7. Blue Mountains Section

Section Description

The Blue Mountains Section is part of the Middle Rockies–Blue Mountains Ecoregion. The Idaho portion of the Blue Mountains, the subject of this review, comprises west-central Idaho from the lower Payette River valley in the south, north to the Lower Salmon River, west from the Snake River and Hells Canyon at state line to include portions of the Little Salmon River, Little Weiser River, and Squaw Creek drainages (Figure 7.1, 7.2). The Blue Mountains spans a 225 to 3,100 m (750 to 9,400 ft) elevation range. This is an arid to semiarid region that generally receives 23 to 46 cm (9 to 18 in) of precipitation annually at lower elevations. Higher elevations receive 43 to 254 cm (17 to 100 in) annually, which falls predominantly during the winter and often as snow.

Middle Fork Brownlee Creek Cecil D Andrus Wildlife Management Area, Washington County, Idaho © 2004 Anna Owsiak

The Blue Mountains Section is predominantly rural and devoted to agricultural production of livestock and crops for livestock production. Agriculture is generally irrigated with either flood or sprinkler irrigation, mostly supplied by diversion from the Snake, Little Salmon, Weiser, and Payette rivers. Major hydroelectric and water storage reservoirs include Brownlee, Oxbow, and Hells Canyon on the Snake River. Urban and suburban development is associated primarily with distinct population centers within river valleys, and the rural–urban interface is expanding. The section's aridity has given rise to water management programs, including water storage, delivery, and regulation of usage to support agriculture as well as urban and suburban areas.

The section provides numerous outdoor recreational opportunities for hunting, angling, trail riding, hiking, camping, birdwatching, and river rafting. Recreation and agriculture are the dominant land uses in the region. The Hells Canyon National Recreation Area and Hells Canyon Wilderness lie within the west central and northwest portion of this section. Sections of the Snake River within and outside of the National Recreation Area are designated as both wild and scenic. Approximately 47% of section lands are under federal ownership and management by the US Forest Service (FS) and Bureau of Land Management (US) (BLM).

A tradition of cattle and sheep ranching exists in the Blue Mountains, and farming and ranching remain major land uses. Agriculture is primarily small family operations with generational ties to the lands. Livestock grazing occurs on open range on a mix of private, state, and federal lands.

This section historically supported extensive logging and small gold and silver mines. Today, a limited, but still commercially viable logging and mineral extraction industry exists for both these raw materials.

The Blue Mountains contains important intact canyon grassland and forest habitats for species including Bighorn Sheep (*Ovis canadensis*) and Northern Idaho Ground Squirrel (*Urocitellus brunneus*). The section's sagebrush steppe habitat has been highly altered by the biological invasion of nonnative plants, particularly invasive annual grasses introduced from the Eurasian Steppe biome such as cheatgrass (*Bromus tectorum* L.) and medusahead (*Taeniatherum caput-medusae* [L.] Nevski). These plants affect many aspects of sagebrush steppe ecology, but perhaps most importantly, the presence of invasive annual grasses alters fire regimes. In some areas, increased intensity and frequency of wildfires has resulted in conversion from shrub-dominated habitats to nonnative annual grasslands, which has reduced habitat value to shrubsteppe obligate species. In some areas, the altered habitat has favored species that benefit from less shrub cover, including early-seral and grassland-dependent species. This has been particularly true at lower elevation sites formerly dominated by Wyoming big sagebrush (*Artemisia tridentata* Nutt. subsp. *wyomingensis* Beetle & Young) and bitterbrush (*Purshia tridentata*, Beetle & Young). However, some areas remain dominated by native vegetation and provide important habitat for species such as Sharp-tailed Grouse (*Tympanuchus phasianellus*), Long-billed Curlew (*Numenius americanus*), and Southern Idaho Ground Squirrel (*U. endemicus*).

Aquatic and wetland habitat is important for most wildlife in this arid landscape and is obligatory for fish, aquatic invertebrates, and amphibious mammals and amphibians. In-stream habitat and riparian habitat are usually intrinsically linked in terms of their condition and value as fish and wildlife habitat. Wetlands and riparian habitat tend to have the highest vegetation productivity within the landscape and are key habitat types for foraging herbivores (invertebrates to large ungulates). Dense cover associated with wetland and riparian habitat is also favorable for many types of wildlife. In addition, high insect abundance is associated with these areas of greater primary productivity, and wetland and riparian habitat is essential for many insectivorous animals, notably bats and neotropical migratory birds.

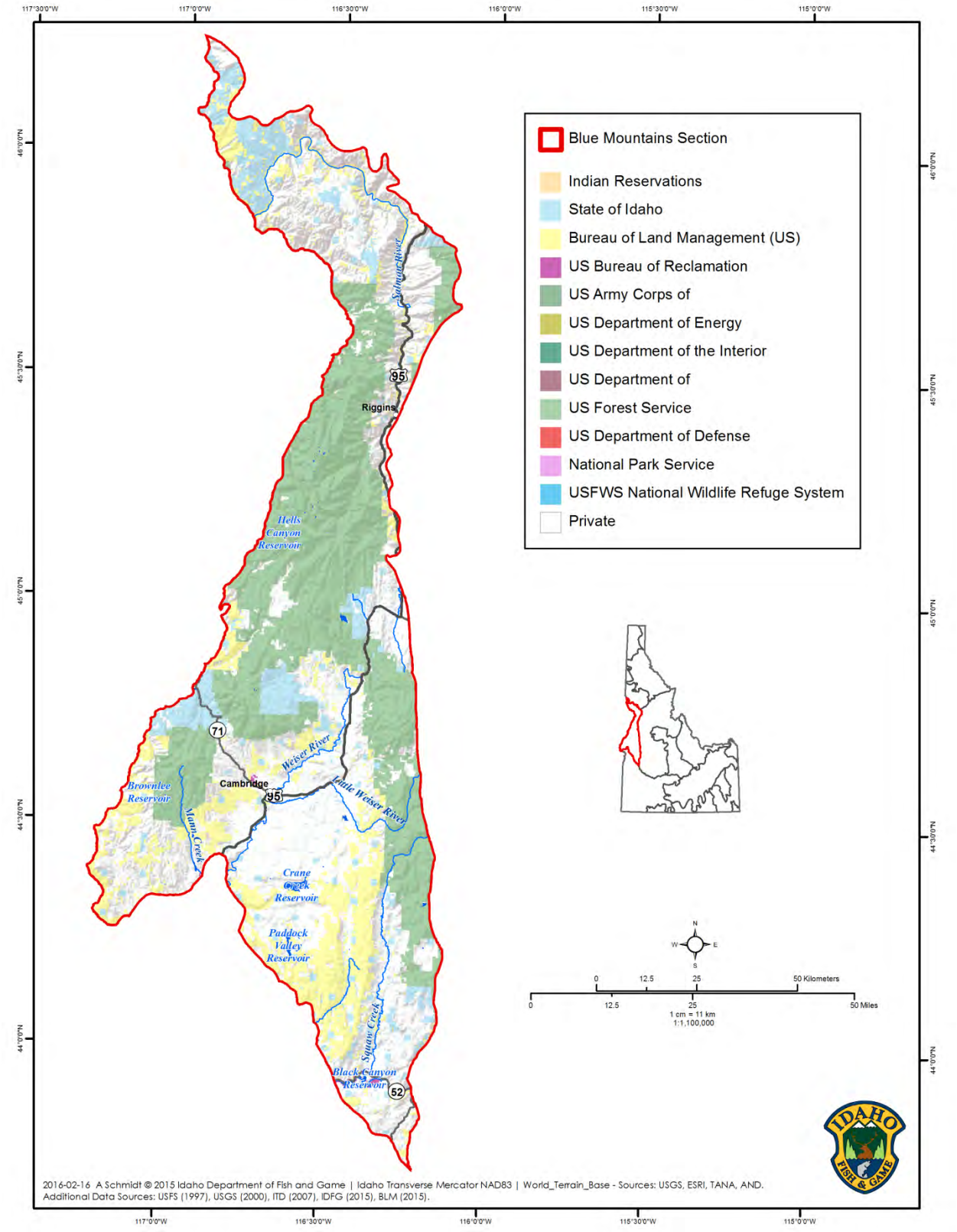


Fig. 7.1 Map of Blue Mountains surface management

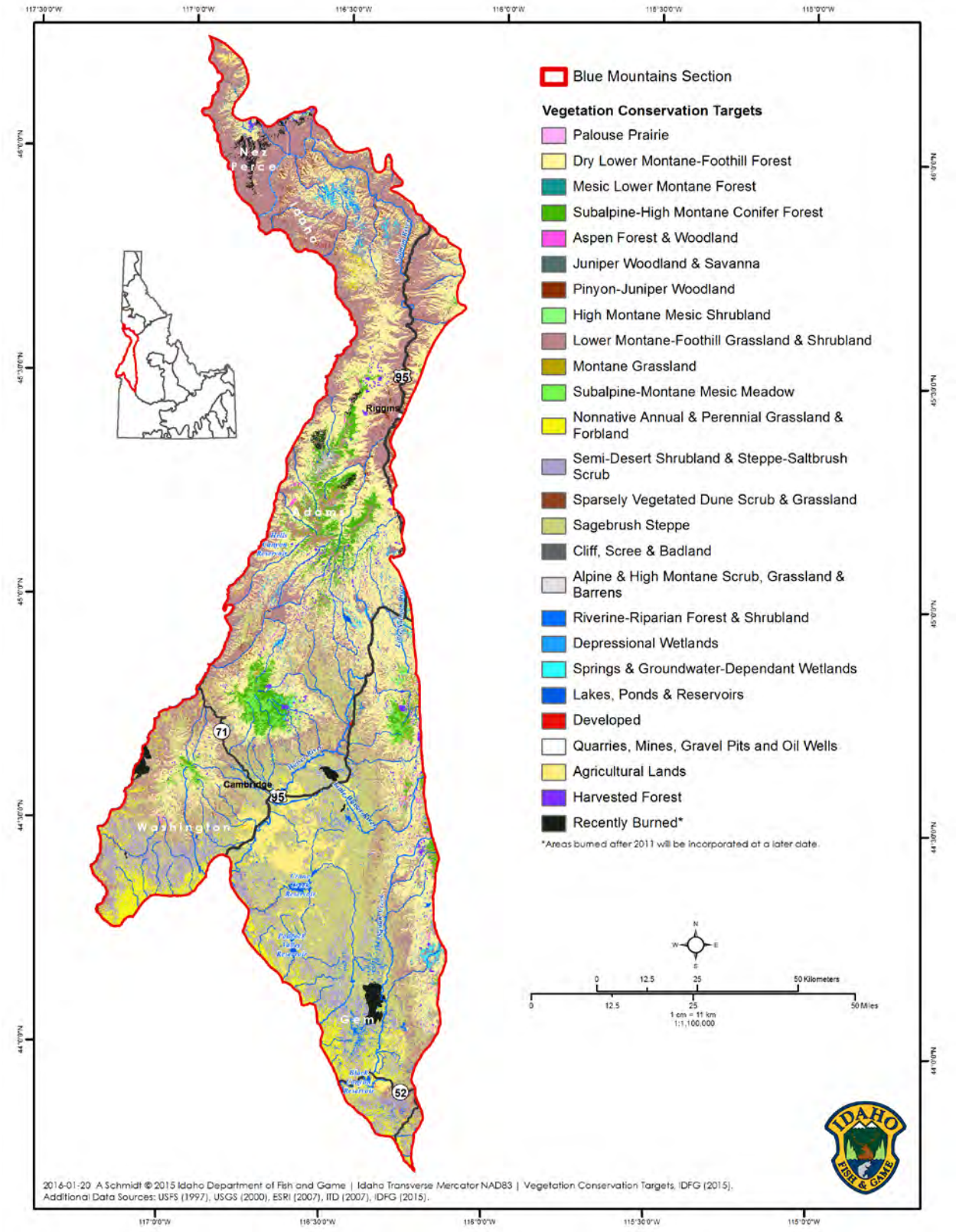


Fig. 7.2 Map of Blue Mountains vegetation conservation targets

Conservation Targets in the Blue Mountains

We selected 6 habitat targets (4 upland, 2 aquatic) that represent the major ecosystems in the Blue Mountains as shown in Table 7.1. Each of these systems provides habitat for key species of greatest conservation need (SGCN), i.e., "nested targets" (Table 7.2) associated with each target. All SGCN management programs in the Blue Mountains have a nexus with habitat management programs. We provide a high-level summary of current viability status for each target. Conservation of the habitat targets listed below should conserve most of the nested species within them. However, we determined that at least 4 taxa—Bighorn Sheep (addressed in separate management plan at http://fishandgame.idaho.gov/public/wildlife/planBighorn.pdf), Northern Idaho Ground Squirrel, Southern Idaho Ground Squirrel, and insect pollinators—face special conservation needs and thus are presented as explicit species targets as shown in Table 7.1.

Table 7.1 At-a-glance table of conservation targets in the Blue Mountains

Target	Target description	Target viability	Nested targets (SGCN)	
Dry Lower Montane–Foothill Forest	Includes wetter meadow patches important to the Northern Idaho Ground Squirrel.	*Fair.* Forest systems intact and functional, but are increasingly impacted by insect and disease outbreaks tied to changing weather patterns. Wildfire scope and severity are increasingly impacting forest health. Housing development expanding into forest systems.	*Tier 1*	Northern Idaho Ground Squirrel Whorled Mountainsnail
			Tier 2	Mountain Quail Silver-haired Bat Hoary Bat Bighorn Sheep Lyrate Mountainsnail Deep Slide Mountainsnail Striate Mountainsnail
			Tier 3	Lewis's Woodpecker White-headed Woodpecker Olive-sided Flycatcher Clark's Nutcracker Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis Salmon Coil Boulder Pile Mountainsnail Coeur d'Alene Oregonian Western Flat-whorl Shiny Tightcoil Spur-throated Grasshopper (*Melanoplus*) Species Group
Lower Montane–Foothill Grassland & Shrubland	Higher elevations of the Salmon River valley, Little Salmon, and Hells Canyon have conifer forest that extends downslope on northern aspects and valleys. Mountain shrub components form understory and patches within this	*Good*. Much of habitat is intact. Annual invasive grasses are prevalent below about 1,200 m (4,000 ft) elevation. Bitterbrush not regenerating in competition with invasive annuals; sagebrush and other shrubs are successfully	*Tier 1*	Greater Sage-Grouse Southern Idaho Ground Squirrel Seven Devils Mountainsnail Whorled Mountainsnail Lava Rock Mountainsnail Salmon Oregonian Cottonwood Oregonian
			Tier 2	Mountain Quail Sharp-tailed Grouse Long-billed Curlew Burrowing Owl Silver-haired Bat Hoary Bat

Target	Target description	Target viability	Nested targets (SGCN)	
	mosaic. Lower slopes and south-facing slopes are grasslands systems.	regenerating. Inappropriate fire regimes are impacting the system.		Bighorn Sheep Lyrate Mountainsnail Costate Mountainsnail Deep Slide Mountainsnail Striate Mountainsnail
			Tier 3	Short-eared Owl Common Nighthawk Grasshopper Sparrow Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis Salmon Coil Southern Tightcoil Boulder Pile Mountainsnail Coeur d'Alene Oregonian
Sagebrush Steppe	Sagebrush-steppe systems occur at all elevations across the Blue Mountains. It is important to maintain a mosaic of sagebrush in different seral stages.	*Poor* to *Fair*. Habitat is highly altered and in poor ecological condition, dominated by invasive annual grasslands with an altered fire regime.	*Tier 1*	Greater Sage-Grouse Southern Idaho Ground Squirrel
			Tier 2	Sharp-tailed Grouse Long-billed Curlew Burrowing Owl Sagebrush Sparrow Silver-haired Bat Hoary Bat Bighorn Sheep Costate Mountainsnail Deep Slide Mountainsnail
			Tier 3	Short-eared Owl Common Nighthawk Grasshopper Sparrow Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis Mountain Goat Boulder Pile Mountainsnail
Riverine–Riparian Forest & Shrubland	Rivers and streams, including aquatic habitats and their associated terrestrial riparian habitats, and off channel wetlands, springs and seeps. Includes the Snake, Weiser, and Little Weiser River systems and their tributaries.	*Fair*. Many riverine systems are still mostly intact. Erosion and other impacts of channelization beginning to be addressed on a local level.	*Tier 1*	Steelhead (Snake River Basin DPS) Sockeye Salmon (Snake River ESU) Chinook Salmon (Snake River fall-run ESU) Chinook Salmon (Snake River spring/summer-run ESU) Greater Sage-Grouse Pixie Pebblesnail Marbled Disc Salmon Oregonian Cottonwood Oregonian
			Tier 2	Mountain Quail Sharp-tailed Grouse Long-billed Curlew Lewis's Woodpecker Silver-haired Bat Hoary Bat

