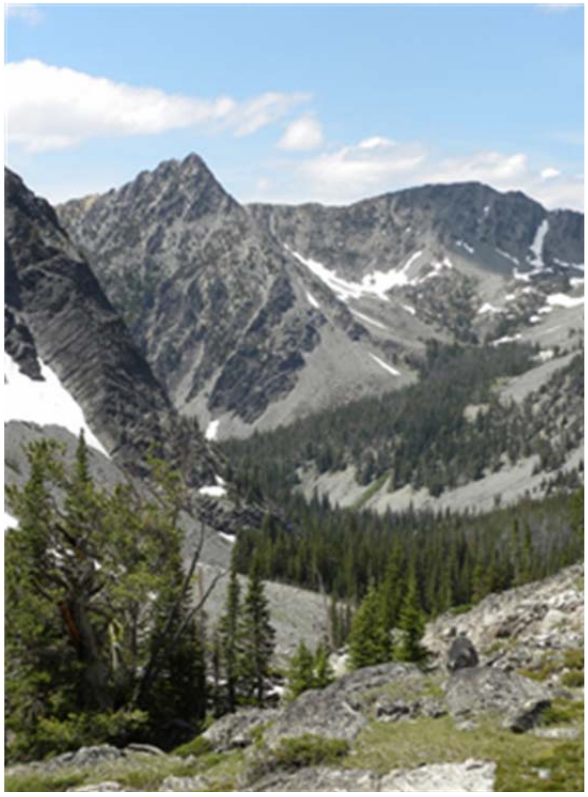
5. Beaverhead Mountains Section (v. 2015-12-21)

Section Description

The Beaverhead Mountains Section is part of the Middle Rockies–Blue Mountains Ecoregion, an expansive landscape of rugged mountains and intermontane valleys including major portions of Oregon, Idaho, Montana, and a small part of Washington. The Beaverhead Mountains Section within Idaho comprises 16,430 km^2 (6,345 mi^2), and together with a 28,330 km^2 (10,940 mi^2) expanse in southwestern Montana, constitutes the largest Section within the Middle Rockies–Blue Mountains Ecoregion. The Idaho portion of the Beaverhead Mountains Section encompasses east-central Idaho from the Continental Divide and state line along the Beaverhead, Centennial, and northern Henrys Lake mountains, west to the Salmon River Valley and south through the Lemhi and Lost River mountain ranges (Fig. 5.1, Fig. 5.2).



Upper Freeman Creek, Beaverhead Mountains © 2011 Beth Waterbury

The Section is a complex physical environment including the highest mountain ranges in Idaho contrasting with intermontane basins and broad valleys, with elevations ranging from 1,100 to 3,860 m (3,600 to 12,662 ft). The diversity of its physical landscape is reflected in its partition into 13 ecological subsections, more than any other section in the state with the exception of the massive Idaho Batholith. The Beaverhead Mountains Section experiences a continental climate with cold, relatively dry winters influenced by the rainshadow effect of the central Idaho mountains. Average annual precipitation varies from over 127 cm (50 in) at the Beaverhead Mountains crest to 20–40 cm (8–16 in) across most of the Section. Most precipitation occurs as snow during winter and early spring, while summers are comparatively dry.

The Section is characterized by expansive publicly-owned lands and a sparse, largely rural human population. Public lands constitute 87% of the land area and are managed to produce forage for cattle grazing, mineral commodities, and wood products, and to provide recreation and terrestrial and aquatic habitats. Privately-owned lands comprise just 13% of the Section's land base and are generally concentrated along watercourses where settlers typically chose to homestead. Beef cattle and hay/alfalfa forage production are the primary uses on private land,

although residential development is increasing, driven by the area's exceptional scenic and recreational amenities.

Vast roadless landscapes of high ecological integrity are the hallmark of this section, providing refugia and movement corridors for wild ungulates, forest carnivores, and other species with large spatial requirements. The easternmost extent of the Centennial Mountains is occupied by Grizzly Bear and is contiguous with the primary conservation area for Grizzly Bears centered on Yellowstone National Park (Merrill and Matson 2003). The Continental Divide along the Centennial and Beaverhead mountains is considered an important linkage corridor for wildlife movement connecting the Greater Yellowstone Ecosystem with the rest of the northern Rocky Mountains (Schwartz et al. 2009, Inman et al. 2013). For purposes of geographic continuity and to best incorporate existing regional conservation and management activities, Shotgun Valley and Henrys Lake Flat in the eastern portion of the Beaverhead Mountains Section are discussed more fully in the Yellowstone Highlands Section.

Aquatic, riparian, and wetland habitats cover approximately 2% of the section, but comprise the most biologically diverse and productive systems of this region. These areas provide primary breeding and foraging habitat for native ungulates, amphibious mammals, birds, bats, amphibians, fish, and aquatic invertebrates, and function as migratory networks on the landscape. The Salmon, Pahsimeroi, Lemhi, and North Fork Salmon rivers in the north half of the Section are notable in supporting populations of one or more native species of salmonids, including anadromous stocks that complete the longest migration in the lower 48 states. At the south end of the Section lie the Sinks Drainages, a collection of closed surface drainage basins originating in the Pioneer, Lost River, Lemhi, and Centennial mountain ranges that flow generally east and south, eventually sinking into the fractured basalts of the Snake River Plain (Van Kirk et al. 2003). At the far eastern end of the Centennials are smaller headwater streams draining into Henrys Lake. Aquatic systems in the Centennial and Henrys Lake mountains support American Beaver (*Castor canadensis*), Moose (*Alces americanus*), a diverse avian community, and important headwater populations of native Yellowstone Cutthroat Trout (*Oncorhynchus clarkii bouvieri*).

The Section's aquatic systems are intrinsically intertwined with its history, culture, and economy. In the Upper Salmon drainage, much of the currently occupied habitat of ESA-listed Salmon and Steelhead occurs on private lands, which also represents lands most important for local economies. Over the last 2 decades, community-driven conservation programs have made significant progress in addressing limiting factors to listed salmonids while minimizing regulatory impacts and revenue losses to the agricultural community. Project work, including tributary reconnection, diversion screening, and instream flow enhancement, has not only benefited fish and wildlife, but has helped to sustain popular recreational fisheries that infuse significant revenue to local communities. The Salmon River is also a renowned multiuse recreation destination for whitewater rafters, other boaters, and outdoor enthusiasts that support a vital tourism industry.

Beaverhead Mountains vegetation reflects an overlap of floristic elements from the Rocky Mountain, Great Basin, and Great Plains regions influenced by the Section's diverse geology and vertical relief, as well as its continental climate (Cooper et al. 1999). The Section's extensive uplands are characterized by sagebrush steppe and mountain shrublands at low to mid

elevations and a relatively narrow forested zone grading up to patchy alpine meadows and barrens at highest elevations.

Sagebrush steppe is the most prevalent habitat in the Beaverhead Mountains Section, covering approximately 53% of the area. The vast majority of sagebrush lands are managed by BLM, though extensive mountain big sagebrush (*Artemesia tridentata* spp. *vaseyana*) sites occur on U.S. Forest Service lands. Sagebrush habitats exhibit high ecological integrity relative to other Idaho Sections based on their large spatial scale, contiguous distribution, and comparatively low human footprint. These attributes contribute to conditions that support viable populations of Greater Sage-Grouse, a "landscape-scale species" dependent on interconnected seasonal habitats (Wakkinen 1990). A large proportion of sagebrush steppe in this section comprises Greater Sage-Grouse Priority Habitat Management Areas (PHMAs). Diverse sagebrush communities also provide important habitat for sagebrush-obligate species such as Pygmy Rabbit, Pronghorn, and Sage Thrasher, and steppe-associate species including Long-billed Curlew, Short-eared Owl, and Ferruginous Hawk.

Forests comprise the second most abundant land cover, occupying approximately 25% of the Section. Forest types range from Douglas-fir forests at lower timberline to mixed Douglas-fir and lodgepole pine at mid elevations to spruce-fir in the subalpine zone. The severe climate produces a relatively narrow forested zone. In some areas, soil moisture is not sufficient for tree growth on south and west aspects below timberline; thus, steppe communities often extend up through what would typically be the forested subalpine zone (Cooper et al. 1999). Other less frequent but ecologically important forest types are ponderosa pine, whitebark pine, Utah juniper, and quaking aspen. Ponderosa pine is a major component of low elevation warm, dry forests at the far north end of the Section. Whitebark pine may occur as a climax species at treeline or as a seral species or codominant with subalpine fir. Utah juniper is found in patchy, open-canopied woodlands on the southernmost foothill toeslopes of the Lost River, Lemhi, Beaverhead, and Centennial mountain ranges. Aspen is a relatively rare component of the forest landscape, forming small, isolated stands in aggregate with conifers. Aspen habitats in the Centennial Mountains are a notable exception, where they can form extensive stands of seral and climax community types (Mueggler 1988).

The mountain ranges of this region all experienced Pleistocene alpine glaciation and today support extensive alpine communities ranging from high relief cirquelands to alpine meadows and barrens above 2,900 m (9,500 ft). Since alpine habitats make up less than 1% of the land area in Idaho (378,656 acres [153,300 ha]), this community is unique and has significant conservation value. Alpine habitats in this section support few vertebrate species, but those that do occur, such as Black Rosy-Finch, Hoary Marmot, Mountain Goat, and Wolverine, are uniquely adapted to harsh climatic conditions. Snowpack from alpine catchments is critically important to maintaining favorable flow regimes in the Section's rivers and streams.

