grass cover and healthy communities of native perennial grasses and the associated forb and shrub communities. 7.2.1 WA RP	For range land agriculture, Implement standard grazing BMPs, or other programs that result in similar protections, including: *Grazing Guidelines* *Note: The standard grazing guidelines and species- specific measures below provide prescriptions with the goal of producing or maintaining habitat for covered species' life history needs, including providing for cover, forage, and*

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
• Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover). Areas which do not currently meet this standard should be managed to restore these components. Adequate monitoring of grazing strategies and their results, with necessary changes in strategies, is essential to ensuring that desired ecological conditions and sage-grouse response are achieved. o Ensure that allotments meet ecological potential and wildlife habitat requirements; o and, ensure that the health and diversity of the native perennial grass community is o consistent with the ecological site. o Inform and educate affected grazing permittees regarding sage-grouse habitat needs o and conservation measures. o Incorporate sage-grouse habitat needs or habitat characteristics into relevant resource o and allotment management plans, including the desired conditions with the o understanding that these desired conditions may not be fully achievable: (a) due to the o existing ecological condition, ecological potential or the existing vegetation; or	*reproduction habitat. Other alternative grazing rotations or prescriptions might be acceptable, as long as they met similar expectations, including utilization rates, stubble heights, and distribution and timing that encourages plant productivity and vigor, seed production, photosynthesis, recovery and re-growth. Alternative grazing prescriptions may need more stringent monitoring plans that are developed and implemented to ensure that expectations are being met. If expectations are not met, the grazing prescriptions may need to be modified as implementation proceeds.* The following will promote better habitat and encourage plant productivity and vigor, seed production, photosynthesis, recovery and re-growth. 1. Develop a grazing management plan that accounts for the intensity of grazing and the timing of both grazing periods and recovery periods. The plan should include: 2. Graze a pasture no more than once every third year during the critical period for key bunchgrass species (boot stage through seed formation: typically May 15 to July15). 3. Manage utilization to achieve: a. No more than 50 percent utilization during the growing season b. No more than 60 percent utilization during the dormant season. 4. Maintain a minimum stubble height of 5" at all times on desirable bunchgrasses on average in a pasture. Note that a stubble height of 8" is better than 5" in appropriate growing

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
o (b) due to causal events unrelated to existing livestock grazing. o Conduct habitat assessments and, where necessary, determine factors causing any o failure to achieve the habitat characteristics. Make adjustments as appropriate. o Given limited agency resources, priority should be given to PACs and then sage-grouse o habitats adjacent to PACs. • Protect sage-grouse habitat on public lands. (4 WA RP) • Ensure compatibility of grazing management on public lands managed for sage-grouse. 4.4 WA RP • Where protection and restoration of sage-grouse is a major objective for public lands, manage grazing so that the habitat characteristics needed for breeding and wintering can be consistently maintained (Connelly et al. 2000b). 4.4.1 WA RP • Minimize grazing damage to soil crusts. 4.4.2 WA RP	sites. 5. Manage livestock distribution to minimize overgrazing, especially during drought. Tools such as fencing, the placement of water & salt, and riding can be used. 6. During winter, use one smaller sacrifice area for feeding to minimize impacts to shrub-steppe and other habitats. 7. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals, unless a grazing system is implemented which has a high rest to grazing period ratio which allows for adequate recovery following heavier use. *Riparian Use* 1. Allow early spring grazing only in existing riparian pasture and manage access. 2. Exclude use in undisturbed riparian areas. 3. Manage livestock to limit access on riparian areas by controlling length of grazing period and time of year or by utilizing exclusionary practices. 4. Use off-stream watering sites or selective herd management to promote livestock use of uplands. 5. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals, unless a grazing system is implemented which has a high rest to grazing period ratio which allows for adequate recovery following heavier use. *Watering Sites, Supplement Sites, Livestock Concentrations*