Target	Target description	Target viability	Nested targets (SGCN)	
				Bighorn Sheep Western Pearlshell A Riffle Beetle (*Bryelmis idahoensis*)
			Tier 3	Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis Western Ridged Mussel Pondsnail (*Stagnicola*) Species Group Rotund Physa Nez Perce Pebblesnail Coeur d'Alene Oregonian Columbia River Tiger Beetle Monarch Spur-throated Grasshopper (*Melanoplus*) Species Group Boise Snowfly A Caddisfly (*Cheumatopsyche logani*) A Caddisfly (*Eocosmoecus schmidi*) A Caddisfly (*Homophylax auricularis*) A Caddisfly (*Rhyacophila oreia*) A Caddisfly (*Sericostriata surdickae*)
Springs & Groundwater-Dependent Wetlands	Includes a subset of groundwater-dependent ecosystems such as springs and seeps, geothermal springs, alkaline wetlands, and wet and mesic meadows.	*Fair*. Habitat area has been negatively impacted by concentrated livestock use, invasive plants and heavy erosion.	*Tier 1*	Greater Sage-Grouse
			Tier 2	Mountain Quail Sharp-tailed Grouse Silver-haired Bat Hoary Bat Bighorn Sheep Pristine Pyrg
			Tier 3	Sandhill Crane Common Nighthawk Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis Mountain Goat Pondsnail (*Stagnicola*) Species Group Monarch
Agricultural Lands	Broad, flat valley bottoms are primarily in agricultural production, particularly livestock and crops for livestock production.	*Good*. Conversion of agricultural lands to urban and suburban development and long-term water availability.	*Tier 1*	Greater Sage-Grouse Southern Idaho Ground Squirrel
			Tier 2	Sharp-tailed Grouse Long-billed Curlew Burrowing Owl Silver-haired Bat Hoary Bat
			Tier 3	Sandhill Crane Common Nighthawk

Target	Target description	Target viability	Nested targets (SGCN)	
				Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis Monarch
Bighorn Sheep	Bighorn Sheep are an iconic species in the Blue Mountains. Main populations in central and northern portions; few to no sheep in southern portion of section. Threats faced include disease transmission from domestic sheep and goats, and potential poaching. Two Population Management Units (PMUs) across the Blue Mountains (IDFG 2010).	*Poor*. Currently population is well below habitat carrying capacity. Conflicts with domestic sheep impact populations.	*Tier 2*	Bighorn Sheep
Northern Idaho Ground Squirrel	Section supports all but one known Northern Idaho Ground Squirrel colony.	*Fair*. Half of populations occur on private lands with no long-term protections. Many habitat issues need to be addressed. Recovery goals for population size and security have not been attained.	*Tier 1*	Northern Idaho Ground Squirrel
Southern Idaho Ground Squirrel	The Southern Idaho Ground Squirrel is endemic to approximately 291,500 ha (720,500 acres) in Gem, Payette, Washington, and Adams counties. This is an exceptionally limited species range.	*Good*. Populations have rebounded from an apparent 1998–2001 population decline and now occupy most of the historical distribution. The population decline driver has not been determined.	*Tier 1*	Southern Idaho Ground Squirrel
Pollinators	Pollinators provide an essential ecosystem service which benefits	*Fair.* Many pollinators are declining range wide.	*Tier 1*	Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee

Target	Target description	Target viability	Nested targets (SGCN)	
	agricultural producers, agricultural consumers, and gardeners. Many pollinators, but particularly bees, are experiencing population declines.		*Tier 3*	A Miner Bee (*Perdita barri*) A Miner Bee (*Perdita salicis euxantha*) A Miner Bee (*Perdita wyomingensis sculleni*) Hunt's Bumble Bee Yellow Bumble Bee A Mason Bee (*Hoplitis orthognathus*) A Moth (*Grammia eureka*) Johnson's Hairstreak Monarch Gillette's Checkerspot

Table 7.2 Species of greatest conservation need (SGCN) and associated conservation targets in the Blue Mountains

Taxon	Conservation targets									
	Dry Lower Montane–Foothill Forest	Lower Montane–Foothill Grassland & Shrubland	Sagebrush Steppe	Riverine–Riparian Forest & Shrubland	Springs & Groundwater-Dependent Wetlands	Agricultural Lands	Bighorn Sheep	Northern Idaho Ground Squirrel	Southern Idaho Ground Squirrel	Pollinators
RAY-FINNED FISHES										
Steelhead (Snake River Basin DPS) (*Oncorhynchus mykiss*)[1]				X						
Sockeye Salmon (Snake River ESU) (*Oncorhynchus nerka*)[1]				X						
Chinook Salmon (Snake River fall-run ESU) (*Oncorhynchus tshawytscha*)[1]				X						
Chinook Salmon (Snake River spring/summer-run ESU) (*Oncorhynchus tshawytscha*)[1]				X						
BIRDS										
Mountain Quail (*Oreortyx pictus*)[2]	X	X		X	X					
Greater Sage-Grouse (*Centrocercus urophasianus*)[1]		X	X	X	X	X				
Sharp-tailed Grouse (*Tympanuchus phasianellus*)[2]		X	X	X	X	X				
Sandhill Crane (*Grus canadensis*)[3]					X	X				
Long-billed Curlew (*Numenius americanus*)[2]		X	X	X		X				
Burrowing Owl (*Athene cunicularia*)[2]		X	X			X				
Short-eared Owl (*Asio flammeus*)[3]		X	X							
Common Nighthawk (*Chordeiles minor*)[3]		X	X		X	X				
Lewis's Woodpecker (*Melanerpes lewis*)[2]	X			X						
White-headed Woodpecker (*Picoides albolarvatus*)[3]	X									
Olive-sided Flycatcher (*Contopus cooperi*)[3]	X									
Clark's Nutcracker (*Nucifraga columbiana*)[3]	X									
Sagebrush Sparrow (*Artemisiospiza nevadensis*)[2]			X							
Grasshopper Sparrow (*Ammodramus savannarum*)[3]		X	X							
MAMMALS										
Townsend's Big-eared Bat (*Corynorhinus townsendii*)[3]	X	X	X	X	X	X				
Silver-haired Bat (*Lasionycteris noctivagans*)[2]	X	X	X	X	X	X				
Hoary Bat (*Lasiurus cinereus*)[2]	X	X	X	X	X	X				
Western Small-footed Myotis (*Myotis ciliolabrum*)[3]	X	X	X	X	X	X				
Little Brown Myotis (*Myotis lucifugus*)[3]	X	X	X	X	X	X				
Mountain Goat (*Oreamnos americanus*)[3]					X					
Bighorn Sheep (*Ovis canadensis*)[2]	X	X	X	X	X		X			
Northern Idaho Ground Squirrel (*Urocitellus brunneus*)[1]	X							X		

Taxon	Conservation targets									
	Dry Lower Montane–Foothill Forest	Lower Montane–Foothill Grassland & Shrubland	Sagebrush Steppe	Riverine–Riparian Forest & Shrubland	Springs & Groundwater-Dependent Wetlands	Agricultural Lands	Bighorn Sheep	Northern Idaho Ground Squirrel	Southern Idaho Ground Squirrel	Pollinators
Southern Idaho Ground Squirrel (*Urocitellus endemicus*)[1]		X	X			X			X	
BIVALVES										
Western Pearlshell (*Margaritifera falcata*)[2]				X						
Western Ridged Mussel (*Gonidea angulata*)[3]				X						
GASTROPODS										
Pondsnail (*Stagnicola*) Species Group[3]				X	X					
Rotund Physa (*Physella columbiana*)[3]				X						
Nez Perce Pebblesnail (*Fluminicola gustafsoni*)[3]				X						
Pixie Pebblesnail (*Fluminicola minutissimus*)[1]				X						
Pristine Pyrg (*Pristinicola hemphilli*)[2]					X					
Marbled Disc (*Discus marmorensis*)[1]				X						
Salmon Coil (*Helicodiscus salmonaceus*)[3]	X	X								
Seven Devils Mountain Snail (*Oreohelix hammeri*)[1]		X								
Lyrate Mountainsnail (*Oreohelix haydeni*)[2]	X	X								
Costate Mountainsnail (*Oreohelix idahoensis*)[2]		X	X							
Deep Slide Mountainsnail (*Oreohelix intersum*)[2]	X	X	X							
Boulder Pile Mountainsnail (*Oreohelix jugalis*)[3]	X	X	X							
Striate Mountainsnail (*Oreohelix strigosa goniogyra*)[2]	X	X								
Whorled Mountainsnail (*Oreohelix vortex*)[1]	X	X								
Lava Rock Mountainsnail (*Oreohelix waltoni*)[1]		X								
Salmon Oregonian (*Cryptomastix harfordiana*)[1]		X		X						
Coeur d'Alene Oregonian (*Cryptomastix mullani*)[3]	X	X		X						
Cottonwood Oregonian (*Cryptomastix populi*)[1]		X		X						
Western Flat-whorl (*Planogyra clappi*)[3]	X	X								
Southern Tightcoil (*Ogaridiscus subrupicola*)[3]		X								
Shiny Tightcoil (*Pristiloma wascoense*)[3]	X	X								
INSECTS										
Columbia River Tiger Beetle (*Cicindela columbica*)[3]				X						
A Riffle Beetle (*Bryelmis idahoensis*)[2]				X						
A Miner Bee (*Perdita barri*)[3]										X
A Miner Bee (*Perdita salicis euxantha*)[3]										X
A Miner Bee (*Perdita wyomingensis sculleni*)[3]										X
Yellow Bumble Bee (*Bombus fervidus*)[3]										X

Taxon	Conservation targets									
	Dry Lower Montane–Foothill Forest	Lower Montane–Foothill Grassland & Shrubland	Sagebrush Steppe	Riverine–Riparian Forest & Shrubland	Springs & Groundwater-Dependent Wetlands	Agricultural Lands	Bighorn Sheep	Northern Idaho Ground Squirrel	Southern Idaho Ground Squirrel	Pollinators
Hunt's Bumble Bee (*Bombus huntii*)[3]										X
Morrison's Bumble Bee (*Bombus morrisoni*)[1]										X
Western Bumble Bee (*Bombus occidentalis*)[1]										X
Suckley's Cuckoo Bumble Bee (*Bombus suckleyi*)[1]										X
A Mason Bee (*Hoplitis orthognathus*)[3]										X
A Moth (*Grammia eureka*)[3]										X
Johnson's Hairstreak (*Callophrys johnsoni*)[3]										X
Monarch (*Danaus plexippus*)[3]				X	X	X				X
Gillette's Checkerspot (*Euphydryas gillettii*)[3]										X
Spur-throated Grasshopper (*Melanoplus*) Species Group[3]	X			X						
Boise Snowfly (*Utacapnia nedia*)[3]				X						
A Caddisfly (*Cheumatopsyche logani*)[3]				X						
A Caddisfly (*Eocosmoecus schmidi*)[3]				X						
A Caddisfly (*Homophylax auricularis*)[3]				X						
A Caddisfly (*Rhyacophila oreia*)[3]				X						
A Caddisfly (*Sericostriata surdickae*)[3]				X						

Target: Dry Lower Montane–Foothill Forest

Dry Lower Montane–Foothill Forest is a significant habitat in the central portion of the Blue Mountains. It accounts for approximately 26% of the land area in this section and restoration is a high priority. This conifer forest habitat occurs at lower elevations and along major river corridors. It is typically the first forest zone above grassland or shrubland and transitions to subalpine forest at the higher-elevation end of its range. Ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*) are dominant tree species, occurring in open stands with a variety of grasses and/or shrubs in the understory, such as pinegrass (*Calamagrostis rubescens*), Idaho fescue, Mallow ninebark (*Physocarpus malvaceus*), white spirea (*Spiraea betulifolia*), and snowberry (*Symphoricarpos* spp.). Frequent, low-intensity wildfire historically maintained open stand conditions with widely spaced large trees. These forests have been important for timber harvest and recreation due to their accessibility.

Mixed conifer dry montane forest, Adams County, Idaho © Anna Owsiak

Most of the Dry Lower Montane–Foothill Forest in the Blue Mountains occurs on federally managed land, within the Payette National Forest. Over the last decade US Forest Service (USFS) management direction has focused on restoring dry pine forests toward historical range of variability for structure (e.g., tree species, size classes, canopy cover) and ecological function (e.g., fire regime).

Target Viability

The condition of Dry Lower Montane–Foothill Forest varies across the section from good to fair. The amount of habitat is still relatively high within its historic distribution, but nearly a century of fire suppression and timber harvest have changed conditions in many stands, particularly those outside wilderness areas. Forests have grown in with dense thickets of smaller-diameter trees, canopy cover is higher, large-diameter trees and snags are less abundant, and tree species composition has changed from predominantly early-seral species such as ponderosa pine and western larch (*Larix occidentalis*)to a greater abundance of less fire-resistant species such as grand fir (*Abies grandis*). As a result, the potential for more lethal fires has increased. These changes have affected habitat conditions for SGCN that occur in Dry Lower Montane–Foothill Forest, such as Lewis's Woodpecker and White-headed Woodpecker. Housing development is

expanding into forest areas, especially in the Council and New Meadows areas, increasing fragmentation and motorized impacts in forests.

Spotlight Species of Greatest Conservation Need: White-headed Woodpecker

The White-headed Woodpecker (*Picoides albolarvatus*) is considered a permanent resident of Blue Mountains coniferous forests, although some may migrate to lower elevations during winter months. Preferred breeding habitat is montane coniferous forests with sparse understory and a relatively open canopy, dominated by ponderosa pine. They are highly limited by suitable habitat, nesting in forests with large-diameter trees and snags indicative of old growth systems. Abundance of mature pines is crucial to provide a food source as well as snags and high stumps used for nesting. These birds can thrive in recently burned or cut areas provided that large standing trees are still present. Changes in fire scope and severity pose a threat to the retention of mature trees and large diameter and high-cut stumps.

This woodpecker is currently listed as a "Sensitive Species" by the US Forest Service in the Intermountain and Northern regions of the western United States.

Prioritized Threats and Strategies for Dry Lower Montane–Foothill Forest

High rated threats to Dry Lower Montane–Foothill Forest in the Blue Mountains

Changes in precipitation & broad-scale hydrologic regimes

Intensified drought due to increasing temperatures and changing precipitation patterns is increasing the vulnerability of forests to insect and disease outbreaks, and wildfire scope and severity. Snowpack levels are decreasing and winter temperatures are increasingly milder, creating conditions favorable for pathogen insect survival. More moisture is falling as rain during winter months, changing hydrologic regimes within this habitat and in lower elevation habitats whose headwaters lie within the section. Less snowpack equates to more drought stress to native plants, and increases conditions for drought adapted invasive species to establish.

Objective	Strategy	Action(s)	Target SGCNs
Improve landscape resilience to climate change.	Manage for diverse, healthy plant communities able to resist stresses including drought and drought mediated impacts such as invasion by nonnative plants and wildfire.	Research options for managing this habitat under forecasted climate models. Work with other agencies, organizations and user groups across the Blue Mountains to address climate change impacts across landscapes, and refine land management planning options and alternatives down to local level implementable projects where possible. Engage in trust building efforts with impacted stakeholders to develop individual and social support for proposed land management actions and restoration activities (Gordon et al. 2014).	Mountain Quail White-headed Woodpecker Olive-sided Flycatcher Clark's Nutcracker Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Northern Idaho Ground Squirrel Bighorn Sheep

Objective	Strategy	Action(s)	Target SGCNs
		Engage in microclimate monitoring to better identify and understand local pockets of environmental opportunity to enhance habitat resistance to climate induced stressors. Engage in researching to identifying plants useful for habitat restoration or enhancement from current climate regimes that are forecast to be local future climate regimes. Support efforts to increase public and political awareness of climate change impacts to local landscapes and wildlife dependent on them. Research options for managing livestock grazing in this habitat under forecasted climate models (i.e.-drought conditions). Work with agencies, organizations and livestock operators to use this information to both be proactive and refine land management planning options and alternatives down to local level implementable projects. Implement livestock drought management alternatives on IDFG owned lands.	Salmon Coil Lyrate Mountainsnail Boulder Pile Mountainsnail Striate Mountainsnail Whorled Mountainsnail Coeur d'Alene Oregonian Western Flat-whorl Shiny Tightcoil Spur-throated Grasshopper (*Melanoplus*) Species Group

Historic & current fire suppression

Fires historically burned at more frequent intervals (Havlina, 1995), resulting in a more patchy mosaic of different seral stages. Wildfires in this system are becoming larger and more intense. Altered fire cycles favor invasive plants and habitat conversion to less desirable species. Longer return fire intervals are allowing conifer invasion into historic meadow habitats, negatively impacting Northern Idaho Ground Squirrel which requires open meadow habitats in association with forest.

Objective	Strategy	Action(s)	Target SGCNs
Restore historic fire intervals.	Increase fire frequency on the landscape.	Work with federal agencies to develop and implement policies that move fire management from reactive to proactive. Increase number of low intensity controlled burns to create a better seral condition mosaic across the landscape and increase habitat conditions favored by Northern Idaho Ground Squirrel.	Mountain Quail White-headed Woodpecker Olive-sided Flycatcher Clark's Nutcracker Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Northern Idaho Ground Squirrel Salmon Coil Lyrate Mountainsnail Boulder Pile Mountainsnail Striate Mountainsnail

Objective	Strategy	Action(s)	Target SGCNs
			Whorled Mountainsnail Coeur d'Alene Oregonian Western Flat-whorl Shiny Tightcoil Spur-throated Grasshopper (*Melanoplus*) Species Group

Target: Lower Montane–Foothill Grassland & Shrubland

This habitat type accounts for approximately 25% of the land area in the Blue Mountains Section. Preservation of good quality habitat and restoration are high priorities. Higher elevations of the Salmon River, Little Salmon, and Hells Canyon drainages have conifer forest that extends downslope on northern aspects and valleys. Mountain shrub components include mallow ninebark, snowberry , and serviceberry (*Amelanchier alnifolia*), which form understory and patches within this mosaic. Lower slopes and south-facing slopes are fire-maintained grassland systems dominated by bluebunch wheatgrass and Idaho fescue, with patches of sagebrush and bitterbrush. Scattered patches of Douglas-fir and ponderosa pine occur primarily in drainages and on north-facing slopes. Lengthened fire return intervals have allowed conifers to expand into former grasslands and shrublands.