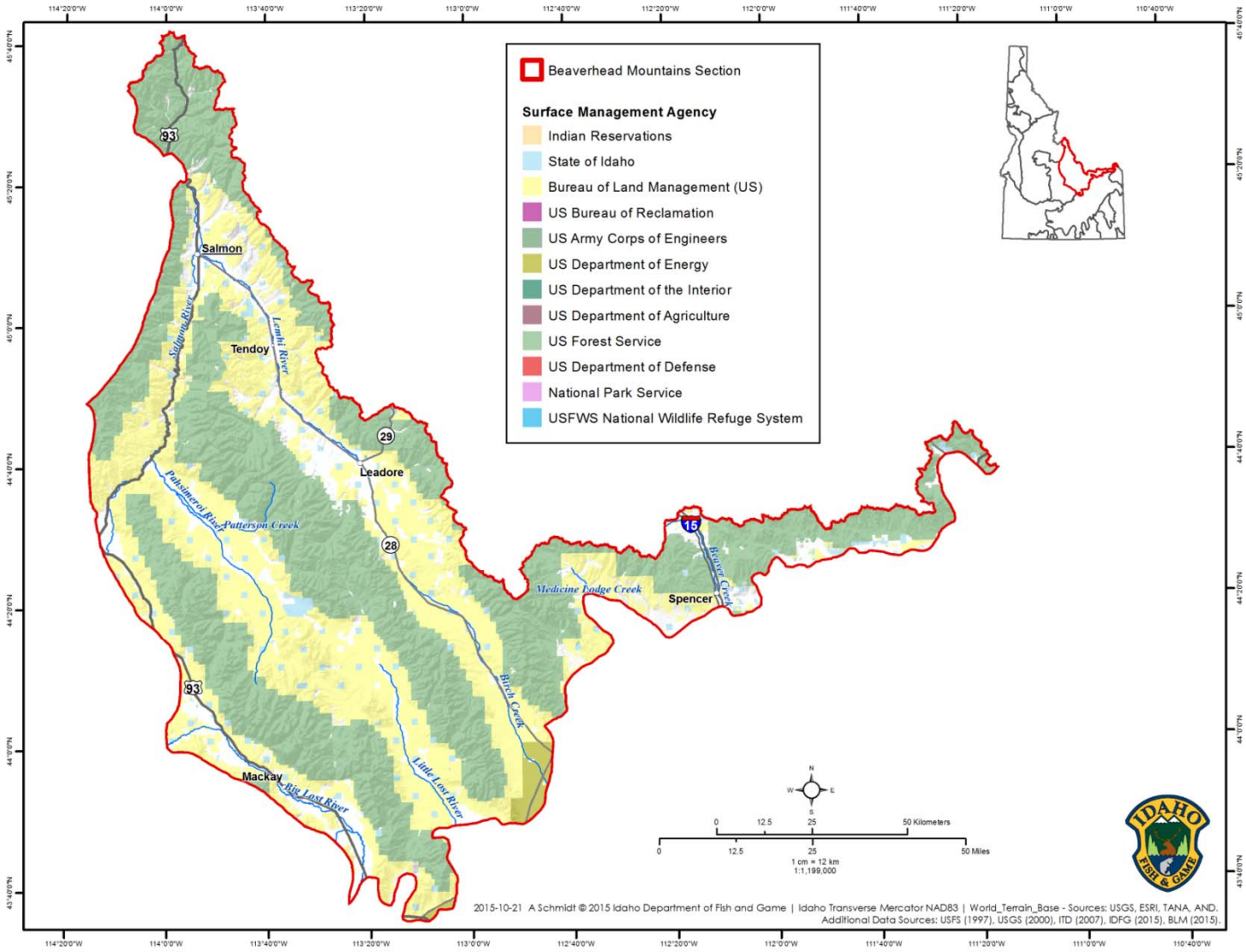


Fig. 5.1 Map of Beaverhead Mountains surface management

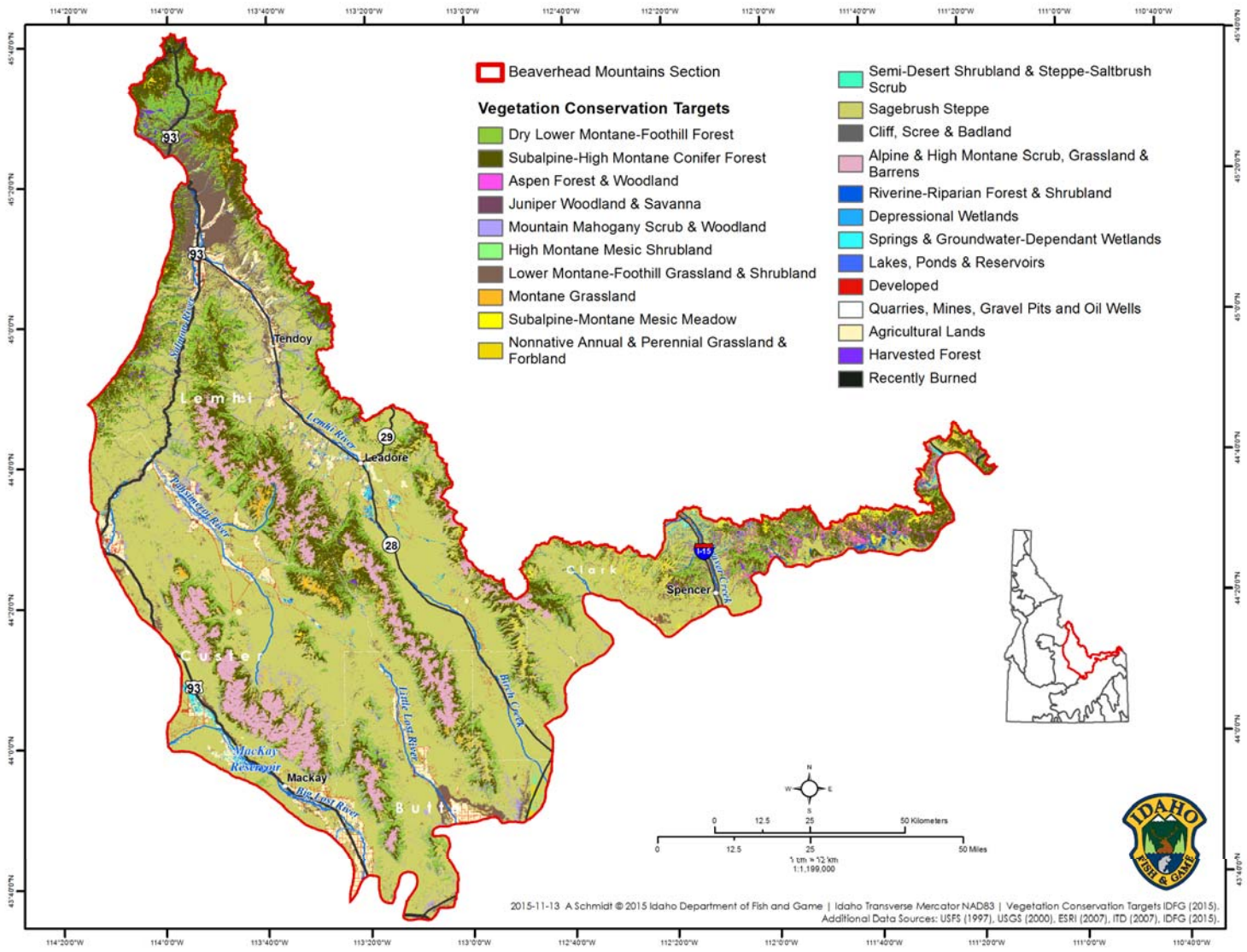


Fig. 5.2 Map of Beaverhead Mountains vegetation conservation targets

Conservation Targets in the Beaverhead Mountains

Eleven habitat targets (8 upland, 3 aquatic) were selected to represent the major ecosystems in the Beaverhead Mountains Section as shown in Table 5.1. Each of these systems provides habitat for key Species of Greatest Conservation Need (SGCN), i.e., "nested targets" (Table 5.2) associated with each target. All SGCN management programs in the Beaverhead 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 3 taxa—Wolverine, Bighorn Sheep, and pollinators—face special conservation needs and thus are presented as explicit species targets as shown in Table 5.1.