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
<u>Manage rangelands to improve habitat *(cont.)*</u>	1. Locate watering facilities away from riparian zones as much as is practicable; ensure escape devices for small wildlife (such as a boards or ramps). 2. Ensure that any livestock watering diversions do not restrict fish passage nor impede water volume flow. 3. If riparian crossing location is the only option, harden crossing and manage access. 4. Locate salt licks away from riparian or wetland areas. 5. Avoid livestock concentrations or travel routes on sensitive areas. 6. Protect sensitive areas, such as riparian habitat, occupied Columbia Basin pygmy rabbit habitat, Washington ground squirrel colonies, greater sage-grouse/Columbian sharp-tail grouse leks, and rare plant populations from unnecessary impacts caused by livestock concentrations. Possible management practices include: a. Locating mineral supplements, water troughs and supplemental feeding sites on shallow, gravelly, or rocky soils or rocky areas away from sensitive areas, b. Implementing exclusion fencing. 7. Manage livestock to maintain water quality goals by minimizing concentrated animal use near streams or in upland areas where surface water drains across these sites and carries excess nutrients downslope to surface water. 8. To minimize fertilizer loss to ground water or surface flow, use fertilizers in hay fields at an agronomic level that provides plant benefit but is not in excess of plant needs.

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
<u>Manage rangelands to improve habitat *(cont.)*</u>	9. Maintain chemical use on livestock and rangelands at a level that is effective, but not in amounts or in areas that would cause contamination of soil, forage, water, wildlife or habitat. Additional grazing BMPs specific to sage grouse for Likely occupied Nesting Habitats with grazing: In grazed pastures, implement measures to promote nesting cover (through appropriate rotations, stocking rates, rest, and/or deferment schedules).
<u>Minimize use of chemicals</u> • Promote agricultural practices which use fewer chemicals. 7.3 WA RP • Promote management strategies which minimize the potential exposure of sage-grouse to pesticides. 7.3.2 WARP	*Implement BMPs for all agricultural uses, including:* *Pest Management and Weed Management* 1. Integrate pest management techniques. Design control methods to target pest species only. 2. Implement integrated weed management plans to ensure timely elimination of invasive plants to prevent their spread to adjacent habitats. 3. Encourage biological control of weeds.
<u>Manage wildfires</u> • Restore degraded and burned sage-grouse habitat within Sage-Grouse Management Units. 8 WA RP. • Prepare contingency plans for habitat restoration to be used after wildfires. 8.2 WA RP • Restore degraded sage-grouse habitat. 8.3 WA RP • Retain and restore healthy native sagebrush plant communities within the range of sage-grouse (COT).	*Implement BMPs for all agricultural uses, including:* *Wildfire Management* 1. Develop fire management plans with local fire districts. 2. Manage mechanical firebreaks and backfires to minimize impacts to Covered Species and supporting habitats. 3. Along with local fire districts, identify habitats that need special consideration during wildfire control and discuss

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
o Restrict or contain fire within the normal range of fire activity (assuming a healthy native perennial sagebrush community), including size and frequency, as defined by the best available science. o Eliminate intentional fires in sagebrush habitats, including prescribed burning of breeding and winter habitats. o Design and implement restoration of burned sagebrush habitats to allow for natural succession to healthy native sagebrush plant communities. This will necessitate an intensive and well-funded monitoring system for this long-term endeavor. To be considered successful, restoration must also result in returning or increasing sage-grouse populations within burned areas. o Implement monitoring programs for restoration activities. To ensure success, monitoring must continue until restoration is complete (establishment of mature, healthy native sagebrush plant communities), with sufficient commitments to make adequate corrections to management efforts if needed. o Immediately suppress fire in all sagebrush habitats. Where resources are limited, these actions should first focus on PACs and any	special control techniques. Identify areas where fire control is not a critical issue. 4. Use mechanical firebreaks and backfires to minimize the adverse effects of wildfire control on critical habitats. 5. Group land units into control, limited control, and minimal wildfire control areas.

Recommended Recovery or Conservation Strategies for Sage Grouse that can be addressed by private landowners **Sources:** **Washington's Sage Grouse Recovery Plan (WA RP) (Stinson et al 2004)** **Conservation Objectives Team Report (COT)(USFWS 2013 p.38-52)**	**How the MSGCP addresses these**
identified connectivity corridors between PACs. • Discourage burning of CRP and vegetation along the edges of farm fields and roadsides; particularly where remnant patches of shrub-steppe may be burned in the process. 7.1.2 WA RP	