Indian Creek drainage, tributary of Snake River, Idaho © 2014 Anna Owsiak

Overall, this habitat is in good condition and a large portion is under management by federal agencies. The northern and southern ends of this target are impacted more by noxious weeds, especially yellow star-thistle and invasive annual grasses. Fire return intervals are longer than historic levels, leading to increased fuel loads and greater wildfire severity in scale and scope. Fire is a historically dominant ecosystem process in this target, with forest and shrub components dependent on fire for long term sustainability (Havlina 1995). Because of both changes in fire intervals and invasive annual grasses, bitterbrush—an important big game winter forage—is failing to regenerate, potentially resulting in trophic changes in shrublands.

Target Viability

Much of the habitat is intact and in desirable, native vegetation. Annual invasive grasses are prevalent below about 1,220 m (4,000 ft) elevation, especially on the northern and southern ends of the target and on west and south-facing slopes. Bitterbrush is not regenerating due to competition with invasive annuals. Increased wildfire scope and severity in combination with

invasive annuals is negatively impacting successful shrub regeneration and establishment in the northern and southern ends of the target. In Hells Canyon forests (including shrublands), fire is a dominant ecosystem process in the creation of landscape mosaics, in governing species distribution, and in the maintenance of biological diversity. The return of historic fire regimes is needed to sustain a desirable, seral mosaic and, in some cases, ensure bitterbrush regeneration (Havlina 1995).

Prioritized Threats and Strategies for Lower Montane–Foothill Grassland & Shrubland

Very High rated threats to Lower Montane–Foothill Grassland & Shrubland in the Blue Mountains

Changes in precipitation & broad-scale hydrologic regimes

Intensified drought due to increasing temperatures and changing precipitation patterns is increasing the vulnerability of this habitat to wildfire and noxious weed and invasive grass invasion. Wildfire scope and severity is increasing. Snowpack levels are decreasing and winter temperatures are increasingly milder, creating conditions favorable for pathogen insect survival and invasive annual grasses. More moisture is falling as rain during winter months, changing hydrologic regimes within this habitat and in lower elevation habitats whose headwaters lie within the section. Less snowpack equates to more drought stress to native plants, and increases conditions for drought adapted invasive species to establish.

Objective	Strategy	Action(s)	Target SGCNs
Improve landscape resilience to climate change.	Manage for diverse, healthy plant communities able to resist stresses including drought and drought mediated impacts such as invasion by nonnative plants and wildfire.	Research options for managing this habitat under forecasted climate models. Work with other agencies, organizations, and user groups across the Blue Mountains to address climate change impacts across landscapes, and refine land management planning options and alternatives down to local level implementable projects where possible. Engage in trust building efforts with impacted stakeholders to develop individual and social support for proposed land management actions and restoration activities (Gordon et al. 2014). Engage in microclimate monitoring to better identify and understand local pockets of environmental opportunity to enhance habitat resistance to climate induced stressors. Engage in research to identify plants useful for habitat restoration or enhancement from current climate regimes that are forecast to be local future climate regimes. Support efforts to increase public and political awareness of climate change impacts to local	Mountain Quail Sharp-tailed Grouse Long-billed Curlew Burrowing Owl Short-eared Owl Common Nighthawk Grasshopper Sparrow Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Gastropod Assemblage*

Objective	Strategy	Action(s)	Target SGCNs
		landscapes and wildlife dependent on them. Research options for managing livestock grazing in this habitat under forecasted climate models (i.e., drought conditions). Work with agencies, organizations, and livestock operators to use this information to both be proactive and refine land management planning options and alternatives down to local level implementable projects. Implement livestock drought management alternatives on IDFG owned lands.	

*Gastropod Assemblage includes the following species: Salmon Coil, Seven Devils Mountainsnail, Lyrate Mountainsnail, Costate Mountainsnail, Deep Slide Mountainsnail, Boulder Pile Mountainsnail, Striate Mountainsnail, Whorled Mountainsnail, Lava Rock Mountainsnail, Salmon Oregonian, Coeur d'Alene Oregonian, Cottonwood Oregonian, and Southern Tightcoil.

Noxious weeds & invasive annual grasses

In the Blue Mountains, noxious weeds and invasive annual grasses (e.g., cheatgrass) have colonized many of the sagebrush and grassland habitats at the northern and southern ends of the target. Annual grasses primarily dominate below 1,220 m (4,000 ft) elevations on west and south-facing slopes and on flatter benches. Yellow star-thistle is a major invader in the Snake River Breaks on the northern end of the target, and it continues to move south and into other areas. Rush skeletonweed , spotted knapweed (*Centarea maculosa*) and hoary cress are well represented, crowd out native grasses and forbs, and are effective at preventing reestablishment of native species. Wildfire, off road motorized vehicle use and concentrated livestock use are the most common disturbance vectors creating opportunities for invasion within this target.

Objective	Strategy	Action(s)	Target SGCNs
Effectively control and restore areas dominated by invasive, nonnative annual grasses and yellow star-thistle at a rate greater than the rate of the spread (DOI 2015).	Implement large-scale experimental activities to reduce invasive annual grass and yellow star-thistle through integrated pest management.	Locate and coordinate installation of long-term studies and subsequent monitoring to test the efficacy of large-scale application of integrated pest management programs that include chemical, mechanical, biological, newly registered biocides, and subsequent restoration practices (DOI 2015). Support the use of Plateau® herbicide in controlling cheatgrass. Explore the use of MB 906®, a bacteria soil amendment for the suppression of annual grass, in restoration efforts, commercially available fall 2015. Promote certified weed-free seeds/forage (Idaho Sage-grouse Advisory Committee 2006). Incorporate desirable nonnative plant species capable of outcompeting invasive annual	Mountain Quail Sharp-tailed Grouse Long-billed Curlew Burrowing Owl Short-eared Owl Common Nighthawk Grasshopper Sparrow Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep

Objective	Strategy	Action(s)	Target SGCNs
		grasses as the first transitional step in restoration of perennial vegetation on annual grass and noxious weed dominated sites. Increase application of biocontrol agents to target noxious weeds in areas with minimal conventional access options.	Gastropod Assemblage *
Maintain diverse, resilient native plant communities capable of resisting noxious weed invasion.	Reduce the amount, size and scope of disturbance to intact native habitats.	Create strategic fire breaks in human use landscapes, building upon existing roads and terrain features. Use targeted grazing and desirable nonnative vegetation in landscapes dominated by human uses (grazing, roads, private lands…) and infested with annual invasives. Use controlled burns to return historic fire cycles to intact habitats. Balance the use of fire with the potential for invasion when designing and locating projects. Work with livestock producers to implement fuels treatments on their lands and allotments (DOI 2015). Develop Rural Fire Protection Districts (RFPDs) to help suppress and fight fires. Promote certified weed-free seeds/forage (Referenced in 2006 Sage-Grouse Plan, p. 4-52) Support efforts to increase management of motorized vehicle use on public lands to reduce additional weed transmission and establishment. Work with other agencies and organizations to increase signage and use of other communication methods for providing public information on the impacts of OHV use and noxious weed spread. Support efforts to implement and enforce federal travel management plans. Work with federal and state agencies, and private producers to alter livestock management to reduce disturbance caused by concentrated livestock use in areas at highest risk for noxious weed invasion.	Mountain Quail Sharp-tailed Grouse Long-billed Curlew Burrowing Owl Short-eared Owl Common Nighthawk Grasshopper Sparrow Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Gastropod Assemblage *

*Gastropod Assemblage includes the following species: Salmon Coil, Seven Devils Mountainsnail, Lyrate Mountainsnail, Costate Mountainsnail, Deep Slide Mountainsnail, Boulder Pile Mountainsnail, Striate Mountainsnail, Whorled Mountainsnail, Lava Rock Mountainsnail, Salmon Oregonian, Coeur d'Alene Oregonian, Cottonwood Oregonian, and Southern Tightcoil.

High rated threats to Lower Montane–Foothill Grassland & Shrubland in the Blue Mountains

Historic & current fire suppression

Fires historically burned at more frequent intervals (Havlina 1995), resulting in a more patchy mosaic of different seral stages. Wildfires in this system are becoming larger and more intense. Altered fire cycles favor invasive plants and habitat conversion to less desirable species. Longer return fire intervals are allowing conifer invasion into historic grass and shrublands and in some cases are preventing successful shrub regeneration (Havlina 1995).

Objective	Strategy	Action(s)	Target SGCNs
Restore historic fire intervals.	Increase fire frequency on the landscape.	Work with federal agencies to develop and implement policies that move fire management from reactive to proactive. Increase number of low intensity controlled burns to create a better seral mosaic across the landscape. Strategically develop projects to minimize the potential for noxious weed invasion.	Mountain Quail Sharp-tailed Grouse Long-billed Curlew Burrowing Owl Short-eared Owl Common Nighthawk Grasshopper Sparrow Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Gastropod Assemblage*

*Gastropod Assemblage includes the following species: Salmon Coil, Seven Devils Mountainsnail, Lyrate Mountainsnail, Costate Mountainsnail, Deep Slide Mountainsnail, Boulder Pile Mountainsnail, Striate Mountainsnail, Whorled Mountainsnail, Lava Rock Mountainsnail, Salmon Oregonian, Coeur d'Alene Oregonian, Cottonwood Oregonian, and Southern Tightcoil.

Improper livestock grazing management

In the context of this plan, "improper" is defined as grazing beyond the capacity of the resource in either direction (e.g., overuse such as along riparian areas that need protection; i.e., need to for seasonal adjustments). Negative impacts of grazing are typically associated with persistent heavy grazing. In the Governor's Alternative (Otter 2012), improper livestock grazing management is considered a secondary threat with monitoring and management actions tailored accordingly.

In the Blue Mountains, factors that contribute to improper livestock grazing on federal lands include the lack of flexibility for timing of grazing written within existing federal allotment permits, insufficient funds for federal land management agency oversight and a backlog of existing allotment renewal work, and insufficient monitoring (i.e., lack of appropriate rangeland health assessment monitoring data gathered annually on a consistent basis to support trend analysis). Consequently, some management decisions are compromised by a lack of appropriate data.

On private lands, contributing factors include established cultural grazing traditions, lack of economic incentive to alter operating methods, and lack of awareness of alternative methods and benefits.

Objective	Strategy	Action(s)	Target SGCNs
Manage livestock to maintain rangeland health and habitat quality (Otter 2012).	Manage the timing, intensity, duration, and frequency of grazing practices to manipulate vegetative condition (Otter 2012).	Prioritize permit renewals and land health assessments for allotments with declining Sage-Grouse populations (Otter 2012). Inform affected permittees and landowners regarding Sage-Grouse habitat needs and conservation measures (Idaho Sage-grouse Advisory Committee 2006). Incorporate GRSG Seasonal Habitat Objectives (Table 2-2 in BLM 2015) into relevant resource management plans and projects. Use the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015) with an appropriate sampling design to conduct fine-scale habitat assessments to inform grazing management. Undertake adaptive management changes related to existing grazing permits when improper grazing is determined to be the causal factor in not meeting habitat objectives (Otter 2012).	Mountain Quail Sharp-tailed Grouse Long-billed Curlew Burrowing Owl Short-eared Owl Common Nighthawk Grasshopper Sparrow Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Gastropod Assemblage*
Maintain or enhance wildlife values on working ranches.	Develop partnerships that work to improve rangeland ecological condition.	Find key community leaders within the livestock industry to help facilitate the broader use of livestock management techniques that reduce concentrated livestock use in critical areas (springs, riparian), and result in improved rangeland ecological health. Promote use of Farm Bill Programs to improve rangelands and other wildlife habitats on private lands. Support efforts to disseminate information on livestock management alternatives that improve rangeland ecological health. Support and partner on habitat restoration efforts on private lands. Work with local Soil and Water Conservation Districts to get habitat and wildlife priorities included in District priorities.	Mountain Quail Sharp-tailed Grouse Long-billed Curlew Burrowing Owl Short-eared Owl Common Nighthawk Grasshopper Sparrow Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Gastropod Assemblage*
	Maintain MOU between Idaho State Department of Agriculture	Involve permittees in providing monitoring information, the interpretation of monitoring data, & providing input into grazing	Mountain Quail Sharp-tailed Grouse Long-billed Curlew Burrowing Owl

Objective	Strategy	Action(s)	Target SGCNs
	(ISDA) and BLM as it pertains to grazing management.	management adjustments to meet the goals and objectives of federal land management agencies and the permittees (Sanders 2006).	Short-eared Owl Common Nighthawk Grasshopper Sparrow Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Gastropod Assemblage*
Support the continued responsible use of federal lands for grazing to maintain open spaces and important habitat conditions (e.g., year-round water sources) that benefit wildlife (WGA Policy Resolution 2015-03).	Implement Western Governors' Association (WGA) policy for public lands grazing (for details, see WGA Policy Resolution 2015-03).	Use sound, science-based management decisions for federal lands and base these decisions upon flexible policies that take into account local ecological conditions and state planning decisions.	Mountain Quail Greater Sage-Grouse Sharp-tailed Grouse Long-billed Curlew Burrowing Owl Short-eared Owl Common Nighthawk Grasshopper Sparrow Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Southern Idaho Ground Squirrel Gastropod Assemblage*

*Gastropod Assemblage includes the following species: Salmon Coil, Seven Devils Mountainsnail, Lyrate Mountainsnail, Costate Mountainsnail, Deep Slide Mountainsnail, Boulder Pile Mountainsnail, Striate Mountainsnail, Whorled Mountainsnail, Lava Rock Mountainsnail, Salmon Oregonian, Coeur d'Alene Oregonian, Cottonwood Oregonian, and Southern Tightcoil.

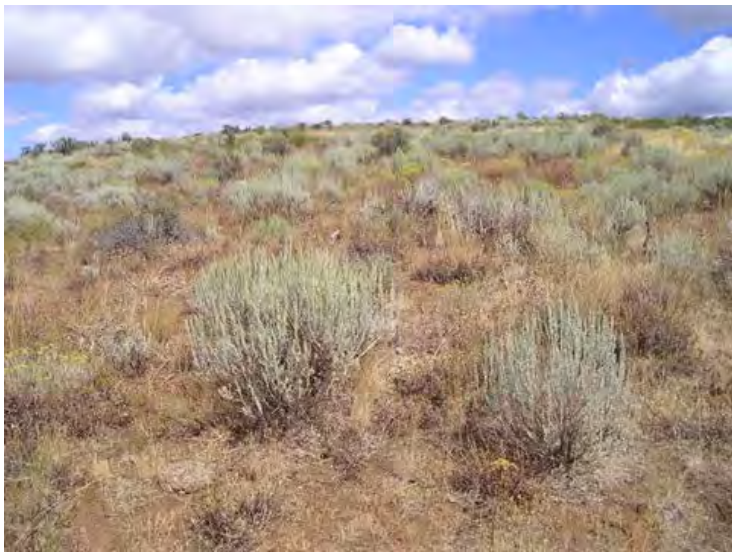
Species designation, planning & monitoring

Mountain Quail would benefit from the following additional management actions:

Objective	Strategy	Action(s)	Target SGCNs
Increase knowledge of current population status.	Monitor population status.	Conduct periodic assessments of species status relative to habitat conditions and management opportunities.	Mountain Quail

Target: Sagebrush Steppe

Sagebrush steppe within the Blue Mountains is widely distributed from low elevation, semiarid settings to more moist and mountainous areas. Dwarf sagebrush-steppe comprised of black (*Artemesia nova*) and scabland sagebrush (*A. rigida*) occurs on rocky ridges, benches, and slopes. Big sagebrush-steppe, dominated by any of several subspecies of big sagebrush (*A. tridentata*), occurs on plains, alluvial fans, foothills, ridges, and mountain slopes with bitterbrush (*Purshia tridentata*) and rabbitbrush (*Ericameria* spp.) often intermixed. The understory is grass-dominated and includes Sandberg bluegrass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), and bluebunch wheatgrass (*Pseudoroegneria spicata*). Invasive annual grasses, including cheatgrass (*Bromus tectorum*), and medusahead (*Taeniatherum caput-medusae*), are widespread and dominate heavily disturbed sites. Forbs are diverse, and include arrowleaf balsamroot (*Balsamorhiza sagittata*), Indian paintbrush (*Castilleja* spp.), hawksbeard (*Crepis* spp.), and buckwheat (*Eriogonum* spp.).



Sagebrush steppe with mixed annual grass understory, Washington County, Idaho © Anna Owsiak

Sagebrush steppe is a highly altered and fragmented biome in the Blue Mountains. It accounts for approximately 20% of the land area in this section and stabilization and restoration are high priorities. Agricultural conversion, human development, wildfire, and invasion of nonnative annual grasses and noxious weeds have left only remnant stands in good ecological health.