Table 5.1 At-a-glance table of conservation targets in the Beaverhead Mountains

Target	Target description	Target viability	Nested targets (SGCN)	
Dry Lower Montane–Foothill Forest	Forms 9% of section's land base at mid-elevations. Douglas-fir forests predominate with ponderosa pine codominant at the north end. Utah juniper woodlands occur on rocky foothills at the south end. Quaking aspen and mountain mahogany are often intermixed.	*Fair*. Fire suppression has created conditions highly susceptible to insect outbreaks and high severity stand-replacing fires. Lack of disturbance has also suppressed vigor of understory vegetation and allowed extensive areas of Douglas-fir to encroach on grassland and sagebrush steppe habitats.	*Tier 1* *Tier 2* *Tier 3* 	Wolverine Grizzly Bear Western Toad Ferruginous Hawk Golden Eagle Lewis's Woodpecker Silver-haired Bat Hoary Bat Fisher Bighorn Sheep Lyrate Mountain Snail Common Nighthawk Olive-sided Flycatcher Clark's Nutcracker Black Rosy-Finch Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis Spur-throated grasshoppers
Subalpine–High Montane Conifer Forest	Comprises 15% of section's land base. Generally forms the highest-elevation forests including the upper treeline ecotone with alpine habitat. This section contains important populations of whitebark pine, a keystone and foundation species of this target.	*Fair*. Altered fire regimes are favoring succession of fire-intolerant trees more susceptible to high-severity fires. The threat posed by white pine blister rust, in synergy with mountain pine beetle, altered fire regimes, and climate warming, threatens the viability of whitebark pine communities and the ecosystem services they provide.	*Tier 1* *Tier 2* *Tier 3* 	Wolverine Grizzly Bear Western Toad Golden Eagle Silver-haired Bat Hoary Bat Fisher Alpine Tiger Beetle Great Gray Owl Olive-sided Flycatcher Clark's Nutcracker Black Rosy-Finch Little Brown Myotis Mountain Goat
Aspen Forest and	Aspen is an	*Poor*. Aspen	*Tier 1*	Grizzly Bear

Target	Target description	Target viability	Nested targets (SGCN)	
Woodland	uncommon (<2% of land base) yet important habitat in this section. Although small in extent, aspen communities harbor high biodiversity, maintain water storage capacity for watersheds, and offer recreation and scenic value to humans.	decline across the western U.S. is attributed to altered fire regimes and heavy ungulate grazing leading to poor regeneration. Recurring drought as a result of climate warming could exacerbate aspen decline.	*Tier 2* *Tier 3*	Western Toad Silver-haired Bat Hoary Bat Fisher Great Gray Owl Common Nighthawk Lewis's Woodpecker Olive-sided Flycatcher Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis
Mountain Mahogany Scrub and Woodland	These unique shrublands and woodlands occur in small to large scattered stands in steep canyons, rocky outcrops, and steppe slopes of this section. Stands provide important winter cover for Mountain Goat, Bighorn Sheep, and other wild ungulates. Mountain mahogany is highly palatable to Bighorn Sheep, Moose, Elk, and Mule Deer.	*Fair*. Where dry conifer types are expanding due to altered fire regimes, mountain mahogany may be replaced as conifers dominate the canopy. Under this scenario and continued fire exclusion, this system is at risk from stand-replacing fire.	*Tier 2* *Tier 3*	Ferruginous Hawk Golden Eagle Bighorn Sheep Lyrate Mountainsnail Common Nighthawk Townsend's Big-eared Bat Western Small-footed Myotis Mountain Goat
Lower Montane–Foothill Grassland and Shrubland	Comprising 5% of the section's land base, this target includes a subset of grasslands, shrub steppe, and deciduous shrubland types found below the lower treeline and extending up into high montane zones. This is a compositionally diverse habitat supporting numerous SGCN.	*Fair*. Altered fire regimes have resulted in dry conifer encroachment and dense shrublands outside the range of natural historic variation. Livestock grazing use has altered species composition. Invasive weeds have pioneered on many road and trail systems.	*Tier 1* *Tier 2* *Tier 3*	Greater Sage-Grouse Grizzly Bear Ferruginous Hawk Golden Eagle Long-billed Curlew Burrowing Owl Bighorn Sheep Lyrate Mountainsnail Short-eared Owl Common Nighthawk Black Rosy-Finch Townsend's Big-eared Bat Western Small-footed Myotis Monarch Gillette's Checkerspot A Grasshopper (*Argiacris militaris*) Spur-throated Grasshopper Group
Sagebrush	This system covers	*Good*. Target is	*Tier 1*	Greater Sage-Grouse

Target	Target description	Target viability	Nested targets (SGCN)	
Steppe	53% of the section's land base and is characterized by an open shrub canopy and sparse to dense herbaceous layer dominated by perennial grasses. Microbiotic crusts are typically present. Sagebrush steppe habitats are relatively intact compared to more fragmented landscapes in other sections.	extensive, strongly continuous, and exhibits a diversity of age classes and structure. Most is in public ownership, thus, less vulnerable to rangewide threats of habitat fragmentation and conversion to agriculture common in areas of mixed ownership. Target is relatively resilient to the fire–cheatgrass cycle in this section.	*Tier 2* *Tier 3*	Ferruginous Hawk Golden Eagle Long-billed Curlew Burrowing Owl Sage Thrasher Sagebrush Sparrow Pygmy Rabbit Bighorn Sheep Lyrate Mountainsnail Sandhill Crane Short-eared Owl Common Nighthawk Townsend's Big-eared Bat Western Small-footed Myotis Idaho Point-headed Grasshopper A Grasshopper (*Argiacris amissuli*) A Grasshopper (*Argiacris militaris*) Spur-throated Grasshopper Group
Alpine and High Montane Scrub, Grassland and Barrens	Target comprises the greatest area and highest proportion of alpine land cover (5%) among Idaho sections. System occurs in notable extents in the Lemhi and Big Lost River mountain ranges. Target supports wildlife species specialized for cold, snowy environments.	*Good*. Large portions of this system are protected as Wilderness Study Area or Roadless Area. Other areas are "de facto" wilderness due to remoteness and inhospitable conditions for human habitation. Alpine wildlife is sensitive to climatic factors and may have low adaptive capacity to climate change.	*Tier 1* *Tier 2* *Tier 3*	Wolverine Grizzly Bear Golden Eagle Bighorn Sheep Clark's Nutcracker Black-Rosy Finch Mountain Goat Hoary Marmot
Riverine–Riparian Forest and Shrubland	This system includes rivers and streams, including aquatic habitats and their associated terrestrial riparian habitats. Major river systems are the Salmon, Pahsimeroi, Lemhi, North Fork Salmon, Sinks Drainages, and tributaries draining Henrys Lake Mountains.	*Fair to Good*. System accounts for 1% of land area, but supports diverse array of aquatic and terrestrial biota, including keystone species (American Beaver, salmon, cottonwood) and migration, juvenile rearing, spawning, or resident habitat for 5 species of ESA-	*Tier 1* *Tier 2*	Pacific Lamprey Steelhead (Snake River Basin DPS) Sockeye Salmon (Snake River ESU) Chinook Salmon (Snake River spring/summer-run) Grizzly Bear Western Toad Harlequin Duck Lewis's Woodpecker Silver-haired Bat Hoary Bat Fisher Bighorn Sheep

Target	Target description	Target viability	Nested targets (SGCN)	
		listed fish. Water diversions have resulted in perturbation of fluvial processes and riparian conditions in this section.		Western Pearlshell Lolo Mayfly A Mayfly (*Cinygma dimicki*) Sandhill Crane Common Nighthawk Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis California Floater Western Ridged Mussel Pondsnail Species Group Monarch Gillette's Checkerspot Lolo Sawfly Tiny Forestfly A Caddisfly (*Eocosmoecus schmidi*) A Caddisfly (*Rhyacophila oreia*) A Caddisfly (*Goereilla baumanni*) A Caddisfly (*Sericostriata surdickae*)
Springs and Groundwater-Dependent Wetlands	This target includes seeps, springs, and wet meadows occurring on gentle to steep slopes from floodplain to montane forest elevations. These are rare mesic features in a semi-arid landscape, thus attract a diversity of wildlife and invertebrate species.	*Poor*. These systems are highly attractive to livestock and wildlife as sources of palatable green forage and water. Improper livestock grazing and OHV impacts can cause soil compaction and erosion, destroy vegetation, facilitate spread of invasive weeds, and alter hydrologic processes.	*Tier 1* *Tier 2* *Tier 3*	Greater Sage-Grouse Grizzly Bear Western Toad Ferruginous Hawk Golden Eagle Long-billed Curlew Silver-haired Bat Hoary Bat Bighorn Sheep Sandhill Crane Great Gray Owl Short-eared Owl Common Nighthawk Townsend's Big-eared Bat Western Small-footed Myotis Little Brown Myotis Monarch Gillette's Checkerspot
Lakes, Ponds, and Reservoirs	Target comprises all natural lakes and deep ponds, created water bodies of all sizes, and dammed river channels. Includes Williams Lake, Summit Reservoir, and Mackay Reservoir, and hundreds of high mountain lakes in upper montane, subalpine, and alpine elevations.	*Good*. Large lakes/reservoirs established for irrigation water storage benefit fish and wildlife. High mountain lake fish-stocking programs should continue to balance recreational opportunity and maintenance of native amphibian populations. Climate warming	*Tier 2* *Tier 3*	Western Toad Long-billed Curlew Silver-haired Bat Hoary Bat Sandhill Crane Common Nighthawk Western Small-footed Myotis Little Brown Myotis

Target	Target description	Target viability	Nested targets (SGCN)	
		may impair lake temperatures and productivity.		
Agricultural Lands	This system comprises about 4% of the land base and includes irrigated forage crops and pasture tied to beef-cattle production. Agricultural lands are concentrated in the Salmon, Pahsimeroi, Lemhi, Little Lost, and Big Lost river valleys. Hay fields and pasturelands provide surrogate grassland habitat for avian SGCN.	*Fair*. Conversion of flood irrigation agriculture to center pivot systems reduces habitat suitability for grassland-nesting birds. Timing of hay harvest can overlap with peak nesting period for grassland birds.	*Tier 1* *Tier 2* *Tier 3*	Steelhead (Snake River Basin ESU) Chinook Salmon (Snake River spring/summer-run) Greater Sage-Grouse Western Toad Ferruginous Hawk Golden Eagle Long-billed Curlew Burrowing Owl Short-eared Owl Sandhill Crane Common Nighthawk Bobolink Black Rosy-Finch Monarch
Wolverine	An estimated population of ≤18 wolverine occurs within major blocks of primary habitat in the Beaverhead, Centennial, Lemhi and Lost River mountain ranges (IDFG 2014).	*Fair*. Climate warming and shrinking snow cover may amplify the fragmented nature of wolverine habitat in this section resulting in diminished connectivity and a subpopulation more vulnerable to extirpation.	*Tier 1*	Wolverine
Bighorn Sheep	Bighorn Sheep are widely distributed in 7 Population Management Units (PMUs) across the Beaverhead Mountains Section (IDFG 2010).	*Good*. Some PMUs stable in terms of population size and structure.	*Tier 2*	Bighorn Sheep
Pollinators	With the exception of the Monarch, little is known about SGCN pollinator species in this section.	*Good*. Presumably based on extensive area and good condition of native plant communities in surrounding public lands and compatible agriculture.	*Tier 1* *Tier 3*	Morrison Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee Hunt's Bumble Bee A Mason Bee (*Hoplitis producta*) Beartooth Copper Monarch Gillette's Checkerspot

Table 5.2 Species of Greatest Conservation Need (SGCN) and associated conservation targets in the Beaverhead Mountains

Taxon	Conservation targets													
	Dry Lower Montane–Foothill Forest	Subalpine–High Montane Conifer Forest	Aspen Forest and Woodland	Mountain Mahogany Scrub and Woodland	Lower Montane–Foothill Grassland and Shrubland	Sagebrush Steppe	Alpine and High Montane Scrub, Grasslands and Barrens	Riverine–Riparian Forest and Shrubland	Springs and Groundwater-Dependent Wetlands	Lakes, Ponds, and Reservoirs	Agricultural Lands	Wolverine	Bighorn Sheep	Pollinators
FISH														
Pacific Lamprey								X						
Steelhead (Snake River Basin)								X						
Sockeye Salmon								X						
Chinook Salmon (spring/summer)								X						
AMPHIBIANS														
Western Toad	X	X	X					X	X	X	X			
BIRDS														
Harlequin Duck								X						
Greater Sage-Grouse					X	X			X		X			
Ferruginous Hawk	X			X	X	X			X		X			
Golden Eagle	X	X		X	X	X	X		X		X			
Sandhill Crane						X		X	X	X	X			
Long-billed Curlew					X	X			X	X	X			
Burrowing Owl					X	X			X		X			
Short-eared Owl					X	X			X		X			
Great Gray Owl	X	X	X											
Common Nighthawk	X		X	X	X	X		X	X	X	X			
Lewis's Woodpecker	X		X					X						
Olive-sided Flycatcher	X	X	X											
Clark's Nutcracker	X	X					X							
Sage Thrasher						X								
Sagebrush Sparrow						X								
Bobolink											X			
Black-Rosy Finch	X	X			X		X				X			
MAMMALS														
Pygmy Rabbit						X								
Townsend's Big-eared Bat	X		X	X	X	X		X	X					
Silver-haired Bat	X	X	X					X	X	X				
Hoary Bat	X	X	X					X	X	X				
Western Small-footed Myotis	X		X	X	X	X		X	X	X				

Taxon	Conservation targets													
	Dry Lower Montane–Foothill Forest	Subalpine–High Montane Conifer Forest	Aspen Forest and Woodland	Mountain Mahogany Scrub and Woodland	Lower Montane–Foothill Grassland and Shrubland	Sagebrush Steppe	Alpine and High Montane Scrub, Grasslands and Barrens	Riverine–Riparian Forest and Shrubland	Springs and Groundwater-Dependent Wetlands	Lakes, Ponds, and Reservoirs	Agricultural Lands	Wolverine	Bighorn Sheep	Pollinators
Little Brown Myotis	X	X	X					X	X	X				
Wolverine	X	X					X							
Fisher	X	X	X					X						
Grizzly Bear	X	X	X		X		X	X	X					
Mountain Goat		X		X			X							
Bighorn Sheep	X			X	X	X	X	X	X					
Hoary Marmot							X							
AQUATIC BIVALVES														
Western Pearlshell								X						
California Floater								X						
Western Ridged Mussel								X						
GASTROPODS														
Pondsnail Species Group								X						
Lyrate Mountainsnail	X			X	X	X								
INSECTS														
Alpine Tiger Beetle							X							
Lolo Mayfly								X						
A Mayfly (*Cinygma dimicki*)								X						
Hunt's Bumble Bee														X
Morrison Bumble Bee														X
Western Bumble Bee														X
Suckley's Cuckoo Bumble Bee														X
A Mason Bee (*Hoplitis producta*)														X
Beartooth Copper							X							X
Monarch					X			X	X		X			X
Gillette's Checkerspot					X			X	X					X
Idaho Point-headed Grasshopper						X								
A Grasshopper *(Argiacris amissuli)*						X								
A Grasshopper *(Argiacris militaris)*						X	X							

Taxon	Conservation targets													
	Dry Lower Montane–Foothill Forest	Subalpine–High Montane Conifer Forest	Aspen Forest and Woodland	Mountain Mahogany Scrub and Woodland	Lower Montane–Foothill Grassland and Shrubland	Sagebrush Steppe	Alpine and High Montane Scrub, Grasslands and Barrens	Riverine–Riparian Forest and Shrubland	Springs and Groundwater-Dependent Wetlands	Lakes, Ponds, and Reservoirs	Agricultural Lands	Wolverine	Bighorn Sheep	Pollinators
A Grasshopper *(Barracris petraea)*							X							
Spur-throated Grasshoppers	X				X	X	X							
Lolo Sawfly								X						
Tiny Forestfly								X						
A Caddisfly (*Eocosmoecus schmidi*)								X						
A Caddisfly (*Rhyacophila oreia*)								X						
A Caddisfly (*Goereilla baumanni*)								X						
A Caddisfly (*Sericostriata surdickae*)								X						

Target: Dry Lower Montane–Foothill Forest

Dry Lower Montane–Foothill Forest communities comprise about 9% of this section. They typically occur at the lower treeline ecotone immediately above valley grasslands or sagebrush steppe and shrublands. Douglas-fir is the predominant forest type, but lodgepole pine and limber pine forests may intermix. Ponderosa pine is a codominant canopy tree at the northern end of the section, and Utah juniper woodlands are found on rocky foothills at the southern end of the section. Quaking aspen and mountain mahogany can also be intermixed. Fire suppression has interrupted the natural fire regime in this habitat type, resulting in unnaturally high tree densities with greater competition, less vigor and growth; susceptibility to insect outbreaks; and high risk of stand-replacing fires. Absence of fire has also suppressed vigor of understory vegetation and allowed extensive areas of Douglas-fir to encroach on grassland and sagebrush steppe habitats. Most of this community type occurs on public lands managed by BLM and USFS.

Upper Kenney Creek, Beaverhead Mountains © 2007 Beth Waterbury

This ecosystem supports several SGCN including Great Gray Owl, Olive-sided Flycatcher, and Clark's Nutcracker. Lewis's Woodpecker is present where ponderosa pine is a dominant component, and Western Toad occurs in kettle holes within lodgepole pine forests. This system provides abundant snag and live tree structure for bat roosting and insect prey for bat foraging.

Target Viability

Fair. Nearly a century of fire suppression in this forest type has created conditions highly susceptible to insect outbreaks and high severity stand-replacing fires. Absence of fire disturbance also results in Douglas-fir encroachment of ecotonal grasslands and sagebrush steppe communities. Noxious weeds such as spotted knapweed have colonized many roads in this forest type, particularly at lower-elevation sites.

Prioritized Threats and Strategies for Dry Lower Montane–Foothill Forest

High Rated Threats to Dry Lower Montane–Foothill Forest in the Beaverhead Mountains

Altered fire regimes

These forest types evolved under the influence of frequent, low-severity fire that maintained relatively open stands of a mix of fire-resistant species. Nearly a century of fire suppression has dramatically shifted successional patterns, reduced spatial heterogeneity of forest types, increased the density of small shade-tolerant trees, and produced an unnatural accumulation of ground fuels. These conditions, further exacerbated by drought and warmer temperatures, have led to massive insect outbreaks and tree mortality. As a result, many low- and mid-elevation conifer forests in this section are susceptible to uncharacteristically large, high-severity, stand-replacing fires. The continuing absence of fire in the dry montane forest type has allowed extensive areas of Douglas-fir to encroach into montane and foothill grasslands and sagebrush steppe habitats. Absence of fire has altered diversity, habitat structure, and productivity of understory shrubs, forbs, and grasses.