In the Blue Mountains, resource management programs affecting wildlife habitat within sagebrush steppe are currently focused towards considerations for Greater Sage-Grouse hereafter Sage-Grouse; *Centrocercus urophasianus*) and Southern Idaho Ground Squirrel populations. Many other species are reliant on sagebrush-steppe habitat and ultimately benefit from resource management programs, including Sharp-tailed Grouse, Mule Deer (*Odocoileus hemionus*), and Pronghorn (*Antilocapra americana*). Bitterbrush, an important component of sagebrush steppe and forage for big game, is in decline throughout the section. Bitterbrush is unable to successfully establish in competition with invasive annual grasses. Livestock grazing continues to be a predominant land use activity within sagebrush steppe, on both private and public lands.

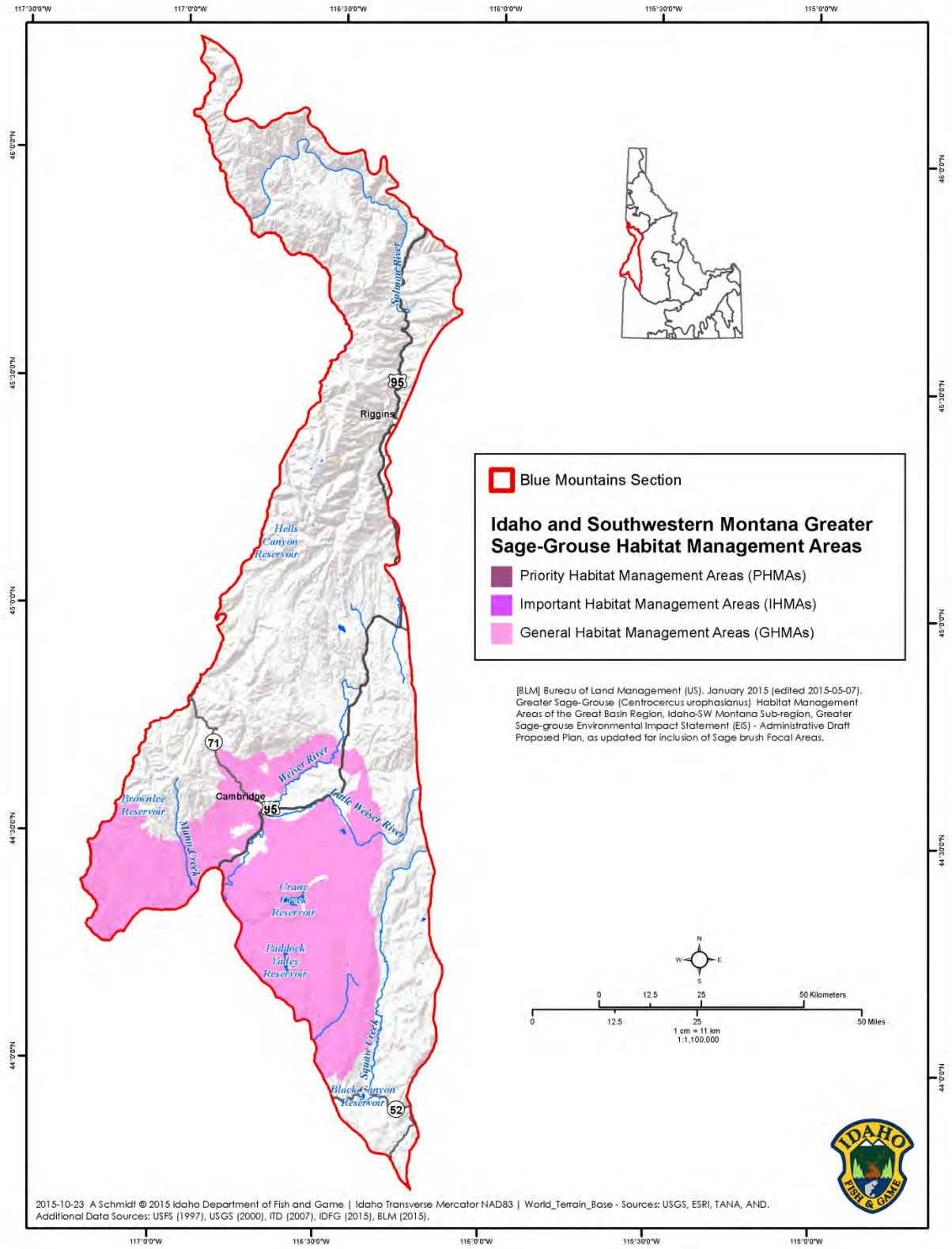


Fig. 7.3 Map of Idaho and Southwestern Montana Greater Sage-Grouse Habitat Management Areas in the Blue Mountains

Target Viability

Poor to *Fair.* Sagebrush steppe condition varies across the section, from poor to pockets of good. Most remaining sagebrush contains significant annual grass invasion, greatly reducing the habitat value and increasing its susceptibility to wildfire. Sagebrush steppe along the Snake River canyon is vulnerable to lightning-caused wildfires and invasive annual grasses thrive along the Snake River below 1,220 m (4,000 ft) elevation, on the Weiser and Little Weiser River breaks, and on most low gradient lands. Large scale wildfire is increasing and some areas have burned multiple times in the last decade. Historically, livestock grazing was heavy across this habitat type, and riparian habitats on private rangelands adjacent to sagebrush steppe continue to be heavily used. Noxious weeds in addition to annual grasses pose a serious threat to this habitat, specifically yellow star-thistle (*Centaurea solstitialis* L.) and rush skeletonweed (*Chondrilla juncia*).

Prioritized Threats and Strategies for Sagebrush Steppe

Very High rated threats to Sagebrush Steppe in the Blue Mountains

Changes in precipitation & broad-scale hydrologic regimes

Intensified drought due to increasing temperatures and changing precipitation patterns is a driver in creating conditions that lead to larger, more intense rangeland fires. The amount and timing of water affects sagebrush growth (Germino 2014). Less snowfall in the winter and most precipitation falling as rain have direct ramifications in that cheatgrass is active in early winter due to adequate warmth and moisture required for germination and growth (N. DeCrappeo, DOI Northwest Climate Science Center, pers. comm.). Less snowpack leads to a drier spring and summer, subsequent drought conditions for native plants, and drying out of cheatgrass. Dry and highly flammable plant material can result in an increase in fire frequency exacerbated by warmer temperatures (N. DeCrappeo, DOI Northwest Climate Science Center, pers. comm.).

Objective	Strategy	Action(s)	Target SGCNs
Improve landscape resilience.	Manage for diverse, healthy plant communities able to resist stresses including drought and drought mediated impacts such as invasion by nonnative plants and wildfire.	Research options for managing this habitat under forecasted climate models. Work with other agencies, organizations, and user groups within the Blue Mountains to address climate change impacts across landscapes and refine land management planning options and alternatives down to local level implementable projects where possible. Engage in trust building efforts with stakeholders to develop individual and social support for proposed land management actions and restoration activities (Gordon et al. 2014). Engage in microclimate monitoring to better identify and understand local pockets of environmental opportunity to enhance habitat resistance to climate induced stressors.	Sharp-tailed Grouse Greater Sage-Grouse Long-billed Curlew Burrowing Owl Short-eared Owl Common Nighthawk Sagebrush Sparrow Grasshopper Sparrow Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Southern Idaho Ground Squirrel Costate Mountainsnail Deep Slide Mountainsnail

Objective	Strategy	Action(s)	Target SGCNs
		Engage in research to identify plants useful for habitat restoration or enhancement from current climate regimes that are forecast to be local future climate regimes. Support efforts to increase public and political awareness of climate change impacts to local landscapes and wildlife dependent on them. Research options for managing livestock grazing in sagebrush steppe habitat under forecasted climate models (i.e., drought conditions). Work with agencies, organizations, and livestock operators to use this information to both be proactive and refine land management planning options and alternatives down to local level implementable projects. Implement livestock drought management alternatives on IDFG owned lands.	
	Restore American Beaver (*Castor canadensis*) as a climate adaptation strategy to increase water holding capacity of landscape.	Develop plan to restore American Beaver to Blue Mountains systems. Identify key watersheds that would benefit from beavers and minimize conflicts with agricultural activities. Conduct outreach to engage stakeholders in key areas. Do site preparation work. Manage trapping seasons to ensure that beavers continue to contribute to healthy riparian systems in the Blue Mountains. Translocate beaver from source. Monitor actions.	Sharp-tailed Grouse Greater Sage- Grouse Long-billed Curlew Burrowing Owl Short-eared Owl Common Nighthawk Sagebrush Sparrow Grasshopper Sparrow Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Mountain Goat Bighorn Sheep Southern Idaho Ground Squirrel

Increased frequency & intensity of wildfire

The increased frequency and intensity of wildfire is considered a primary threat to the sagebrush-steppe ecosystem and to the many sagebrush-steppe species that depend on it, including Greater Sage-Grouse (Otter 2012, US Fish and Wildlife Service 2014). The accelerated invasion of nonnative annual grasses—in particular cheatgrass and medusahead create conditions that lead to larger, more intense rangeland fires (DOI 2015). This contributes to the continued fragmentation, degradation, and loss of shrub steppe habitats.

Habitat management within GHZs is intended to facilitate multiple use activities to prevent siting them in higher level zones (Otter 2012). More aggressive wildfire and invasive species management practices are recommended to prevent further encroachment of these 2 primary

threats into Core (CHZ) and Important (IHZ) zones (Otter 2012). Local working group combined with Coordinated Weed Management Area efforts are to be the main focus (Otter 2012) for improving habitat, including addressing fuel loads and wildfire issues.

Within the Blue Mountains sagebrush steppe, wildfire is increasing in scope and severity. Burned areas are nearly continuous, with little if any sagebrush inclusions within them. Invasive annual grasses are significantly impacting fire behavior and outcomes. Annual grass dominance is shortening fire return intervals and preventing the reestablishment of sagebrush and other shrubs.

Objective	Strategy	Action(s)	Target SGCNs
Manage wildfires to minimize loss of sagebrush habitat.	Improve fire suppression protocols and resource allocations to limit habitat losses to wildfire.	Support development and implementation of Rangeland Fire Protection Associations (RFPAs) (e.g., Idaho Code § 38-104B and Governor's Executive Order 2015-04) (Otter 2015). During high fire danger conditions, stage initial attack and secure additional resources closer to priority areas, with particular consideration of the West Owyhee, Southern, and Desert Conservation Areas to ensure quicker response times in or near Sage-Grouse habitat (BLM 2015). Create and maintain effective fuel breaks to modify fire behavior and increase fire suppression effectiveness based on criteria outlined in the Governor's Alternative (Otter 2012).	Greater Sage-Grouse Southern Idaho Ground Squirrel Long-billed Curlew Sharp-tailed Grouse Sagebrush Sparrow Burrowing Owl Silver-haired Bat Hoary Bat Bighorn Sheep Costate Mountainsnail Deep Slide Mountainsnail Common Nighthawk Grasshopper Sparrow Short-eared Owl Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis
Increase post-fire restoration success (DOI 2015).	Expand the use of desirable nonnative seeds and seedlings in to accelerate efforts to improve and restore post-fire rangeland health in annual grass dominated areas.	Coordinate and collaborate across agencies on climate trend data as it relates to acquisition, storage, and distribution of seeds (DOI 2015). Use of nonnatives should be limited to transitional, noninvasive species, replaced by natives in subsequent ecological restoration or during natural successional processes (DOI 2015).	Greater Sage-Grouse Southern Idaho Ground Squirrel Long-billed Curlew Sharp-tailed Grouse Sagebrush Sparrow Burrowing Owl Silver-haired Bat Hoary Bat Bighorn Sheep Costate Mountainsnail Deep Slide Mountainsnail Common Nighthawk Grasshopper Sparrow Short-eared Owl Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis
Commit to multiyear investments in restoration (DOI	Support long-term strategies for the restoration of sagebrush-	Map hot spots of restoration activity or investment to help identify trends and opportunities for greater efficiency and leveraging of funds	Greater Sage-Grouse Southern Idaho Ground Squirrel Long-billed Curlew

Objective	Strategy	Action(s)	Target SGCNs
2015)	steppe ecosystems, including consistent long-term monitoring protocols and adaptive management for restored areas (DOI 2015).	(DOI 2015). Support a cross-jurisdictional consortium of agencies, organizations and partners dedicated to implementation of restoration, monitoring, and adaptive management activities leading to a healthy sagebrush-steppe ecosystem (DOI 2015).	Sharp-tailed Grouse Sagebrush Sparrow Burrowing Owl Silver-haired Bat Hoary Bat Bighorn Sheep Costate Mountainsnail Deep Slide Mountainsnail Common Nighthawk Grasshopper Sparrow Short-eared Owl Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis
Maintain intact sagebrush stands to limit fragmentation and minimize direct habitat loss.	Protect remaining sagebrush from destruction by wildfire.	Suppress wildfires in Sage-Grouse habitat, commensurate with threatened and endangered species habitat or other critical habitats to be protected (BLM 2015). Develop fuel breaks in areas dominated by invasive annual grasses adjacent to Wyoming big sagebrush stands.	Greater Sage-Grouse Southern Idaho Ground Squirrel Long-billed Curlew Sharp-tailed Grouse Sagebrush Sparrow Burrowing Owl Silver-haired Bat Hoary Bat Bighorn Sheep Costate Mountainsnail Deep Slide Mountainsnail Common Nighthawk Grasshopper Sparrow Short-eared Owl Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis

Noxious weeds & invasive annual grasses

Invasive species are considered a primary threat to Sage-Grouse in Idaho in the Governor's Alternative (Otter 2012) and a primary threat to shrubsteppe habitats by the US Fish and Wildlife Service (2014). In addition, the accelerated invasion of nonnative annual grasses—in particular cheatgrass and medusahead—is one of the primary drivers of larger, more intense rangeland fires and directly threatens the habitat of Sage-Grouse and other sagebrush-steppe dependent wildlife (DOI 2015). In the Blue Mountains, noxious weeds and invasive annual grasses (e.g., cheatgrass) have colonized many of the sagebrush habitat types, particularly at lower-elevation sites and in much of the rangelands within the West Central Sage Grouse Conservation Area. In addition, species such as rush skeletonweed and hoary cress (*Cardarua draba*) crowd out native grasses and forbs, and are effective at preventing reestablishment of native species.

Objective	Strategy	Action(s)	Target SGCNs
Effectively control and restore areas dominated by invasive,	Implement large-scale experimental activities to remove	Implement The Idaho Invasive Species Strategic Plan 2012–2016 ([ISDA] Idaho State Department of Agriculture 2012). Develop integrated weed management	Greater Sage-Grouse Southern Idaho Ground Squirrel Long-billed Curlew Sharp-tailed Grouse

Objective	Strategy	Action(s)	Target SGCNs
nonnative annual grasses at a rate greater than the rate of the spread (DOI 2015)	cheatgrass and other invasive annual grasses through various tools (DOI 2015).	programs that include chemical, mechanical, biological, newly registered biocides, and subsequent restoration practices (DOI 2015). Develop large-scale application of integrated weed management programs that include chemical, mechanical, biological, newly registered biocides, and subsequent restoration practices (DOI 2015). Support the use of Plateau® herbicide in controlling cheatgrass. Promote certified weed-free seeds/forage (Idaho Sage-grouse Advisory Committee 2006). Target areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species (BLM 2015). Support the development of a framework for a national invasive species Early Detection and Rapid Response (EDRR) program (DOI 2015).	Sagebrush Sparrow Burrowing Owl Silver-haired Bat Hoary Bat Bighorn Sheep Costate Mountainsnail Deep Slide Mountainsnail Common Nighthawk Grasshopper Sparrow Short-eared Owl Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis

High rated threats to Sagebrush Steppe in the Blue Mountains

Improper livestock grazing management

In the context of this plan, "improper" is defined as grazing beyond the capacity of the resource in either direction (e.g., overuse such as along riparian areas that need protection; i.e., there needs for seasonal adjustments). Negative impacts of grazing are typically associated with persistent heavy grazing. In the Governor's Alternative (Otter 2012), improper livestock grazing management is considered a secondary threat with monitoring and management actions tailored accordingly.

Livestock grazing can affect wildlife habitat in many ways (Krausman et al. 2009). For example, livestock grazing can change habitat features that directly influence birds by reducing plant species diversity and biomass (Reynolds and Trost 1981, Bock and Webb 1984, Saab et al. 1995). Alternatively, changes in water and nutrient cycling caused by grazing can promote the spread of invasive species, which then degrade native bird habitats by altering fire and disturbance regimes (Rotenberry 1998). Sagebrush systems are particularly sensitive to grazing disturbance (Mack and Thompson 1982).

In the Blue Mountains, factors that contribute to this problem include the lack of flexibility for timing of grazing written within existing federal allotment permits, insufficient funds for federal land management agency oversight and a backlog of existing allotment renewal work, and insufficient monitoring (i.e., lack of appropriate rangeland health assessment monitoring data gathered annually on a consistent basis to support trend analysis). Consequently, some

management decisions are compromised by a lack of appropriate data. No specific application is given to livestock grazing in the GHMA.