Objective	Strategy	Action(s)	Target SGCNs
Restore characteristic fire regime and forest structure in dry lower montane forest systems	Coordinate actions with federal land management agencies and municipalities	Engage and involve forest collaboratives in the development and implementation of forest restoration projects. Incorporate prescribed fire treatments in restoration projects. Use managed natural fire for forest restoration where/when appropriate. Incorporate mechanical thinning treatments to reduce stand densities where appropriate. Develop landscape-level models that evaluate commodity production, fire risk, forest health, and habitat needs of fish and wildlife in an integrated fashion.	Western Toad, Ferruginous Hawk, Golden Eagle, Great Gray Owl, Common Nighthawk, Lewis's Woodpecker, Olive-sided Flycatcher, Clark's Nutcracker, Black Rosy-Finch, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Western Small-footed Myotis, Fisher, Grizzly Bear, Bighorn Sheep, Lyrate Mountainsnail
Where appropriate, develop more aggressive strategies to reduce fuel load	Improve targeting of fuels reduction opportunities and implementation	Evaluate opportunities for harvesting and removal of biomass to meet treatment objectives and supply local biofuel facilities. Forest vegetation management includes evaluation opportunities for harvesting and removal of biomass to meet treatment	Western Toad, Ferruginous Hawk, Golden Eagle, Great Gray Owl, Common Nighthawk,

Objective	Strategy	Action(s)	Target SGCNs
		objectives. Use stewardship contracts to achieve public land management goals in rural communities.	Lewis's Woodpecker, Olive-sided Flycatcher, Clark's Nutcracker, Black Rosy-Finch, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Western Small-footed Myotis, Fisher, Grizzly Bear, Bighorn Sheep, Lyrate Mountainsnail
Change societal perceptions to accept fire as a beneficial tool for forest stewardship	Develop effective stakeholder outreach on the role of wildland fire in forest health	Engage forest collaboratives to promote benefits of forest restoration techniques, including use of fire. Develop and disseminate public outreach products on fire ecology in dry forest systems (news releases, presentations, brochures, articles).	Western Toad, Ferruginous Hawk, Golden Eagle, Great Gray Owl, Common Nighthawk, Lewis's Woodpecker, Olive-sided Flycatcher, Clark's Nutcracker, Black Rosy-Finch, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Western Small-footed Myotis, Fisher, Grizzly Bear, Bighorn Sheep, Lyrate Mountainsnail
Minimize conflicts between fire suppression and forest health policies	Develop growth management policies in Wildland-Urban Interface areas	Develop local land use ordinances to minimize rural/urban sprawl into wildlands. Incorporate climate change and fire behavior information into growth management and rural interface community planning initiatives.	Western Toad, Ferruginous Hawk, Golden Eagle, Great Gray Owl, Common Nighthawk, Lewis's Woodpecker, Olive-sided Flycatcher, Clark's Nutcracker, Black Rosy-

Objective	Strategy	Action(s)	Target SGCNs
			Finch, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Western Small-footed Myotis, Fisher, Grizzly Bear, Bighorn Sheep, Lyrate Mountainsnail

Forest insect pests and disease

Dry forest types in the Beaverhead, Lemhi, and Lost River mountain ranges have experienced extensive tree mortality in the last decade associated with widespread outbreaks of mountain pine beetle and western spruce budworm. Outbreaks often develop in dense stands of mature age-class lodgepole pine, mid-sized ponderosa pine, and homogeneous Douglas-fir forests. Warming climatic conditions and continued fire suppression have intensified insect outbreaks in this region. Extensive tree mortality associated with insect and disease outbreaks can significantly influence successional pathways and forest community composition. Other short- and long-term forest processes such as water yield and wildfire extent and severity can also be affected by tree mortality associated with insect outbreaks.

Objective	Strategy	Action(s)	Target SGCNs
Reduce the potential for large-scale loss of dry lower montane forest stands to insect outbreaks	Implement restorative forest management at the landscape level	Identify and strategically place forest restoration treatments in landscape locations and orientations for maximum benefit. Conduct risk assessments and appropriately prioritize areas for treatment. Restore appropriate stocking levels, species composition, and stand structure to levels more consistent with conditions under which host trees and insect/pathogen species coevolved.	Western Toad, Ferruginous Hawk, Golden Eagle, Great Gray Owl, Common Nighthawk, Lewis's Woodpecker, Olive-sided Flycatcher, Clark's Nutcracker, Black Rosy-Finch, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Western Small-footed Myotis, Fisher, Grizzly Bear, Bighorn Sheep, Lyrate Mountainsnail

Noxious weeds and invasive annual grasses

The invasion of nonnative grasses and forbs is now a threat to dry lower montane-foothill forests. These invasive weeds were historically considered a low-elevation problem; however, they are now spreading to higher elevations and spreading rapidly in some mid-elevation areas. Noxious weeds (e.g., spotted knapweed) and invasive annual grasses (e.g., cheatgrass) have colonized some habitat types of this section at lower and mid-elevations. Noxious weeds and invasive annual grasses replace native forbs and grasses, reduce forage quality for herbivorous wildlife, and increase the risk of intensified fire regimes. The predicted climate warming scenario for this region may generate the biophysical conditions favored for further cheatgrass establishment

Objective	Strategy	Action(s)	Target SGCNs
Control or eradicate noxious weeds	Work with USFS, BLM, and other partners to control or reduce noxious weed occurrence	Participate in County Cooperative Weed Management Area collaboratives Map and identify noxious weed patches and provide to the appropriate land manager Use biological controls (insects) on infestations of spotted knapweed Conduct aggressive weed management as part of post-fire habitat restoration Monitor roads and trails leading into key wildlife habitats for presence of weeds and treat aggressively if detected Provide native grass and shrub seed recommendations to land managers	Western Toad, Ferruginous Hawk, Golden Eagle, Great Gray Owl, Common Nighthawk, Lewis's Woodpecker, Olive-sided Flycatcher, Clark's Nutcracker, Black Rosy-Finch, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Western Small-footed Myotis, Fisher, Grizzly Bear, Bighorn Sheep, Lyrate Mountainsnail

Changing temperature and precipitation regimes

Current climate models predict changing precipitation patterns and warming temperatures for the Beaverhead Mountains Section. Precipitation and temperature changes may be of great enough magnitude to exceed the environmental tolerances of existing plant species and their related fauna and ecosystem services from portions of the Beaverhead Mountains Section. Change in precipitation from snow to rain is much more likely to induce earlier summer plant dormancy, lengthen the fire season, and shorten the wetland saturation period (van Mantgem et al. 2009). Predicted temperature increases for central Idaho show at least a sixfold increase of area burned by wildfire with each 1 °C (1.8 °F) of temperature increase relative to the median annual area burned during 1950–2003 (Littell et al. 2009). The goal of dry-forest restoration should be to develop more open structure consistent with historical disturbance regimes (Arno et al. 1995, Stephens et al. 2012). This goal creates forests more resilient to and compatible with a warmer and dryer future.

Objective	Strategy	Action(s)	Target SGCNs
Increase resiliency of dry lower montane forest types to climate pattern uncertainty	Actively implement restorative forest management at the landscape level	Employ silvicultural and prescribed fire treatments to restore characteristic forest stand structure, fuel loading, and vegetative heterogeneity. Incorporate climate change mitigation strategies in forest and resource management plans.	Western Toad, Ferruginous Hawk, Golden Eagle, Great Gray Owl, Common Nighthawk, Lewis's Woodpecker, Olive-sided Flycatcher, Clark's Nutcracker, Black Rosy-Finch, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Western Small-footed Myotis, Fisher, Grizzly Bear, Bighorn Sheep, Lyrate Mountainsnail

Target: Subalpine–High Montane Conifer Forest

Subalpine–High Montane Conifer Forest communities comprise about 14% of this section and generally form the elevationally uppermost forests, including the upper treeline ecotone with the alpine. Characteristic trees are subalpine fir, Engelmann spruce, whitebark pine, lodgepole pine, limber pine, and quaking aspen, which form variable canopies from nearly closed to open or patchy with intervening grasslands and shrublands. Subalpine fir (*Abies lasiocarpa*) and Engelmann spruce (*Picea engelmannii*) form climax or long-lived seral forests in this section, with periodic disturbance from windthrow, avalanches, and more prominently, insect outbreaks and stand-replacing fire. Lodgepole pine forest types occur in cold-air drainages as seral even-aged stands. Whitebark pine and limber pine are prevalent forest types in upper subalpine environments where they are important foundation and keystone species. The threat posed by the introduced pathogen that causes white pine blister rust, in synergy with mountain pine beetle, altered fire regimes, and warming climates, threatens the sustainability of these fragile 5-needled pine communities.

Subalpine forests and woodlands in this section are almost exclusively managed by the U.S. Forest Service and form expansive, continuous, and largely unroaded habitat strongholds for a wide range of wildlife. Characteristic species include Wolverine, Great Gray Owl, Olive-sided Flycatcher, Clark's Nutcracker, and Black Rosy-Finch. Boggy sites within subalpine forests also harbor Western Toad, and decay-prone spruce and fir trees provide roosting and natal sites for bats.

Target Viability

Fair. Successful fire suppression over the past century in this forest system has increased the proportion of area in late successional structural stages of stand development and led to increased homogeneity in forest cover. As subalpine forests become increasingly homogenous due to a cessation of small stand replacement fires, risk of larger fire occurrence may be heightened. A rapid decline in whitebark pine has occurred in the last decade as a result of 3 interrelated factors: (1) epidemics of mountain pine beetle, (2) the introduced disease white pine blister rust, and (3) successional replacement by shade-tolerant conifers, specifically subalpine fir and Engelmann spruce, probably as a result of fire exclusion. The loss of this keystone and foundational tree species poses serious consequences for upper subalpine ecosystems, both in terms of the impacts on biodiversity and in losses of valuable ecosystem processes and services.