Objective	Strategy	Action(s)	Target SGCNs
Manage livestock to maintain rangeland health and habitat quality (Otter 2012).	Manage the timing, intensity, duration, and frequency of grazing practices to manipulate vegetative condition (Otter 2012).	Prioritize permit renewals and land health assessments for allotments with declining Sage-Grouse populations (Otter 2012). Inform affected permittees and landowners regarding Sage-Grouse habitat needs and conservation measures (Idaho Sage-grouse Advisory Committee 2006). Incorporate GRSG Seasonal Habitat Objectives (Table 2-2 in BLM 2015) into relevant resource management plans and projects. Use the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015) with an appropriate sampling design to conduct fine-scale habitat assessments to inform grazing management. Undertake adaptive management changes related to existing grazing permits when improper grazing is determined to be the causal factor in not meeting habitat objectives (Otter 2012).	Greater Sage-Grouse Southern Idaho Ground Squirrel Long-billed Curlew Sharp-tailed Grouse Sagebrush Sparrow Silver-haired Bat Hoary Bat Bighorn Sheep Costate Mountainsnail Deep Slide Mountainsnail Common Nighthawk Grasshopper Sparrow Short-eared Owl Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis
	Maintain MOU between Idaho State Department of Agriculture (ISDA) and BLM as it pertains to grazing management.	Involve permittees in providing monitoring information, the interpretation of monitoring data, & providing input into grazing management adjustments to meet the goals and objectives of federal land management agencies and the permittees (Sanders 2006).	Greater Sage-Grouse Southern Idaho Ground Squirrel Long-billed Curlew Sharp-tailed Grouse Sagebrush Sparrow Silver-haired Bat Hoary Bat Bighorn Sheep Costate Mountainsnail Deep Slide Mountainsnail Common Nighthawk Grasshopper Sparrow Short-eared Owl Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis
Assess the impacts (both negative and, potentially, positive) of livestock grazing on	Implement new, properly designed and replicated experiments involving a variety of	Conduct experiments over multiple years (Rotenberry 1998).	Greater Sage-Grouse Sharp-tailed Grouse Sagebrush Sparrow

Objective	Strategy	Action(s)	Target SGCNs
sagebrush-steppe obligate songbirds (Rotenberry 1998).	alternative grazing treatments (including no grazing at all) across the spectrum of major shrubsteppe habitat types (Rotenberry 1998).		
Maintain or enhance wildlife values on working ranches.	Develop partnerships that work to maintain and improve wildlife habitat on private lands.	Work with NRCS and local Soil and Water Conservation Districts to provide technical assistance to private landowner/grazers and collaborate on habitat improvement projects to improve private lands for wildlife. Work with local Soil and Water Conservation Districts to get fish, wildlife, and habitat priorities incorporated into District priorities.	Greater Sage-Grouse Southern Idaho Ground Squirrel Long-billed Curlew Sharp-tailed Grouse Sagebrush Sparrow Burrowing Owl Silver-haired Bat Hoary Bat Bighorn Sheep Costate Mountainsnail Deep Slide Mountainsnail Common Nighthawk Grasshopper Sparrow Short-eared Owl Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis Boulder Pile Mountainsnail
Support the continued responsible use of federal lands for grazing to maintain open spaces and important habitat conditions (e.g., year-round water sources) that benefit wildlife (WGA Policy Resolution 2015-03).	Implement Western Governors' Association (WGA) policy for public lands grazing (for details, see WGA Policy Resolution 2015-03).	Use sound, science-based management decisions for federal lands and base these decisions upon flexible policies that take into account local ecological conditions and state planning decisions.	Greater Sage-Grouse Southern Idaho Ground Squirrel Long-billed Curlew Sharp-tailed Grouse Sagebrush Sparrow Silver-haired Bat Hoary Bat Bighorn Sheep Costate Mountainsnail Deep Slide Mountainsnail Common Nighthawk Grasshopper Sparrow Short-eared Owl Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis

Target: Riverine–Riparian Forest & Shrubland

Riverine wetlands occur in river and stream channels, their floodplains, and riparian vegetation influenced by stream channel hydrology (Brinson et al. 1995). The inclusion of riparian habitat in this definition of "riverine" is broader than that of Cowardin et al. (1979), which only includes wetlands found within the channel. The dominant water sources in riverine are overbank flooding from the channel and subsurface shallow water table connections between the stream channel and wetlands (i.e., hyporheic zone) (Brinson et al. 1995). Other water sources include overland runoff from adjacent uplands, tributaries, and precipitation. Flow may be perennial, perennial but interrupted (e.g., alternating between surface flow emanating in channel bottom upwellings and subsurface flow), or ephemeral/intermittent (flowing only temporarily in response to seasonal runoff but sometimes leaving isolated pools after flow subsides). Surface flows are seasonally complex and in multiple directions (e.g., down valley, out of the channel into the floodplain, and return from floodplain back into the channel). Water also moves laterally in the shallow groundwater table between the channel and riparian zones, as well as out of the system through infiltration into deep groundwater. At their headwaters, riverine wetlands are often replaced by slope wetlands (e.g., seeps and springs), or where topographical contours become closed, depressional or lacustrine wetlands. Dams may create depressional or lacustrine wetlands that interrupt a riverine wetland corridor. The lack of stream channel and floodplain morphology and/or lack of floodplain connectivity to a stream channel (either overbank or subsurface) are good indicators of a change in wetland type.

Grade Creek, Cecil D Andrus WMA, Idaho © 2014 Anna Owsiak

In the Blue Mountains, the riverine ecosystem includes a variety of important aquatic habitat types including:

1st- to 3rd-order streams—This type includes habitat within the channels of headwater and relatively small streams. Examples include numerous montane streams in the Blue Mountains. Baseflows of perennial streams are supported by springs much of the year. These streams tend to have high gradients and water velocities where scouring and erosion exports much of the fine material in the watershed during brief snowmelt runoff periods or large thunderstorm precipitation events (i.e., flash floods). Floodplains and valley bottoms tend to be narrow, confined by canyon walls or mountain slopes. This geomorphic and hydrologic setting creates aquatic habitats dominated by boulders, cobbles, gravel, and less mobile large woody debris. There are few pools and many rapids. Aquatic communities are usually dominated by shredder and collector macroinvertebrates and small fish (e.g., Redband Trout, Sculpin species [*Cottus* spp.], etc.).

Where canyons widen and fill with alluvium, streams have lower gradients and higher sinuosity. In these settings, they flow through willow bottoms, meadows, and, frequently, pastures and hayfields. The Weiser River is an example of a large, but low-order stream flowing in a broad alluvial valley.

Cougar Creek waterfall, tributary of Snake River, Idaho © 2012 Anna Owsiak

Waterfalls—This habitat occurs where streams or rivers fall vertically or nearly vertically down a cliff face or over a bedrock ledge. Water may be mostly free of contact with a rock face, creating a unique habitat on the wet rock face behind the veil of water and a deep plunge pool at the fall's base. Alternatively, water may fan out, maintaining contact with a rock face or fall in a series of smaller falls over rock outcrops (e.g., a cascade). Waterfalls support aquatic organisms uniquely adapted to extremely high water velocities, and plants and animals that require cool, constantly moist rocky habitats. These are relatively common habitats in the Blue Mountains, occurring mostly in association with the Salmon and Snake rivers and their tributaries. Waterfalls in 1st order streams of the Blue Mountains are often seasonal or intermittent.

4th+ order Streams and Rivers—This type includes habitat within the channels of larger streams and rivers. Aquatic communities tend to be dominated by collector and grazer macroinvertebrates and larger fish. The Weiser and Little Weiser rivers flow out of mountains and into broad alluvial valleys. These rivers have lower gradients and water velocities than low-order streams, and also have naturally higher sinuosity. Originally, this geomorphology allowed for the deposition of cobble, gravel, sand, and woody debris on alluvial bars, and the formation of floodplains in wider valleys. Aquatic habitats were a mix of cobbles, gravel, sand, and mobile woody debris resulting in many pools, riffles, and glides. The Snake River above Hells Canyon Dam is now a serious of slack pools, with regulated peak flows and an inability to form new gravel and cobble alluvial bars necessary for sustaining native riparian vegetation. It is now a more stable river system with more homogenous aquatic and riparian communities and narrowed floodplains. There are cobble-dominated aquatic habitats where gradients are higher and choked by fine sediment in low gradient areas and the main reservoir pools. The Snake River below Hells Canyon Dam and the lower Salmon

Weiser River, Idaho © 2012 Mike Larkin

River both maintain their free-flowing forms. These free-flowing aquatic systems have narrow but dynamic floodplains and moderate gradients. Aquatic habitats include many pools and glides behind boulder-choked rapids interspersed with cobble riffles and sandy alluvial bars.

The riverine ecosystem supports the following riparian forest, shrubland, and herbaceous vegetation types (see Idaho Vegetation appendix for complete descriptions of each type):

- G796 Northern Rocky Mountain Lowland and Foothill Riparian Forest
- G510 Interior West Ruderal Riparian Forest and Scrub (limited to Lower Weiser Basin)
- G506 Rocky Mountain and Great Basin Montane Riparian Forest
- G526 Rocky Mountain and Great Basin Lowland and Foothill Riparian Shrubland
- G527 Western Montane-Subalpine Riparian and Seep Shrubland
- Foothill and Canyon Meadow and Herbaceous Riparian and Seep Vegetation

Target Viability

Fair. Snake River system is highly altered. Weiser and Little Weiser rivers are highly impacted by human uses and poor stream/riparian management. High sediment loads, actively eroding cut banks and minimal riparian area widths are common in human use landscapes, which ultimately increase water temperatures and decrease water quality. Human-caused sediment loads are significant for the Weiser River, and subsequently the Snake River, especially during high water events, from the prevalence of actively eroding stream banks. More riparian systems are intact and in better condition in forested federal landownerships where stream headwaters lie. Rangeland riparian areas are highly impacted and frequently in fair or poor condition from current and historic concentrated livestock use. The lower Salmon River and Snake River below Hells Canyon Dam are in good condition, including most of its tributaries lying within federal lands and the National Recreation and Wilderness areas.

Lower Salmon River, Idaho © 2007 Chris Murphy

Spotlight Species of Greatest Conservation Need: Chinook Salmon and Steelhead

In the Blue Mountains, Chinook Salmon and Steelhead are native to the Snake and Salmon rivers. Snake River fall-run Chinook Salmon historically were found spawning in the Snake River upriver to the Hagerman Valley and in lower portions of the Salmon and Clearwater rivers. Populations of both using the tributaries above Hells Canyon Dam (and earlier upriver dams) were eliminated with the construction of the Hells Canyon complex in the 1950s. Currently, wild and hatchery Steelhead are found in the Snake River downriver of Hells Canyon Dam.

The construction of dams on the mainstem Snake and Columbia rivers has reduced survival of migrating juveniles and adults, and blocked access to nearly half their historic range. Both species are affected by multiple threats, including changes in run timing of juveniles and adults, impacts from stream diversions, the loss of riparian cover, sedimentation, and artificial barriers to stream passage. The addition of hatchery programs to mitigate for lost habitat and survival of fish has introduced potential genetic impacts to wild stocks.

Brownlee Reservoir of the Snake River, near Brownlee Dam, Idaho © 2015 Anna Owsiak

The status of listed populations of spring/summer-run Chinook Salmon in the Salmon Basin and summer Steelhead in the Salmon and Clearwater Basin was formally evaluated in 2011. At that time NOAA Fisheries determined that these species maintain their Threatened status (50 CFR Parts 223 and 224; August 15 2011). Snake River fall-run Chinook ESU retained its Threatened status in 2011 as well, however a petition to delist the species in 2015 (a result of substantial increases in abundance) presented substantial scientific evidence indicating that the petitioned action may be warranted and a status review was initiated to determine whether delisting is warranted (80 FR22468; April 22 2015).

Prioritized Threats and Strategies for Riverine–Riparian Forest & Shrubland

Very High rated threats to Riverine–Riparian Forest & Shrubland in the Blue Mountains

Nutrient enrichment from agriculture

Historic and current agricultural practices have reduced riparian widths that formerly captured and retained nutrient runoff from both agriculture (fertilizers and pesticides) and livestock (animal waste) operations. Current agricultural practices emphasize the use of maximum amounts of fertilizer in general, much of which gets leached into water systems as it moves through the soil. The Snake River acts as the nutrient drain for most of southern Idaho, and Brownlee Reservoir is increasingly impacted by fish disease episodes and die-offs as both water temperatures and nutrient levels increase. The Weiser River has over one quarter of its linear miles of river banks actively eroding (Mike Larkin, pers. comm.), contributing both sediment and nutrients to the system.

Objective	Strategy	Action(s)	Target SGCNs
Manage agricultural nutrient waste to prevent impacts	Capture and retrain nutrients.	Support and promote the use of Farm Bill programs by private landowners that improve ability to retain nutrients and minimize their entry into waterbodies.	Steelhead (Snake River Basin DPS) Sockeye Salmon

Objective	Strategy	Action(s)	Target SGCNs
to water systems.		Increase riparian width and subsequent proper function and condition through the use of exclusion fencing and riparian pasture management for grazed riparian systems, and implement active restoration of riparian habitats. Develop off-site watering sources for livestock in conjunction with exclusion fencing. Encourage and support the use of Best Management Practices for waste and nutrient management in agricultural systems.	(Snake River ESU) Chinook Salmon (Snake River fall-run ESU) Chinook Salmon (Snake River spring-run ESU) Western Pearlshell Western Ridged Mussel

High rated threats to Riverine–Riparian Forest & Shrubland in the Blue Mountains

Changes in precipitation & broad-scale hydrologic regimes

Snowpack levels are decreasing and more moisture is falling as rain during winter months, changing hydrologic regimes. Less snowpack equates to more drought stress to native plants, and increases conditions favorable for drought-adapted invasive species to establish. Less precipitation also results in lower in-stream water levels, higher water temperatures, and conversion of cold water systems to warm water systems during summer and irrigation months.

Objective	Strategy	Action(s)	Target SGCNs
Improve landscape resilience to climate change.	Increase water storage capacity within landscape to maintain in-stream flows.	Enhance natural storage of water in headwaters or major rivers and streams. Develop in-stream agreements with irrigation districts/private landowners to retain adequate in-stream flows.	Steelhead (Snake River Basin DPS) Sockeye Salmon (Snake River ESU) Chinook Salmon (Snake River fall-run ESU) Chinook Salmon (Snake River spring-run DSU) Mountain Quail Lewis's Woodpecker Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Western Pearlshell Western Ridged Mussel Terrestrial Gastropod Assemblage* Insect Assemblage**
	Manage for diverse, healthy plant communities able to resist stresses including	Research options for managing riverine systems and riparian forest and shrubland habitats under forecasted climate models. Work with other agencies, organizations, and user groups across the Blue	Steelhead (Snake River Basin DPS) Sockeye Salmon (Snake River ESU) Chinook Salmon (Snake River fall-run ESU) Chinook Salmon (Snake

Objective	Strategy	Action(s)	Target SGCNs
	drought and drought-mediated impacts such as invasion by nonnative plants and wildfire.	Mountains to address climate change impacts across landscapes, and refine land management planning options and alternatives down to local level implementable projects where possible. Engage in trust building efforts with impacted stakeholders to develop individual and social support for proposed land management actions and restoration activities (Gordon et al. 2014). Engage in microclimate monitoring to better identify and understand local pockets of environmental opportunity to enhance habitat resistance to climate induced stressors. Engage in research to identify plants useful for habitat restoration or enhancement from current climate regimes that are forecast to be local future climate regimes. Support efforts to increase public and political awareness of climate change impacts to local landscapes and wildlife dependent on them.	River spring-run DSU) Mountain Quail Sharp-tailed Grouse Long-billed Curlew Lewis's Woodpecker Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Western Pearlshell Western Ridged Mussel Terrestrial Gastropod Assemblage* Insect Assemblage**

*Terrestrial Gastropod Assemblage includes these species: Pondsnail (*Stagnicola*) Species Group, Rotund Physa, Nez Perce Pebblesnail, Pixie Pebblesnail, Marbled Disc, Salmon Oregonian, Coeur d'Alene Oregonian, Cottonwood Oregonian.
**Insect assemblage includes these species: A Riffle Beetle (*Bryelmis idahoensis*), Columbia River Tiger Beetle, Monarch, Spur-throated Grasshopper (*Melanoplus*) Species Group, Boise Snowfly, A Caddisfly (*Cheumatopsyche logani*), A Caddisfly (*Eocosmoecus schmidi*), A Caddisfly (*Homophylax auricularis*), A Caddisfly (*Rhyacophila oreia*), A Caddisfly (*Sericostriata surdickae*).

Improper livestock grazing management

Improper livestock grazing within riverine habitats has resulted in the loss of riparian width and plant and wildlife diversity, created opportunities for noxious weed and invasive plant invasion, increased stream temperature and stream width, changed stream hydrology and biotic composition, increased nutrient loads, and lowered water oxygen levels.

Insufficient monitoring (i.e., lack of appropriate rangeland health assessment monitoring data gathered annually on a consistent basis to support trend analysis) also contributes to improper livestock grazing within the Blue Mountains. Consequently, some management decisions are compromised by a lack of appropriate data.

Objective	Strategy	Action(s)	Target SGCNs
Properly manage livestock grazing to maintain riparian health	Implement Best Management Practices for riparian grazing systems and	Support and promote the use of Farm Bill programs by private landowners. Increase riparian width and	Steelhead (Snake River Basin DPS) Sockeye Salmon (Snake River ESU) Chinook Salmon (Snake

Objective	Strategy	Action(s)	Target SGCNs
and habitat quality.	grazing infrastructure improvements.	subsequent proper function and condition through the use of exclusion fencing and riparian pasture management for grazed riparian systems. Develop off-site watering sources for livestock in conjunction with exclusion fencing. Conduct fine-scale habitat assessments to inform grazing management. Undertake adaptive management changes related to existing grazing permits where improper grazing is determined to be the causal factor in declining rangeland health.	River fall-run ESU) Chinook Salmon (Snake River spring-run DSU) Mountain Quail Sharp-tailed Grouse Long-billed Curlew Lewis's Woodpecker Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Western Pearlshell Western Ridged Mussel Terrestrial Gastropod Assemblage* Insect Assemblage**
	Maintain MOU between Idaho State Department of Agriculture (ISDA) and BLM as it pertains to grazing management.	Involve permittees in providing monitoring information, the interpretation of monitoring data, & providing input into grazing management adjustments to meet the goals and objectives of federal land management agencies and the permittees (Sanders 2006).	Steelhead (Snake River Basin DPS) Sockeye Salmon (Snake River ESU) Chinook Salmon (Snake River fall-run ESU) Chinook Salmon (Snake River spring-run DSU) Mountain Quail Greater Sage-Grouse Sharp-tailed Grouse Long-billed Curlew Lewis's Woodpecker Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Western Pearlshell Western Ridged Mussel Terrestrial Gastropod Assemblage* Insect Assemblage**
	Reduce erosion sediment and nutrient loads associated with livestock grazing.	Expand riparian widths through the use of exclusion fencing and active, soft restoration activities to naturally stabilize stream banks and diffuse stream energy during high-water events. Develop off-site watering sources for livestock in conjunction with exclusion fencing. Streamline and improve permitting process for projects intended to	Steelhead (Snake River Basin DPS) Sockeye Salmon (Snake River ESU) Chinook Salmon (Snake River fall-run ESU) Chinook Salmon (Snake River spring-run DSU) Mountain Quail Greater Sage-Grouse Sharp-tailed Grouse Long-billed Curlew Lewis's Woodpecker

Objective	Strategy	Action(s)	Target SGCNs
		restore aquatic habitats. Work with Soil and Water Conservation Districts to get a draft Stream Restoration Permit (in process through IDWR) approved and in use. On restoration projects, work with nonriprap materials. Use willow plantings, recontour stream banks, use logs instead of riprap as Adam County Soil and Water Conservation District is doing on the Little Weiser River and IDFG is doing on the Little Salmon River.	Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Western Pearlshell Western Ridged Mussel Terrestrial Gastropod Assemblage* Insect Assemblage**
Support the continued responsible use of federal lands for grazing to maintain open spaces and important habitat conditions (e.g., year-round water sources) that benefit wildlife (WGA Policy Resolution 2015-03).	Implement WGA policy for public lands grazing (for details, see WGA Policy Resolution 2015-03).	Use sound, science-based management decisions for federal lands and base these decisions upon flexible policies that take into account local ecological conditions and state planning decisions.	Steelhead (Snake River Basin DPS) Sockeye Salmon (Snake River ESU) Chinook Salmon (Snake River fall-run ESU) Chinook Salmon (Snake River spring-run DSU) Mountain Quail Greater Sage-Grouse Sharp-tailed Grouse Long-billed Curlew Lewis's Woodpecker Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Western Pearlshell Western Ridged Mussel Terrestrial Gastropod Assemblage* Insect Assemblage**

*Terrestrial Gastropod Assemblage includes these species: Pondsnail (*Stagnicola*) Species Group, Rotund Physa, Nez Perce Pebblesnail, Pixie Pebblesnail, Marbled Disc, Salmon Oregonian, Coeur d'Alene Oregonian, Cottonwood Oregonian.
**Insect assemblage includes these species: A Riffle Beetle (*Bryelmis idahoensis*), Columbia River Tiger Beetle, Monarch, Spur-throated Grasshopper (*Melanoplus*) Species Group, Boise Snowfly, A Caddisfly (*Cheumatopsyche logani*), A Caddisfly (*Eocosmoecus schmidi*), A Caddisfly (*Homophylax auricularis*), A Caddisfly (*Rhyacophila oreia*), A Caddisfly (*Sericostriata surdickae*).

Invasive aquatic plants & invertebrates

In the Blue Mountains, invasive aquatic plants and invertebrates pose a significant threat to Snake River reservoirs, due to their high nutrient loads, warm water temperatures, slow flow rates, and high recreation use patterns. Invasives, especially invasive invertebrates, have the potential to cause significant damage to infrastructure management on dams and water diversion structures, resulting in significant control expenditures once they are in the system. Monitoring

has been conducted for invasive invertebrate species such as Zebra Mussel (*Dreissena polymorpha*) and quagga mussel (*Dreissena bugensis*), but they have not yet been detected.

Invasive plants already exist within the Snake River system, including Eurasian watermilfoil (*Myriophyllum spicatum* L.). There is significant potential for additional noxious weeds to invade this system. They too can impact infrastructure management and recreation.

Objective	Strategy	Action(s)	Target SGCNs
Manage invasive species.	Minimize opportunity for additional noxious and invasive species introductions.	Increase efforts to intercept potentially contaminated watercraft before they enter Idaho waterbodies. Continue and expand detection efforts including boat washing stations and inspections. Work with local, state and federal weed control partners to Increase educational efforts about personal responsibility to manage watercraft and actions to prevent transporting invasive species. Use EDRR methods for new invaders.	Western Pearlshell Western Ridged Mussel

Species designation, planning & monitoring

Pixie Pebblesnail

The Idaho population of the Pixie Pebblesnail historically occurred in the Weiser River. The species may potentially be extinct. Little is known about the life history needs of this snail.

Objective	Strategy	Action(s)	Target SGCNs
Determine population status.	Develop survey strategies.	Conduct surveys to determine presence or absence of snail. Gather life history information from which to determine status and life history needs of snail. Make and implement management recommendations based on gathered information if/when snail populations are confirmed.	Pixie Pebblesnail

Target: Springs & Groundwater-Dependent Wetlands

This target contains a subset of groundwater-dependent ecosystems (GDEs), specifically springs and groundwater-dependent slope wetlands (e.g., meadows, seep-fed tree- or shrub-dominated wetlands). Springs are GDEs where groundwater discharges at the ground surface, often through complex subsurface flow paths (Stevens and Meretsky 2008), including both cold and hot (geothermal) springs. Spring-dependent communities of plants and animals often exist where springs emerge. A variety of other wetland types are also dependent on groundwater-fed subsurface flows and seasonal seeps. Within this section, GDE wetlands include fens; marshes, shrublands, and woodland swamps in sloped settings; and wet and mesic meadows. Groundwater-dependent wetlands often occur on sloping land with gradients that range from steep hillsides to nearly imperceptible slopes. Slope wetlands differ from Depressional Wetlands by the lack of closed contours. Groundwater sources can originate from either a regional aquifer or from localized infiltration of surface water (e.g., precipitation, seasonal flooding). Water flow is downslope and unidirectional. Groundwater-dependent wetlands lose water primarily by subsurface outflow, surface flows, and evapotranspiration. Groundwater-dependent wetlands may develop channels, but the channels serve only to convey water away from the groundwater-dependent wetland. Definitions are modified from US Forest Service Gen. Tech. Report WO-86a (March 2012) and Brinson et al. (1995).

Grassland slope spring–seep. Cecil D Andrus WMA, Cambridge, Idaho © Anna Owsiak

In the Blue Mountains, GDE wetlands are important and widespread. Most occurrences of GDEs are in the form of springs and seeps emanating from basalt canyon walls, talus, toeslopes of bluffs, and canyon grassland slopes. These include geothermal springs scattered in the lower Salmon and Snake rivers. Seasonally-moist sloped seeps are widely scattered throughout the section, perched on basaltic bedrock. These form isolated pockets of wet or mesic meadow vegetation within extensive sagebrush steppe or mixed conifer woodlands that are important for a variety of wildlife, including Greater Sage-Grouse, Mountain Quail, and Bighorn Sheep.

The Springs & Groundwater-Dependent Wetlands ecosystem supports the following riparian forest, shrubland, and herbaceous vegetation types (see Idaho Vegetation Appendix for complete descriptions of each type):

- G526 Rocky Mountain and Great Basin Lowland and Foothill Riparian Shrubland
- G527 Western Montane–Subalpine Riparian and Seep Shrubland
- Foothill and Canyon Meadow and Herbaceous Riparian and Seep Vegetation.

Target Viability

Fair. Many spring/seep systems are negatively impacted from concentrated livestock use, resulting in erosion and establishment of nonnative plants. Water content and output of these systems is directly tied to snowpack and rain levels. Changes in hydrologic regimes and weather patterns are impacting spring systems. Spring systems within the federal lands not subjected to grazing by livestock (Hells Canyon Recreation Area and Hells Canyon Wilderness) are often in better condition.

Prioritized Threats and Strategies for Springs & Groundwater-Dependent Wetlands

High rated threats to Springs & Groundwater-Dependent Wetlands in the Blue Mountains

Changes in precipitation & broad-scale hydrologic regimes

Intensified drought due to increasing temperatures and changing precipitation patterns is impacting the ability of these systems to maintain water availability, plant health, and system resiliency. Snowpack levels are decreasing and more moisture is falling as rain during winter months, changing hydrologic regimes. Less snowpack equates to more drought stress to native plants, and increases conditions favorable for drought-adapted invasive species to establish. Spring and seep systems may be lost altogether if drought conditions become severe enough.

Objective	Strategy	Action(s)	Target SGCNs
Improve landscape resilience to climate change.	Manage for diverse, healthy plant communities able to resist stresses including drought and drought mediated impacts such as invasion by nonnative plants and wildfire.	Research options for managing groundwater-dependent wetlands under forecasted climate models. Work with other agencies, organizations and user groups across the Blue Mountains to address climate change impacts across landscapes, and refine land management planning options and alternatives down to local level implementable projects where possible. Engage in trust building efforts with impacted stakeholders to develop individual and social support for proposed land management actions and restoration activities (Gordon et al. 2014). Engage in microclimate monitoring to better identify and understand local pockets of environmental opportunity to enhance habitat resistance to climate induced stressors. Engage in research to identify plants useful for habitat restoration or enhancement from current climate regimes that are forecast to be local future climate regimes. Support efforts to increase public and political	Mountain Quail Greater Sage-Grouse Sharp-tailed Grouse Sandhill Crane Common Nighthawk Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Mountain Goat Bighorn Sheep Pondsnail (*Stagnicola*) Species Group Pristine Pyrg Monarch

Objective	Strategy	Action(s)	Target SGCNs
		awareness of climate change impacts to local landscapes and wildlife dependent on them.	

Improper livestock grazing management

Concentrated livestock grazing within Springs & Groundwater-Dependent Wetlands has resulted in the loss of native plant and wildlife diversity, created opportunities for noxious weed invasion, increased sedimentation of springs and loss of water storage capacity at the spring site, and changed biotic composition.

Objective	Strategy	Action(s)	Target SGCNs
Proper livestock grazing management maintains spring/seep integrity and habitat quality.	Reduce concentrated livestock impacts to spring/seep systems.	Support and promote the use of Farm Bill programs by private landowners to develop off site water sources for livestock on private lands. Develop off-site watering sources for livestock in conjunction with exclusion fencing.	Mountain Quail Greater Sage-Grouse Sharp-tailed Grouse Sandhill Crane Common Nighthawk Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Mountain Goat Bighorn Sheep Pondsnail (*Stagnicola*) Species Group Pristine Pyrg Monarch
	Maintain MOU between Idaho State Department of Agriculture (ISDA) and BLM as it pertains to grazing management.	Involve permittees in providing monitoring information, the interpretation of monitoring data, & providing input into grazing management adjustments to meet the goals and objectives of federal land management agencies and the permittees (Sanders 2006).	Mountain Quail Greater Sage-Grouse Sharp-tailed Grouse Sandhill Crane Common Nighthawk Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Mountain Goat Bighorn Sheep Pondsnail (*Stagnicola*) Species Group Pristine Pyrg Monarch

Noxious weeds & invasive annual grasses

Invasive species are considered a primary threat to Sage-Grouse in Idaho in the Governor's Alternative (Otter 2012) and a primary threat to shrubsteppe habitats by the US Fish and Wildlife Service (2014). The State of Idaho has developed *The Idaho Invasive Species Strategic Plan 2012–2016* ([ISDA] Idaho State Department of Agriculture 2012).

In the Blue Mountains, noxious weeds and invasive annual grasses (e.g., cheatgrass) have colonized many habitat types, including Springs & Groundwater-Dependent Wetlands. Noxious weed infesting these groundwater-dependent systems include both riparian (Canada thistle), upland species (spotted knapweed , leafy spurge [*Euphorbia esula*]) and invasive grasses. These

invaders crowd out native grasses and forbs, are effective at preventing reestablishment of native species, and are easily transported to new locations by human, livestock, and wildlife.

Objective	Strategy	Action(s)	Target SGCNs
Manage noxious and invasive weeds to minimize impacts to system.	Control weeds and restore desirable vegetation in degraded habitats.	Implement *The Idaho Invasive Species Strategic Plan 2012–2016* ([ISDA] Idaho State Department of Agriculture 2012). Support the development of a framework for a national invasive species EDRR program (DOI 2105). Promote certified weed-free seeds/forage (Idaho Sage-grouse Advisory Committee 2006). Incorporate desirable nonnative plant species capable of outcompeting invasive species as the first transitional step in restoring perennial vegetation at sites dominated by invasive species. Use integrated pest management techniques to treat weeds across the landscape	Mountain Quail Greater Sage-Grouse Sharp-tailed Grouse Sandhill Crane Common Nighthawk Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Bighorn Sheep Pondsnail (*Stagnicola*) Species Group Pristine Pyrg Monarch
	Reduce concentrated livestock use.	Develop off-site watering sources for livestock in conjunction with exclusion fencing to protect sensitive wet areas and spring sources. Actively manage livestock to reduce concentrated use at spring and wetland locations. Use active restoration to improve degraded sites.	Mountain Quail Greater Sage-Grouse Sharp-tailed Grouse Sandhill Crane Common Nighthawk Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Mountain Goat Bighorn Sheep Pondsnail (*Stagnicola*) Species Group Pristine Pyrg Monarch

Target: Agricultural Lands

Portions of this habitat consists of a mosaic of remnant stands of sagebrush and other xeric brush species intermixed with rangeland dominated by invasive annual grasses, including cheatgrass, medusahead, jointed goatgrass (*Aegilops cylindrical*), and ventenata (*Ventenata dubia*), but also includes native bunchgrasses and forbs, and planted desirable nonnative grasses and forbs such as intermediate wheatgrass (*Thinopyrum intermedium*) and alfalfa (*Medicago sativa*). These lands are primarily used for dryland livestock grazing and planted nonnative grasslands are common on Conservation Reserve Program lands. The other portion of this habitat consists of historically wet meadows and valley bottoms now converted to working agricultural lands, including irrigated pastures, hay, and crop fields.

Irrigated and dryland agriculture, and private foothill grazing lands typical of this section. Cambridge, Idaho © 2012 Anna Owsiak

Most irrigated agricultural lands lie within river valleys. These irrigate lands provide important habitat for Long-bill Curlew and foraging Greater Sage-Grouse, especially irrigated alfalfa fields.

Invasive annuals are particularly well-established on these rangelands at lower elevation and south-facing slopes and ridges, and the associated fire regime in this system has resulted in the functional loss of shrubs over large areas. Consequently, only remnant stands of sagebrush remain with much of the understory dominated by cheatgrass. Historic fires have been reseeded with crested wheatgrass (*Agropyron cristatum* [L.] Gaertn.) and other nonnative grass species. Agricultural lands contains some remnant Sage-Grouse habitats, characterized as General Sage-Grouse Habitat Management Zones as defined by the Governor's Alternative (see p. 6, Otter 2012). Sharp-tailed Grouse (*Tympanuchus phasianellus*) occupy a variety of steppe habitats and winter in deciduous shrubs (e.g., chokecherry [*Prunus virginiana* L.])at higher elevations. Sage-Grouse winter in remnant steppe habitat in the Crane Creek/Indian Valley area. Managing rangeland plant diversity and wildfire are priorities.

Target Viability

Fair to Good. Large expanses of dryland habitat have been converted to stands of invasive annual grasses and subjected to altered fire regimes, which result in the functional loss of shrubs. Some dryland areas remain dominated by native vegetation, but they are mostly isolated patches. Some habitat is being lost by conversion to housing and other development. Invasive

plants common to irrigated and dry agricultural lands include Canada thistle (*Cirsium arvense*), scotch thistle (*Onopordum acanthium*), and rush skeletonweed. Changes in snowpack and moisture patterns may have greater impacts to these habitats in the future.

Prioritized Threats and Strategies for Agricultural Lands

High rated threats to Agricultural Lands in the Blue Mountains

Changes in precipitation & broad-scale hydrologic regimes

Intensified drought due to increasing temperatures and changing precipitation patterns is increasing the vulnerability of this habitat to wildfire and noxious weed and invasive grass invasion. Wildfire scope and severity is increasing. Snowpack levels are decreasing and winter temperatures are increasingly milder, creating conditions favorable for pathogen insect survival and invasive annual grasses. More moisture is falling as rain during winter months, changing hydrologic regimes within this habitat and in lower elevation habitats with headwaters within this section. Less snowpack equates to more drought stress to native plants, and increases conditions for drought-adapted invasive species to establish.