Meadow Canyon, Lemhi Mountain © 2006 Chris Murphy

Prioritized Threats and Strategies for Subalpine-High Montane Conifer Forest

High Rated Threats to Subalpine-High Montane Conifer Forest in the Beaverhead Mountains

Changing temperature and precipitation regimes

Current climate models predict changing precipitation patterns and warming temperatures for the Beaverhead Mountains Section. Precipitation and temperature changes may be of great enough magnitude to exceed the environmental tolerances of existing plant species and their related fauna and ecosystem services from portions of the Beaverhead Mountains Section. Change in precipitation from snow to rain is much more likely to induce earlier summer plant dormancy, lengthen the fire season, and shorten the wetland saturation period (van Mantgem et al. 2009). Predicted temperature increases for central Idaho show at least a sixfold increase of area burned by wildfire with each 1 °C (1.8 °F) of temperature increase relative to the median annual area burned during 1950–2003 (Littell et al. 2009). This trajectory suggests that without active forest management, Subalpine–High Montane Conifer Forest systems will become less resilient and less compatible with a warmer and dryer future.

Objective	Strategy	Action(s)	Target SGCNs
Increase resiliency of subalpine–high montane conifer forest types to climate pattern uncertainty	Actively implement restorative forest management at the landscape level	Develop landscape-level models that evaluate commodity production, fire risk, forest health, and habitat needs of fish and wildlife in an integrated fashion. Identify and prioritize areas for immediate restoration treatments. Incorporate prescribed fire treatments in restoration projects. Use managed natural fire for forest restoration where/when appropriate. Incorporate mechanical thinning treatments to reduce stand densities and crown cover where appropriate. Favor retention of fire-tolerant tree species and restore fine-scale patchiness. Retain older age-class or large trees as part of a managed stand to create structural and age-class heterogeneity. Engage and involve forest collaboratives in the development and implementation of forest restoration projects.	Western Toad, Golden Eagle, Great Gray Owl, Olive-sided Flycatcher, Clark's Nutcracker, Black Rosy-Finch, Silver-haired Bat, Hoary Bat, Little Brown Myotis, Wolverine, Fisher, Grizzly Bear, Mountain Goat

Forest insect pests and disease in 5-needled pines

Whitebark pine and limber pine are native 5-needled pines considered foundation species of high-elevation settings of this section. These woodland types serve a variety of key ecological roles, including providing food resources for Grizzly Bear, Clark's Nutcracker, squirrels, and other birds and improving snow retention. Populations of whitebark and limber pines in this section have been extensively and severely impacted by epidemics of mountain pine beetle and white pine blister rust. Warming climate change forecasts suggest continued optimal conditions for pine beetle outbreaks for many decades (Hicke and Logan 2009). The introduced pathogen that causes white pine blister rust poses a more insidious threat given that it affects all aspects of the 5-needled pine forest regeneration process and will impair ecosystem recovery long after pine beetle epidemics phase out. Continued losses of whitebark and limber pines in this section could adversely modify hydrologic processes critical to listed anadromous fish and other aquatic-associated species.

Objective	Strategy	Action(s)	Target SGCNs
Ensure future persistence and viability of whitebark pine	Support and implement long-term strategies to restore whitebark pine (i.e., A Range-Wide Restoration Strategy for Whitebark Pine (Pinus albicaulis) (Keane et al. 2012)	Collect whitebark pine seed for genetic testing, gene conservation, rust screening, and operational planting. Cultivate rust-resistant whitebark pine seedlings to out-plant to disturbed areas. Allow wildfire to treat potentially declining areas to reduce competing subalpine fir and create caching habitat for Clark's Nutcracker. Preserve putative rust-resistant cone-bearing	Clark's Nutcracker, Black Rosy-Finch, Wolverine, Grizzly Bear, Mountain Goat

Objective	Strategy	Action(s)	Target SGCNs
		trees as cultivated and natural seed sources. Plant burned areas with rust-resistant whitebark pine seedlings. Use stand-level treatments to restore high value or critical declining stands, especially those stands that are distant from seed sources, that contain putative rust-resistant cone-bearing trees, or that are too valuable to lose from uncontrolled wildfire (e.g., critical Grizzly Bear habitat). Inventory, monitor, evaluate, and adaptively manage treatment sites.	

Target: Aspen Forest and Woodland

Aspen is an important yet uncommon (<2% of landbase) vegetation community in most of the Beaverhead Mountains Section. Aspen is somewhat more abundant and in larger stands in the Centennial Mountains. Although small in scale, healthy aspen communities harbor high biodiversity and are critically important to mule deer, elk, birds, bats, amphibians, and pollinator insects. In addition, they maintain water storage capacity for watersheds and offer recreation and scenic value to humans. Aspen stands in this section are typically small (<10 acres) and interspersed with conifers or part of a riparian area. Although aspen is naturally seral in this section, it has declined about 60% since European settlement. This decline has been due primarily to changes in fire regimes and heavy ungulate browsing leading to poor regeneration. Within the Beaverhead Mountains section, it can be found in lower elevation dry forest, montane riparian areas, subalpine forest, subalpine meadows and shrublands, and mountain big sagebrush stands.

Salmon River Mountains © 2013 Beth Waterbury

Significant effort has been made over the last decade by land managers and their partners within the section to identify aspen stands and assess their overall condition and likelihood for successful treatment. In addition, some stands that ranked as high priority for treatment have been addressed. These areas include the Salmon River Mountains directly west of Salmon, the

Lemhi Range, the upper Pahsimeroi valley, the upper Little Lost drainage, and the Centennial Mountains.

Target Viability

Aspen condition is poor over most of the section, primarily from conifer encroachment and heavy ungulate browsing. Climate change resulting in less precipitation, higher temperatures, and recurring drought, could exacerbate aspen decline. The Centennial Mountains may have better-condition aspen because of the greater abundance there. Aspen stands in the Beaverhead Mountains have had little assessment work or on-the-ground management and are vulnerable to further decline from conifer encroachment and ungulate damage. Aspen stands in the Lemhi Range have had some assessment and manipulation, primarily in the McDevitt and Hayden Creek drainages. This has resulted in some improvement to these stands. Some stands in the South Fork of Williams Creek were the focus of some thinning and fencing in the last year and significant improvement is expected. BLM personnel conducted risk assessments on stands in the upper Pahsimeroi Valley and conifer removal work began in the fall of 2015. Improvement work consisting mostly of conifer removal has been ongoing in Sawmill Canyon in the upper Little Lost drainage.

Prioritized Threats and Strategies for Aspen Forest and Woodland

High rated threats to Aspen Forest and Woodland in the Beaverhead Mountains

Changing precipitation and temperature patterns

Long range climate models predict hotter and drier conditions for the Beaverhead Mountains section. A bioclimate model developed for aspen in the Central Rockies predicts a 40–75% decline in the extent of aspen range by the decade surrounding 2060 (Rehfeldt et al. 2009). In fact, the effects of drought and warmer temperatures have already become evident in the form of Sudden Aspen Decline (SAD) documented over the last decade in parts of the Central Rockies (Morelli and Carr 2011). Within this section, it is difficult to determine if this phenomenon has occurred as many of these stands are small and already on the decline from conifer encroachment and ungulate damage. However, this section has experienced similar drought and above normal temperatures, so one can assume that those conditions are placing stress on aspen stands.

Objective	Strategy	Action(s)	Target SGCNs
Enhance resiliency of aspen stands from long-term decline caused by altered precipitation and temperature patterns	Implement actions aimed at increasing the health and vigor of existing stands	Identify all stands with high levels of conifer encroachment and implement conifer removal Use prescribed burning to stimulate suckering and stand expansion Thin conifers upslope from aspen stands to increase water availability Erect barriers such as fencing and stacking of felled conifers to protect treated stands from livestock and wild ungulate damage	Western Toad, Great Gray Owl, Common Nighthawk, Lewis's Woodpecker, Olive-Sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Western Small-footed Myotis,

Objective	Strategy	Action(s)	Target SGCNs
			Little Brown Myotis, Fisher, Grizzly Bear

Improper livestock grazing management

Improper livestock grazing in aspen stands in the Beaverhead Mountains Section is occurring where regeneration and recruitment of aspen is severely hindered by livestock browsing or damage. Many of these stands are in mesic drainage bottoms that attract and hold livestock during the hottest part of the summer and are characteristic of aspen in the Lemhi and Pahsimeroi Valleys. Long-term grazing, even when regulated, retards aspen recruitment at a level that can affect overall age structure of a stand and its long-term presence on the landscape (Beschta et al. 2014). Although detrimental browsing pressure by wild ungulates may occur, especially where winter densities are high (Smith et al. 2001), these animals are widespread over their range and impacts to aspen recruitment are often not measurable (DeByle 1985). Remote cameras have been deployed in several stands in the upper Pahsimeroi Valley to try and document wild ungulate compared to livestock use.