Objective	Strategy	Action(s)	Target SGCNs
Improve landscape resilience to climate change.	Manage for diverse, healthy plant communities able resist changing and forecasted environmental conditions. Conditions include drought and drought-mediated impacts such as invasion by nonnative plants and wildfire.	Use desirable nonnative vegetation and seed sources on rangeland improvement projects able to out-compete invasive annual grasses common to agricultural rangelands. Manage fuel loads to reduce severity of wildfire while still meeting rangeland health standards. Install drought tolerant green strip vegetation in strategic locations within the landscape to assist in managing wildfire. Work with other agencies, organizations, and user groups across the Blue Mountains to address climate change impacts across landscapes, and refine land management planning options and alternatives down to local level implementable projects where possible. Engage in trust building efforts with impacted stakeholders to develop individual and social support for proposed land management actions and restoration activities (Gordon et al. 2014). Engage in microclimate monitoring to better identify and understand local pockets of environmental opportunity to enhance habitat resistance to climate induced stressors. Engage in research to identify plants useful for habitat restoration or enhancement from current climate regimes that are forecast to be	Greater Sage-Grouse Sharp-tailed Grouse Sandhill Crane Long-billed Curlew Burrowing Owl Common Nighthawk Townsend's Big-eared Bat Silver-haired Bat Hoary Bat Western Small-footed Myotis Little Brown Myotis Southern Idaho Ground Squirrel Monarch

Objective	Strategy	Action(s)	Target SGCNs
		local future climate regimes. Support efforts to increase public and political awareness of climate change impacts to local landscapes and wildlife dependent on them. Support exploring options for managing livestock grazing in this habitat under forecasted climate models (i.e., drought conditions). Work with agencies (NRCS), organizations (Soil and Water Conservation Districts), and livestock operators to use this information to both be proactive and refine land management planning options and alternatives down to local level implementable projects.	

Species designation, planning & monitoring

The Southern Idaho Ground Squirrel (SIGS) would benefit from the additional management actions identified below:

Objective	Strategy	Action(s)	Target SGCNs
Maintain dryland plant diversity and productivity	Manage livestock use to promote forage availability during critical SIGS foraging periods.	Work with livestock operators to adjust grazing regimes to maximize retention of early season (Feb-June) forbs and grass diversity and productivity.	Southern Idaho Ground Squirrel
	Improve existing habitat quality.	Design and implement rangeland restoration projects that maximize plant species diversity.	Southern Idaho Ground Squirrel

Target: Bighorn Sheep

Bighorn Sheep is an iconic western species, frequently associated with wilderness and the steep, rugged canyon country of Hells Canyon and the Salmon River. Sheep were native to both the lower Salmon and Snake river canyons. The Hells Canyon population was extirpated in the early 1900s, with the last Bighorn Sheep reported killed there in 1925. Reintroductions of Bighorn Sheep to Hells Canyon have increased populations there, but disease issues continue to limit populations in both the Snake and lower Salmon rivers.

Most Bighorn Sheep habitat lies within federal- and state-managed lands, and portions are in good condition. Changes in climate and historic fire cycles are impacting Bighorn Sheep habitat. Larger, more severe wildfires are becoming more frequent, and annual grass and noxious weed invasion has occurred in habitats below about 1,200 m (4,000 ft) elevations. Habitat modeling indicates the Snake and Salmon rivers could support higher numbers of Bighorn Sheep than both currently do.

Bighorn Sheep ram, Cecil D Andrus Wildlife Management Area, Cambridge, Idaho © 2009 Ken Miracle

Bighorn Sheep populations are managed in Idaho under a separate species management plan (IDFG Bighorn Sheep Management Plan 2010). Sheep occurrence in the Blue Mountains is defined within 2 Population Management Units (PMUs), described in detail in the Bighorn Sheep Management Plan (2010): Hells Canyon and the Lower Salmon River. In addition, Idaho actively participates in the Hells Canyon Initiative, a multistate and multiagency effort that is working to address issues impacting Bighorn Sheep in Hells Canyon and ultimately improve Bighorn Sheep populations.

Target Viability

Poor. The overall population status of Bighorn Sheep is well below objectives for each of the 2 PMUs in this section. Disease, specifically bronchopneumonia, is the primary factor limiting population growth. The most robust populations are in the northern portion of Hells Canyon on the Snake River. The last few remaining Bighorn Sheep on the south portion of the section near Brownlee Dam were removed in 2015. IDFG will evaluate future transplants intended to reestablish this population once private domestic sheep issues local to the area are addressed. Habitats traditionally occupied by Bighorn Sheep are in good to very good condition overall; most are in federal ownership and have some level of special designation (National Recreation, Wild River and Wilderness areas). On the northern and southern portions of this target habitat, annual invasive grasses are dominant below about 1,200 m (4,000 ft). Yellow star-thistle is widespread throughout the northern end of the section, and there is potential for additional

large-scale invasion by other noxious weeds including rush skeletonweed and spotted knapweed . Wildfire scope and severity are increasing from changes to precipitation and climate patterns, and from lengthening fire return intervals.

Prioritized Threats and Strategies for Bighorn Sheep

Very High rated threats to Bighorn Sheep in the Blue Mountains

Disease transmission

Disease was a significant factor in the historic decline of Bighorn Sheep and is a key factor limiting recovery throughout Idaho (IDFG 2010). Bronchopneumonia increases adult and lamb mortality, affecting Bighorn Sheep population stability in the Blue Mountains.

Bighorn Sheep are vulnerable to organisms carried by healthy domestic sheep and goats, and once these organisms are transmitted, there is no effective treatment in Bighorn Sheep. Minimizing or eliminating the potential for contact between domestic sheep and goats and Bighorn Sheep is the most important management direction for Bighorn Sheep populations (IDFG 2010). Even with aggressive efforts to separate them, foraying wild sheep could come in contact with domestic sheep and goats, and straying domestic sheep and goats with Bighorn Sheep. Another possible source of disease transmission could be incidental contacts with pack goats on backcountry trails. Both the Snake and Salmon rivers have backcountry trails within their boundaries.

All populations in Hells Canyon have experienced intermittent adult mortality and low lamb recruitment due to pneumonia-caused mortalities (IDFG 2010).

Objective	Strategy	Action(s)	Target SGCNs
Work to reduce the effects of disease on Bighorn Sheep populations.	Advocate and work towards maintaining spatial and temporal separation between Bighorn Sheep and domestic sheep and goats.	Continued implementation of Interim Strategy for Managing Separation Between Bighorn Sheep and Domestic Sheep in Idaho, (IDFG and ISDA 2008). Provide federal land managers with Bighorn Sheep data to assist with allotment management. Work with land management agencies to identify appropriate alternative management options. (IDFG 2010). Strategically purchase or negotiate conservation easements on key private parcels to remove the potential for contact between Bighorn Sheep and domestic sheep. Work with a key representative(s) from the livestock production sector to act as a mediator between agencies and producers to open the door to better communications between both groups on science and management issues.	Bighorn Sheep

Objective	Strategy	Action(s)	Target SGCNs
		Engage in trust building efforts with impacted stakeholders to develop individual and social support for proposed land management actions and restoration activities (Gordon 2014). Use domestic goats for weed control in low or no risk areas only. Work with Idaho Power Company to remove potential for domestic sheep or goats to be present on their private housing complexes associated with Brownlee, Oxbow, and Hells Canyon Dams. Work with ranchers to seasonally coordinate grazing patterns (WAFWA 2007; IDFG and ISDA 2008) Capture or euthanize wild sheep and stray domestic sheep or goats if found in an area (removal zone) where contact is likely (IDFG 2010). Encourage double-fencing where appropriate and practical (WAFWA 2007; IDFG and ISDA 2008). Share latest research on wild/domestic disease transmission and provide recommendations for separation (IDFG 2010). Seek out and speak to organized pack goat groups about risk of disease transmission. Develop signs for trailheads with information on avoiding contact between Bighorn Sheep and domestic pack goats.	

High rated threats to Bighorn Sheep in the Blue Mountains

Noxious weeds & invasive annual grasses

In the Blue Mountains, noxious weeds and invasive annual grasses (e.g., cheatgrass) have colonized many habitat types, including those important for Bighorn Sheep. Yellow star-thistle, spotted knapweed and rush skeletonweed are three weed species especially adept at colonizing and dominating habitats important to Bighorn Sheep. These invaders crowd out native grasses and forbs, are effective at preventing reestablishment of native species, and are easily transported to new locations by human, livestock, and wildlife activities. Concentrated livestock grazing on private and public lands has impacted springs, seeps, and riparian areas, creating disturbance opportunities for noxious weed invasion at these sites.

Biocontrol agents are essential to managing noxious weeds in the rugged canyon lands of the Snake and Salmon rivers because of their limited access and steep terrain. It will be increasingly

important to request and support efforts to further expand and fund the development of biocontrol agents.

Objective	Strategy	Action(s)	Target SGCNs
Effectively control and restore areas impacted by invasive and noxious weeds at rates higher than invasion spread rates.	Control and manage established noxious and invasive weeds.	Support the development of a framework for a national invasive species EDRR program (DOI 2105). Promote certified weed-free seeds/forage (Idaho Sage-grouse Advisory Committee 2006). Incorporate desirable nonnative plant species capable of outcompeting invasive species as the first transitional step in restoration at sites dominated by invasive species, especially annual grasses. Coordinate and cooperate with state and federal agencies to apply integrated pest management techniques to treat weeds across the greater landscape with emphasis on biocontrol in area with low accessibility. Support research and development of additional biocontrol agents, especially agents for yellow star-thistle. Explore the use of MB 906®, a bacteria soil amendment for the suppression of annual grass, in restoration efforts; commercially available fall 2015. Develop, participate in, and build upon multiagency/organization partnerships, including Cooperative Weed Management Areas to address weed issues across land ownership and management boundaries.	Bighorn Sheep
	Reduce concentrated livestock use at springs and riparian areas within grazed Bighorn Sheep habitat.	Develop off-site watering sources for livestock in conjunction with exclusion fencing to protect sensitive wet areas and spring sources. Work with livestock producers to reduce concentrated livestock use at spring and riparian locations. Use active restoration to improve degraded sites.	Bighorn Sheep

Target: Northern Idaho Ground Squirrel

The Northern Idaho Ground Squirrel is a rare, endemic small mammal that occurs at <60 sites in Adams and Valley counties in west-central Idaho. The Blue Mountains supports all currently known extant Northern Idaho Ground Squirrel colonies except one, making this species a critically important conservation target for this section. Northern Idaho Ground Squirrel was listed as Threatened under the Endangered Species Act in April 2000, with a Recovery Plan published in 2003 (US Fish and Wildlife Service 2003). Colonies are distributed in the Bear Creek, Lick Creek,

Lost Creek, Weiser River, and Mud Creek drainages, where Northern Idaho Ground Squirrel inhabits dry montane meadows, such as open areas of grasses and forbs surrounded by ponderosa pine (*Pinus ponderosa*) or Douglas-fir (*Pseudotsuga menziesii*) forest (Yensen 1991). The US Forest Service manages land on which roughly half of the known sites occur, with the remaining sites on private land, including those dedicated to commercial timber production and grazing.

Conservation direction for Northern Idaho Ground Squirrel is detailed in the Recovery Plan (US Fish and Wildlife Service 2003). Recovery goals address population size, spatial distribution, and security, as well habitat restoration needed to sustain and expand populations.

Target Viability

Fair. The number of known occupied sites has increased since federal listing, in part a result of more consistent survey effort but also due to changing population distribution on the landscape. However, many of these sites support fewer than 20 individuals and remain geographically and genetically isolated from one another. This makes them vulnerable to genetic drift, inbreeding, and attendant loss of viability and at risk to outbreaks of disease or local extirpation due to natural population fluctuations. The degree to which plague is suppressing population growth is unknown but currently being investigated through research. Population size, distribution, and security are substantially below recovery goals set forth in the recovery plan. Populations on private land (fully half the number of known sites) are at risk from rural residential development. The Payette National Forest prioritizes management to improve NIDGS habitat, but appropriate timber management prescriptions are still to be tested and take time to implement, particularly because prescribed fire is a critical component of habitat improvement.

Northern Idaho Ground Squirrel, Lick Creek Lookout, Idaho © 2013 Carolyn Gillan

Prioritized Threats and Strategies for Northern Idaho Ground Squirrel

High rated threats to Northern Idaho Ground Squirrel in the Blue Mountains

Historic & current fire suppression

Fires historically burned at more frequent intervals (Havlina 1995), resulting in a more patchy mosaic of different seral stages and maintained natural openings. Longer return fire intervals resulting from fire suppression have allowed conifer invasion into historic grass and shrublands and in some cases are preventing successful shrub regeneration (Havlina 1995). This

encroachment has reduced the amount of habitat available to ground squirrels and closed off dispersal corridors between colonies (Sherman and Runge 2002). Altered fire cycles favor invasive plants and habitat conversion to less desirable species, resulting in poorer quality food plants that lack the nutritional value squirrels need to sustain prolonged hibernation (Sherman and Runge 2002, Yensen 2004).

Objective	Strategy	Action(s)	Target SGCNs
Restore historic fire intervals	Increase fire frequency on the landscape.	Work with federal agencies to develop and implement policies that move fire management from reactive to proactive. Increase number of low intensity controlled burns to create a better seral mosaic across Northern Idaho Ground Squirrel habitat and within the greater landscape. Strategically develop projects to minimize the potential for noxious weed invasion. Engage in trust building efforts with impacted stakeholders to develop individual and social support for proposed land management actions and restoration activities (Gordon et al. 2014).	Northern Idaho Ground Squirrel

Rural development

Populations on private land (fully half the number of known sites) are at risk from rural residential development. Both Adams and Valley counties contain rural private lands desired for housing development. There has been some subdivision of agricultural lands for housing development, especially during the height of the housing bubble (about 2006), and commercial timber lands are increasingly managed for real estate as part of company portfolios. Several key private properties with Northern Idaho Ground Squirrel sites are already on the real estate market, and could potentially be subdivided. Should several private properties that currently host the most robust and largest numbers of NIDGS be subdivided, the impacts could be catastrophic for population security and longevity.

Objective	Strategy	Action(s)	Target SGCNs
Private lands host robust and secure populations of Northern Idaho Ground Squirrel.	Maintain intact habitat for Northern Idaho Ground Squirrel on privately owned lands.	Work with private landowners to develop conservation easements on private lands supporting Northern Idaho Ground Squirrel to secure and protect critical habitat.	Northern Idaho Ground Squirrel

Dam construction & inundation

A key Northern Idaho Ground Squirrel colony is located at Lost Valley Reservoir. The reservoir serves as the headwaters of the Weiser River and is an irrigation storage reservoir for Council, Cambridge, and Midvale, Idaho. Proposals to raise the reservoir have periodically been brought forward, including in the past year when it was brought out as a possible alternative to the construction of Galloway Dam, near Weiser, Idaho.

The Lost Valley Northern Idaho Ground Squirrel colony occupies habitat within the proposed new high water mark at the 1,463 m (4,800 ft) contour line. Raising the reservoir's height to this mark would flood out a significant portion of this colony and inundate habitat that the US Forest Service has invested significant resources in improving to facilitate Northern Idaho Ground Squirrel expansion. The Lost Valley colony is believed to function as a source population from which NIDGS dispersal has occurred. The proposed reservoir expansion would impede population recovery from impacts at this Northern Idaho Ground Squirrel site (Northern Idaho Ground Squirrel Technical Working Group Position Statement #1 2008).

Objective	Strategy	Action(s)	Target SGCNs
Continue work to move Northern Idaho Ground Squirrel populations towards recovery goals.	Make sure importance of this Northern Idaho Ground Squirrel population to recovery is understood and the impacts to recovery if this site is impacted by proposed water storage augmentation actions.	Keep local political leaders informed of current population status and recovery actions conducted to move the species towards recovery. Continue working with federal land managers to increase acres of suitable Northern Idaho Ground Squirrel habitats for current populations to expand into.	Northern Idaho Ground Squirrel

Target: Southern Idaho Ground Squirrel

The Southern Idaho Ground Squirrel is endemic to approximately 291,500 ha (720,500 acres) in Gem, Payette, Washington, and Adams counties, Idaho (US Fish and Wildlife Service 2014), concentrated in the foothills north of the Payette River from Weiser east to Squaw Butte. Investigations into the status of this species began in the 1980s (Yensen 1985). At that time, SIDGS populations were suspected to be declining, but not necessarily imperiled. During the late 1990s, however, resurveys indicated a dramatic decline (Yensen 1999 2000), and this information led to this taxon being designated a candidate for listing under ESA in 2001 (Fed Regist. 66:54808–54832).

Southern Idaho Ground Squirrel © US Fish and Wildlife Service

Southern Idaho Ground Squirrel populations occur in a mosaic of shrubland and grassland habitats common to foothills rangelands and pastures. They are also frequently associated with mowed fields, primarily alfalfa, found in drainage and valley bottoms. In some areas, habitat changes are driven by invasion of weedy annual grasses—particularly cheatgrass and medusahead—which displace native plants. The reduced plant diversity affects forage value and alters the timing of plant productivity because the nonnative grasses tend to senesce in late spring (e.g., late May through early June), a period when Southern Idaho Ground Squirrels are completing the accumulation of energy reserves prior to entering estivation in June.

Target Viability

Good. Populations have rebounded from an apparent 1998–2001 population crash and now occupy most of the historical distribution. The driver of the population crash, however, has not been determined.