Objective	Strategy	Action(s)	Target SGCNs
Promote and enforce livestock grazing management strategies that support aspen regeneration and recruitment	Work with and encourage land managers to improve grazing management where damage is occurring	Identify aspen stands where recruitment is impaired by livestock browsing or physical damage Work with district or field office range conservationists and allotment permittees to modify grazing practices to reduce impacts on aspen regeneration Deploy remote cameras in heavily browsed aspen stands to determine level of wild ungulate use	Western Toad, Great Gray Owl, Common Nighthawk, Lewis's Woodpecker, Olive-Sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Western Small-footed Myotis, Little Brown Myotis, Fisher, Grizzly Bear

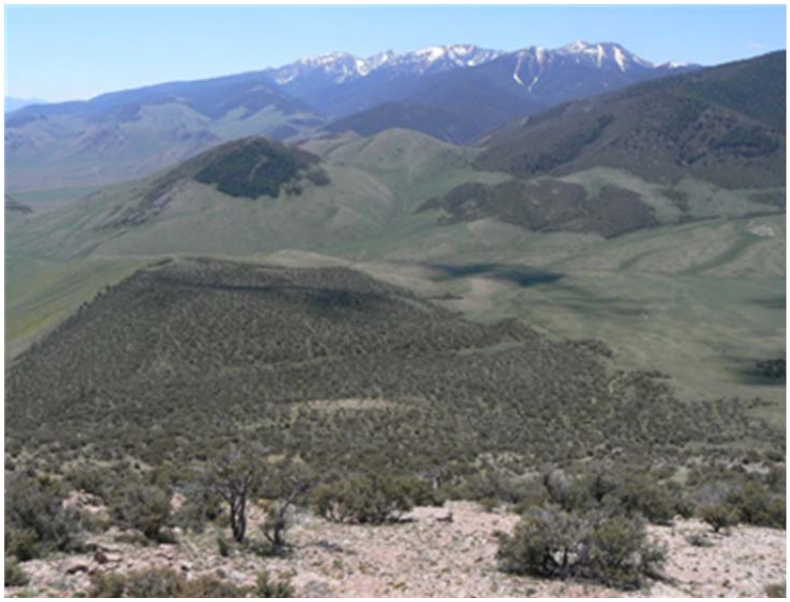
Altered fire regimes

Natural fire intervals have been altered throughout the Beaverhead Mountains Section. Little fire activity has taken place within the section in recent history with the exception of the Mustang Fire north and west of the town of North Fork in 2012 and the north end of the Lemhi range in 2005. Most natural starts have been suppressed, particularly near ranch and residential structures. Some natural starts in higher elevations have been allowed to burn within predefined perimeters. Fire suppression, which allows competing conifers to suppress aspen regeneration, has been identified as the primary driver behind the decline of aspen in the West (Kulakowski et al. 2103).

Objective	Strategy	Action(s)	Target SGCNs
Promote restoration of characteristic fire regimes in aspen forest and woodland systems	Increase use of prescribed fire and mechanical treatments to mimic natural fire history	Identify and map conifer encroachment within aspen stands where regeneration is compromised Provide technical assistance and encouragement to land managers for aspen improvement projects Assist with post-treatment monitoring Stay engaged with Central Idaho Aspen Working Group to work cooperatively on aspen improvement	Western Toad, Great Gray Owl, Common Nighthawk, Lewis's Woodpecker, Olive-Sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Western Small-footed Myotis, Little Brown Myotis, Fisher, Grizzly Bear

Target: Mountain Mahogany Scrub and Woodland

Mountain Mahogany Scrub and Woodland communities occur in small to large scattered patches in steep canyons, rocky outcrops, and steppe slopes of this section. This land cover type includes both woodlands and shrublands dominated by curl-leaf mountain mahogany (*Cercocarpus ledifolius*). Undergrowth is often sparse and dominated by bunchgrasses, such as bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), basin wildrye (*Leymus cinereus*), or spike fescue (*Leucopoa kingii*). Curl-leaf mountain mahogany is a slow-growing, drought-tolerant, and exceptionally long-lived species. Historically, fire was infrequent and spotty in this community due to rocky substrates limiting development of a continuous vegetation canopy needed for fire to spread. Mountain mahogany habitats of this section provide important winter cover for Mountain Goat, Bighorn Sheep, and other wild ungulates. Curl-leaf mountain mahogany comprises about 9% of the summer diets of Bighorn Sheep in the Big Creek drainage (Elliott and Flinders 1984) and is highly palatable to Moose, Elk, and Mule Deer. In areas with high Elk densities, plants are often heavily browsed beyond the reach of smaller-stature wild ungulates.



Hawley Mountain, Lost River Range © 2008 Chris Murphy

Target Viability

Fair. Many mountain mahogany stands in this section occur in the transition zone between the steppe and montane life zones. Where conifers (i.e., Douglas-fir, Utah juniper) are successfully reproducing, curl-leaf mountain mahogany may be replaced as conifers dominate the canopy. Under this scenario and continued fire exclusion, the viability of mountain mahogany communities is at risk from stand replacement fire. Heavy curl-leaf mountain mahogany mortality is common following most fires. Post-fire establishment can take several decades following severe fires that destroy the seed bank and kill parent plants.

Prioritized Threats and Strategies for Mountain Mahogany Scrub and Woodland

High Rated Threats to Mountain Mahogany Scrub and Woodland in the Beaverhead Mountains

Altered fire regimes

Prior to 1900, fire was the chief disturbance process limiting the distribution of mountain mahogany to the most fire-protected rocky escarpments of this section. Increases in mountain mahogany abundance after 1900 are attributed to reductions in fine fuels due to livestock grazing and a decreased fire frequency in response to fire exclusion policies. Many of the areas where mountain mahogany established were historically grasslands. Mountain mahogany stands now comprise ecotonal inclusions between dry conifer forest and steppe communities. Fire exclusion has also facilitated the expansion of dry forest species such as Douglas-fir onto sites historically supporting woodland, shrubland, and grassland vegetation. Curl-leaf mountain mahogany's shade tolerance is low, so where sites can support conifer species, mountain mahogany is typically replaced as Douglas-fir dominates the canopy. Proximity of mountain mahogany stands to dry conifer forests susceptible to large, stand-replacing fires has the potential to cause major mortality to parent plants and seed banks. The necessary conditions for successful seed germination, emergence, and establishment of mountain mahogany do not co-occur regularly and contribute to overall poor regeneration.

Objective	Strategy	Action(s)	Target SGCNs
Reduce conifer encroachment in mountain mahogany stands.	Targeted removal of Douglas-fir or Utah juniper to remove young-age-class trees expanding into mountain mahogany communities.	Map mountain mahogany stands. Mechanical treatment of Douglas-fir/Utah juniper in key areas including lop and lay, mastication, and lop and scatter methods. Exclude old-growth Douglas-fir or Utah juniper stands from any vegetation treatments. Use categorical exclusions to conduct treatments on public lands.	Mountain Goat, Bighorn Sheep, Lyrate Mountainsnail
Restore characteristic fire regime and forest structure in dry lower	Coordinate actions with federal land management agencies and	Incorporate prescribed fire treatments in restoration projects. Use managed natural fire for forest restoration where/when appropriate.	Mountain Goat, Bighorn Sheep, Lyrate Mountainsnail

Objective	Strategy	Action(s)	Target SGCNs
montane forest systems.	municipalities.	Incorporate mechanical thinning treatments to reduce stand densities where appropriate. Develop landscape-level models that evaluate commodity production, fire risk, forest health, and habitat needs of fish and wildlife in an integrated fashion.	

Target: Lower Montane–Foothill Grassland and Shrubland

This target comprises approximately 5% of the section's land area and includes a subset of grasslands, shrub steppe, and deciduous shrubland types found below the lower treeline and extending up into high montane zones. Grasslands are prevalent on warmer, drier sites, especially at higher elevation. Idaho fescue (*Festuca idahoensis*) and bluebunch wheatgrass (*Pseudoroegneria spicata*) are predominant grasses but a variety of cool-season graminoids may be present. Shrublands often occur on cooler, more mesic sites, including the steep slopes of canyons, north aspects, and toeslopes. Common shrubs include Saskatoon serviceberry (*Amelanchier alnifolia*), chokecherry (*Prunus virginiana*), rose (*Rosa* spp.), blue elderberry (*Sambucus nigra* ssp. *cerulea*), common snowberry (*Symphoricarpos albus*), and oceanspray (*Holodiscus discolor*). Forb diversity is typically high in both mesic and dry aspects of this community.

Smout Creek Drainage, Beaverhead Mountains © 2006 Beth Waterbury

Several SGCN are associated with this compositionally diverse habitat. Bighorn Sheep use the grasslands to graze on preferred grasses and forbs, but may seasonally shift to subsist on shrubs. Grassland and shrub steppe habitats provide nesting, brood-rearing, and foraging sites for Greater Sage-Grouse, Short-eared Owl, and Common Nighthawk. Grassland and shrub steppe communities support abundant small mammal prey resources for Ferruginous Hawk and Golden Eagle. Large, mixed flocks of Black Rosy-Finch and Gray-crowned Rosy-Finch migrate downward in elevation to winter in foothill grasslands and adjacent cultivated lands on the west slope of the Beaverhead Mountains. The wide variety of grasses, forbs, and shrubs in this habitat type provide abundant nectar and pollen resources for a diverse assemblage of pollinator species.