Prioritized Threats and Strategies for Southern Idaho Ground Squirrel

High rated threats to Southern Idaho Ground Squirrel in the Blue Mountains

Noxious weeds & invasive annual grasses

In the Blue Mountains, noxious weeds and invasive annual grasses (e.g., cheatgrass) have colonized many habitat types, including those important for Southern Idaho Ground Squirrel. These invaders crowd out native grasses and forbs, are effective at preventing reestablishment of native species, and combined with changing precipitation patterns, are altering fire cycles and increasing fire return intervals. This is also preventing the reestablishment of sagebrush and other brush species once they are lost to wildfire and/or other causes.

Objective	Strategy	Action(s)	Target SGCNs
Effectively control and restore areas impacted by invasive and noxious weeds at rates higher than invasion spread rates.	Control and manage established noxious and invasive weeds.	Support the development of a framework for a national invasive species EDRR program (DOI 2105). Promote certified weed-free seeds/forage. Incorporate desirable nonnative plant species capable of outcompeting invasive species as the first transitional step in restoration at sites dominated by invasive species, especially annual grasses. Use integrated pest management techniques to treat weeds across the greater landscape with emphasis on biocontrol in area with low accessibility. Support research and development of additional biocontrol agents, especially for annual grasses. Explore the use of MB 906®, a bacteria soil amendment for the suppression of annual grass, in restoration efforts; commercially available fall 2015. Develop, participate in, and build upon multiagency/organization partnerships, including Cooperative Weed Management Areas, to address weed issues across land ownership and management boundaries.	Southern Idaho Ground Squirrel

Sylvatic plague

Wildlife diseases have the potential to cause synchronized population declines across all or part of a species range. Plague is of particular interest considering that it is caused by a pathogen

that is nonnative to North America and is especially important to sciurid populations. Plague may occur broadly in mammalian assemblages and remain undetected with standard assays (Biggins et al. 2010). Some sciurid rodents—notably ground squirrels and prairie dogs—tend to be among species most susceptible to plague, and occurrence of the pathogen in a population may be enzootic (when the infection is maintained in the population without the need for external inputs). This disease may mediate population dynamics and community interactions by affecting fitness differentially among species within the small mammal community.

Objective	Strategy	Action(s)	Target SGCNs
Plague is managed to a level of few to no impacts on Southern Idaho Ground Squirrel populations.	Evaluate the effects of enzootic plague occurrence on Southern Idaho Ground Squirrel populations.	Characterize the small mammal community sympatric with Southern Idaho Ground Squirrel populations. Characterize flea loads on Southern Idaho Ground Squirrel and other species within the sympatric small mammal community. Experimentally evaluate the effects of enzootic plague on Southern Idaho Ground Squirrel survival rates and competitive interactions within the small mammal community.	Southern Idaho Ground Squirrel
	Manage plague epizootic outbreaks to maximize population recovery.	Develop and implement approach for detecting and evaluating mortality events to detect plague epizootic outbreaks. Use insecticidal dusts strategically to reduce mortality in key areas in the event of an epizootic outbreak.	Southern Idaho Ground Squirrel
	Treat Southern Idaho Ground Squirrel to prevent plague outbreaks.	Evaluate experimental oral inoculation through food pellets being tested in conservation programs directed at black-footed ferrets. Once feasible, may be effective for use on Southern Idaho Ground Squirrel.	Southern Idaho Ground Squirrel

Target: Pollinators

Pollinators provide an essential ecosystem service which benefits agricultural producers, agricultural consumers, and gardeners (Mader et al. 2011) in the Blue Mountains. A wide range of taxa, including birds and numerous insects provide pollination activities in Idaho. Three butterflies (Johnson's Hairstreak, Gillette's Checkerspot, and Monarch), 8 bees (Yellow Bumble Bee, Hunt's Bumble Bee, Morrison's Bumble Bee, Western Bumble Bee, Suckley's Cuckoo Bumble Bee, 2 Miner Bees, and a Mason Bee) and 1 moth comprise the group of 12 SGCN pollinators known to occur within this section.

Many pollinators, but particularly bees, are known to be experiencing population declines throughout North America (Mader et al. 2011) and those declines may be occurring within the Blue Mountains as well. Population declines and local die offs occur for a variety of reasons including habitat loss, pesticide exposure, and climate change (Mader et al. 2011). The Blue Mountains is ripe with opportunity to address these threats and improve the status of SGCN pollinators. Farmers, land managers, roadway authorities, municipalities, and homeowners can all contribute to pollinator conservation in direct and productive ways.

Target Viability

Fair. Many pollinators are declining rangewide.

Prioritized Threats and Strategies for Pollinators

Very High rated threats to Pollinators in the Blue Mountains

Pesticides

Pollinators are negatively affected by pesticides, especially insecticides. Impacts occur from absorbing pesticides through the exoskeleton, drinking nectar containing pesticides, and carrying pollen laced with pesticides back to colonies (Mader et al. 2011). Neonicotinoids are the most widely used insecticide on earth, and are particularly harmful to bee populations in causing dramatic die-offs (Hopwood et al. 2012,Mineau and Palmer 2013). Neonicotinoids are used on crops, pet collars, home and garden products, and as seed coatings, to name a few of their applications. They are often used pre-emptively, as in the case of seed coatings, instead of when pests are actually present. Although neonicotinoids are much less acutely toxic to farm workers, they are highly toxic to wildlife. A single corn seed coated with neonicotinoids can kill 80,000 bees and up to 10 birds (Mineau and Palmer 2013). Sublethal doses also can have significant, chronic reproductive impacts (Mineau and Palmer 2013). Neonicotinoids have also been detected in streams in Idaho (Hladik and Kolpin 2015). This genre of insecticides is suspected to play a part in the significant decline of insectivorous birds, but research is needed.

Western Bumble Bee © Derrick Ditchburn (The Xerces Society)

Significant benefits to pollinators can be achieved through reducing the use of, and pollinator exposure to, pesticides (Mader et al. 2011).

Objective	Strategy	Action(s)	Target SGCNs
Reduce native pollinator exposure to pesticides (Mader et al. 2011).	Encourage adherence to the principles of integrated pest management and encourage use of environmentally benign pesticides at small scales.	Conduct and support educational activities which encourage potential pesticide applicators to eliminate use of pesticides where practical, apply the minimum amount of chemical necessary and apply when pollinators are least active (i.e., nighttime, when flowers are not blooming) (Mader et al.	A Miner Bee(*Perdita barri*) A Miner Bee (*P. salicis euxantha*) A Miner Bee (*P. wyomingensis sculleni*) Yellow Bumble Bee Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (*Hoplitis orthognathus*) A Moth (*Grammia eureka*)

Objective	Strategy	Action(s)	Target SGCNs
		2011). Specifically target urban homeowners in educational efforts in the elimination of pesticide use, or proper application of pesticides (Mader et al. 2011). Conduct and support workshops which discuss pesticides in relation to other pollinator habitat management concerns (Mader et al. 2011).	Johnson's Hairstreak Monarch Gillette's Checkerspot
Reduce native pollinator exposure to pesticides on IDFG administered property (Mader et al. 2011).	Implement measures to reduce or eliminate pesticide use on IDFG Wildlife Management Areas and other properties (Mader et al. 2011).	Use the minimum recommended amount of pesticide (Mader et al. 2011). Apply pesticides at times when pollinators are least active such as nighttime, cool periods, low wind activity, and when flowers are not blooming (Mader et al. 2011). Mow or otherwise remove flowering weeds before applying pesticides (Mader et al. 2011).	A Miner Bee(*Perdita barri*) A Miner Bee (*P. salicis euxantha*) A Miner Bee (*P. wyomingensis sculleni*) Yellow Bumble Bee Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (*Hoplitis orthognathus*) A Moth (*Grammia eureka*) Johnson's Hairstreak Monarch Gillette's Checkerspot
Eliminate use of neonicotinoid insecticides (Hopwood et al. 2012).	Increase public education and awareness on the detrimental effects of neonicotinoids on bees (Hopwood et al. 2012).	Develop and distribute educational material. Distribute to municipalities, counties, agriculture producers, habitat managers, and other property owners (Hopwood et al. 2012). Prohibit use of neonicotinoids on state lands, particularly IDFG Wildlife Management Areas.	A Miner Bee(*Perdita barri*) A Miner Bee (*P. salicis euxantha*) A Miner Bee (*P. wyomingensis sculleni*) Yellow Bumble Bee Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (*Hoplitis orthognathus*) A Moth (*Grammia eureka*) Johnson's Hairstreak Monarch Gillette's Checkerspot

Habitat loss

Pollinators require foraging and nesting habitat. Providing both types of habitat within close proximity to each other is the best way to ensure pollinator success. Protecting, enhancing, and creating pollinator habitat can be a fun and rewarding way to engage with local communities. Educating landowners and managers about techniques to reduce land management impacts to pollinators is an essential component to pollinator habitat management.

Objective	Strategy	Action(s)	Target SGCNs
Reduce impact of land management practices on pollinators (Mader et al. 2011).	Educate about, and implement practices which benefit pollinators. (Mader et al. 2011).	Work with land managers and livestock grazers to maintain diverse native forb communities on public and private rangelands. Support the development of outreach materials that provide information on grazing methods that support pollinators. Where prescribe fire is used implement pollinator friendly burning protocols including rotational burning of ≤30% of each site every few years, leave small unburned patched intact, avoid burning too frequently (no more than every 5–10 years), avoid high intensity fires unless the burn goal is tree removal. Work with Idaho Transportation Department to implement proper roadside pollinator habitat management (Mader et al. 2011).	A Miner Bee(*Perdita barri*) A Miner Bee (*P. salicis euxantha*) A Miner Bee (*P. wyomingensis sculleni*) Yellow Bumble Bee Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (*Hoplitis orthognathus*) A Moth (*Grammia eureka*) Johnson's Hairstreak Monarch Gillette's Checkerspot
Conserve and improve existing pollinator habitat.	Identify and delineate high value pollinator habitats for use in management planning decisions.	Map existing major known pollinator habitat. Provide maps of important pollinator habitats to area land managers. Identify and recognize landowners providing pollinator habitat. Support and provide habitat management educational opportunities (Mader et al. 2011) to public and private land managers. Support and conduct surveys for native milkweed; map locations and provide to land managers for local level decision making. Initiate seed saving program (Mader et al. 2011). Conduct monarch monitoring on IDFG Wildlife Management Areas to determine presence and use of existing milkweed patches.	A Miner Bee(*Perdita barri*) A Miner Bee (*P. salicis euxantha*) A Miner Bee (*P. wyomingensis sculleni*) Yellow Bumble Bee Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (*Hoplitis orthognathus*) A Moth (*Grammia eureka*) Johnson's Hairstreak Monarch Gillette's Checkerspot
	Increase acres of high quality pollinator habitat.	Increase milkweed populations through seedings and plantings. Use grazing to maintain open, forb-dominated plant communities that support a diversity of pollinator insects, through the correct use timing and intensity of stocking rate (Black et al. 2006). Promote the use of Farm Bill Programs for pollinator conservation. (Stine et al. 2015)	A Miner Bee(*Perdita barri*) A Miner Bee (*P. salicis euxantha*) A Miner Bee (*P. wyomingensis sculleni*) Yellow Bumble Bee Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (*Hoplitis*

Objective	Strategy	Action(s)	Target SGCNs
		Increase the use of biocontrol agents as part of integrated pest management for noxious weed control to reduce herbicide use and impacts.	*orthognathus*) A Moth (*Grammia eureka*) Johnson's Hairstreak Monarch Gillette's Checkerspot
Create new urban and rural pollinator habitat.	Develop programs to encourage urban landowners to create pollinator habitat.	Provide pollinator habitat workshops for homeowners and rural land owners. Provide pollinator educational materials for homeowners and landowners. Develop and support incentives for homeowners to create pollinator habitat in urban yards. Work with municipalities and businesses to create urban pollinator habitat.	A Miner Bee(*Perdita barri*) A Miner Bee (*P. salicis euxantha*) A Miner Bee (*P. wyomingensis sculleni*) Yellow Bumble Bee Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (*Hoplitis orthognathus*) A Moth (*Grammia eureka*) Johnson's Hairstreak Monarch Gillette's Checkerspot

High rated threats to Pollinators in the Blue Mountains

Noxious weeds & invasive annual grasses

Invasive species have the ability to outcompete and exclude native forbs and flowering shrubs important to native pollinators. Habitats under stress from changing temperature and precipitation patterns, increased wildfire scope and severity, and a host of other stressors, are more susceptible to invasion. Although noxious weeds may provide pollinators with alternative food sources and breeding habitat, it is not well known which, if any pollinator species can sustain themselves within invasive dominated habitats.

Objective	Strategy	Action(s)	Target SGCNs
Increase understanding of how altered landscapes are used by and sustain pollinators.	Understand how noxious and invasive plants are used by native pollinators.	Develop research protocols to determine the use of nonnative plants by native pollinators and whether nonnative plants are able to meet pollinator life history requirement in impacted habitats. Share results with applicable land and pollinator managers. Use results in land management planning.	A Miner Bee(*Perdita barri*) A Miner Bee (*P. salicis euxantha*) A Miner Bee (*P. wyomingensis sculleni*) Yellow Bumble Bee Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee

Objective	Strategy	Action(s)	Target SGCNs
			A Mason Bee (*Hoplitis orthognathus*) A Moth (*Grammia eureka*) Johnson's Hairstreak Monarch Gillette's Checkerspot
Sustain and improve habitats for native pollinators. Restore diverse forb communities to degraded habitats.	Control and manage established noxious and invasive weeds, and prevent further invasion of minimally impacted habitats.	Support the development of a framework for a national invasive species EDRR program (DOI 2105). Use Integrated Pest Management techniques to treat weeds across the greater landscape with emphasis on biocontrol in area with low accessibility. Support research and development of additional biocontrol agents to reduce the need for pesticide use to control noxious weeds. Explore the use of MB 906®, a bacteria soil amendment for the suppression of annual grass, in restoration efforts; commercially available fall 2015. Promote/require the use of certified weed-free seeds/forage. Incorporate desirable nonnative plant species capable of outcompeting invasive species as the first transitional step in restoration at sites heavily dominated by invasive species. Develop and build upon multiagency/organization partnerships, including Cooperative Weed Management Areas, to address weed and restoration issues across land ownership and management boundaries, and to provide educational opportunities on the impacts of invasive plants on native pollinators. Work with wildland fire and land managers to proactively take steps to manage wildfire potential in high quality pollinator habitat on public and private lands. This includes developing strategic firebreaks, green stripping and other actions aimed at reducing the scope and severity of wildfires and acres impacted.	A Miner Bee(*Perdita barri*) A Miner Bee (*P. salicis euxantha*) A Miner Bee (*P. wyomingensis sculleni*) Yellow Bumble Bee Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (*Hoplitis orthognathus*) A Moth (*Grammia eureka*) Johnson's Hairstreak Monarch Gillette's Checkerspot

Species designation, planning & monitoring

Actions to enhance pollinator habitat will be most effective with knowledge of the current status of SGCN populations. Initiation of long term monitoring will allow a continuous data stream to assess conservation activities.

Objective	Strategy	Action(s)	Target SGCNs
Determine pollinator population status.	Conduct surveys and implement long term pollinator monitoring program.	Conduct surveys to identify colonies and breeding locations of pollinator SGCN. Research critical host plants for pollinator SCGN. Use information gathered in land use management decisions. Protect known breeding sites for native pollinators.	A Miner Bee(*Perdita barri*) A Miner Bee (*P. salicis euxantha*) A Miner Bee (*P. wyomingensis sculleni*) Yellow Bumble Bee Hunt's Bumble Bee Morrison's Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee A Mason Bee (*Hoplitis orthognathus*) A Moth (*Grammia eureka*) Johnson's Hairstreak Monarch Gillette's Checkerspot

Blue Mountains Section Team

A small working group developed an initial draft of the Blue Mountains Section Plan (Miradi v. 0.12), which was then reviewed by a wider group of partners and stakeholders during a 2-day workshop held at the Idaho Department of Fish and Game Headquarters office, Boise, Idaho in August 2014 (this input was captured in Miradi v. 0.14). That draft was then subsequently distributed for additional stakeholder input including a half-day meeting in December 2014. Since then, we have continued to work with key internal and external stakeholders to improve upon the plan. Materials in this document are based on Miradi v. 0.35. Individuals, agencies, and organizations involved in this plan are listed in Table 7.3.

Table 7.3 Individuals, agencies, and organizations involved in developing this plan [a]

First name	Last name	Affiliation
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Anna	Owsiak*	Idaho Department of Fish and Game, Southwest Region
Bill	Bosworth*	Idaho Department of Fish and Game, Southwest Region, Nampa
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Kerry	Barnowe-Meyer	Nez Perce Tribe
Justin	Barrett	Idaho Department of Fish and Game, Clearwater Region
Regan	Berkley	Idaho Department of Fish and Game, Southwest Region, McCall
Joanne	Bonn	US Forest Service Northern Region (R1), Nez Perce-Clearwater National Forests
Greg	Burak	US Fish and Wildlife Service
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Brad	Smith	Idaho Conservation League
Leona	Svancara	Idaho Department of Fish and Game, Headquarters
Art	Talsma	The Nature Conservancy
Joe	Weldon	Bureau of Land Management (US) Idaho

[a] Apologies for any inadvertent omissions.
[b] An asterisk "*" denotes team leader(s) and contact point if you would like to become involved in this work.