Target Viability

Fair. Lower Montane–Foothill Grassland and Shrubland communities generally occur at lower elevations at the interface of private lands. Consequently, they have a long history of human use, both for commodity purposes (e.g., livestock grazing), and as an area where effective fire exclusion was practiced early on and eventually altered the historic disturbance regime. Changes in fire frequency and severity have resulted in Douglas-fir invasion in many areas, or the development of dense shrublands outside the range of natural historic variation. In some areas, heavy livestock use has altered plant species composition, soil compaction, nutrient levels, and vegetative structure. Invasive weeds have pioneered many roads and trails in this system, affecting the structure and composition of this target.

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

High Rated Threats to Lower Montane–Foothill Grassland and Shrubland in the Beaverhead Mountains

Altered fire regime

Fire is a naturally occurring but highly variable natural disturbance in this system. Although fire has historically played a part in its composition and distribution, the system is not always fire-driven. Although fire suppression has abetted the encroachment of Douglas-fir into some grasslands and shrublands, many sites in this section are too xeric to support tree growth, even in the absence of fire. Likewise, fire suppression has allowed the development of shrub communities dominated by old, dense, and decadent shrubs with substantial amounts of fuels. Consequently, fires that do occur are likely to be high severity, and system recovery slow.

Objective	Strategy	Action(s)	Target SGCNs
Restore characteristic fire regimes in lower montane–foothill grassland and shrubland systems.	Coordinate actions with federal land management agencies, livestock permittees, municipalities, and other stakeholders.	Identify and map key areas in need of restoration treatments. Implement targeted restoration techniques including prescribed burning, seeding, mechanical treatment, and/or changes in livestock grazing regimes. Work with livestock grazing permittees and private landowners to implement fuels treatment actions on their lands and allotments as part of strategic, landscape efforts (DOI 2015). Implement aggressive and targeted application of both proven techniques and the rapid investigation and implementation of new practices to control cheatgrass and spotted knapweed, and mitigate habitat impacts from unwanted rangeland fire (DOI 2015).	Greater Sage-Grouse, Ferruginous Hawk, Golden Eagle, Long-billed Curlew, Short-eared Owl, Grizzly Bear, Bighorn Sheep, Lyrate Mountainsnail, Monarch, Gillette's Checkerspot
Reduce conifer encroachment in lower	Targeted removal of Douglas-fir or Utah juniper to	Mechanical treatment of Douglas-fir/Utah juniper in key areas including lop and lay, mastication, and lop and scatter methods.	Greater Sage-Grouse, Ferruginous

Objective	Strategy	Action(s)	Target SGCNs
montane–foothill grassland systems.	remove young-age-class trees expanding into grassland and shrubland communities.	Exclude old-growth Douglas-fir or Utah juniper stands from any vegetation treatments. Use categorical exclusions to conduct treatments on public lands.	Hawk, Golden Eagle, Long-billed Curlew, Short-eared Owl, Grizzly Bear, Bighorn Sheep, Lyrate Mountainsnail, Monarch, Gillette's Checkerspot

Improper livestock grazing management

Livestock grazing is probably the most widespread economic land use in this system and a legacy activity that has modified much of this vegetative community from its historical condition. Livestock grazing can have a keystone effect on these habitats where livestock occur at economically meaningful densities (Bock et al. 1993). For example, livestock grazing can change grassland habitat features that directly influence birds by reducing ground-nesting cover, substrate for an abundance and diversity of insect prey, and herbaceous cover and foliage height diversity for mammalian prey. The trampling action of livestock can degrade biological soil crusts, which are essential features of arid steppe plant communities that reduce soil evaporation, aid in nitrogen fixation of plants, and inhibit the establishment of invasive exotic species such as cheatgrass and spotted knapweed (Belnap et al. 2001). Exotic weed species not only outcompete native bunchgrasses, but are also susceptible to larger and more frequent fires.

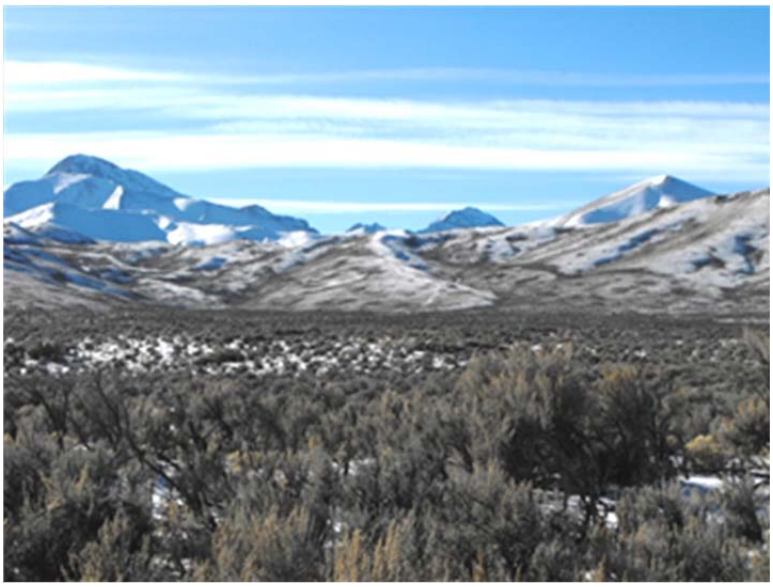
Several grassland-associated SGCN respond negatively to livestock grazing. Short-eared Owl is a ground-nester that selects dense grass canopy in ungrazed or lightly-grazed sites. Ferruginous Hawk also requires heavy litter cover and grass canopy for ground nests, but uses shortgrass steppe for hunting prey. Grasshopper Sparrow is also a ground-nester that selects grasslands of intermediate height with moderately deep litter. Viability of Golden Eagle populations requires maintaining prey habitat where eagles forage. This involves sustaining native grasslands and shrub-steppe landscapes that support the prime habitats for jackrabbits and ground squirrels. The effects of dietary overlap and competition between Bighorn Sheep and livestock are likely intensified on shared winter ranges and when preferred bunchgrass forage senesces. Whereas the proximate effect of livestock grazing on these SGCN may be the removal of grass and forbs important as forage and cover, the ultimate effect may be perpetuation of weedy annuals that outcompete native plants these SGCN are uniquely adapted to.

Objective	Strategy	Action(s)	Target SGCNs
Support proper livestock grazing management that maintains rangeland health and habitat quality (Otter 2012).	Consider livestock grazing in a site-specific context over time where vegetative condition can be manipulated by the timing, intensity, duration,	Designate allotments and schedule grazing periods based on factors such as elevation, weather, and plant growth (e.g., limit duration of hot season use). Conduct fine-scale habitat assessments to inform grazing management. Consider resting (placing in nonuse status) a	Greater Sage-Grouse, Ferruginous Hawk, Golden Eagle, Long-billed Curlew, Short-eared Owl, Grizzly Bear, Bighorn

Objective	Strategy	Action(s)	Target SGCNs
	and frequency of grazing practices (Otter2012).	unit for a period to achieve identified resource objective(s). Build in support for an option of "grass reserve units." Seek and apply the best possible tools and techniques to influence the distribution of livestock. Consider the distribution of, and access to, stock water in springs, seeps, wet meadows, potholes across the uplands late in the summer relative to perennial stream access. Support adequate funding and personnel to collect and analyze livestock grazing-related monitoring and rangeland health data. Undertake adaptive management changes related to existing grazing permits where improper grazing is determined to be the causal factor in not meeting habitat characteristics.	Sheep, Lyrate Mountainsnail, Monarch, Gillette's Checkerspot

Target: Sagebrush Steppe

Sagebrush steppe habitats dominate the landscape of the Beaverhead Mountains Section, forming approximately 53% of its land base. These arid habitat types are prevalent across the intermontane basins and foothills located in the rain shadow of the central Idaho mountains. Communities are characterized by an open shrub canopy and sparse to dense herbaceous layer dominated by perennial graminoid associates and typically have a microbiotic crust of lichens and mosses binding the upper surface of the soil. Sagebrush steppe habitats in this section are relatively intact compared to the highly fragmented landscapes in other regions of Idaho. This is attributed to the high proportion of sagebrush steppe habitats in public ownership, primarily under BLM management. These habitats are largely continuous and extensive, supporting connectivity for species at multiple spatial scales. Although relatively pristine climax sagebrush steppe communities do occur in this section, most



Upper Pahsimeroi Valley © 2009 Beth Waterbury

sites have been modified to some degree by a legacy of past livestock grazing which has rendered disturbed stands less ecologically complex than the mosaic that they replaced (Daubenmire 1966).

Within the greater expanse of sagebrush steppe are frequent inclusions of semi-desert shrubland & steppe–saltbush scrub that form continuous shrub-steppe habitat. These pockets are concentrated on the arid and semiarid alluvial fans and terraces of the Lemhi, Salmon, and Pahsimeroi valleys at lowest elevations. Stands are usually dominated by a mix of several shrubs or dwarf shrubs, but total vegetation cover is low (<30%). Dominant shrubs may include fourwing saltbush (*Atriplex canescens* [Pursh] Nutt.), shadscale saltbush (*A. confertifolia* [Torr. & Frém.] S. Watson), bud sagebrush (*Picrothamnus desertorum* Nutt.), spiny hopsage (*Grayia spinosa* [Hook.] Moq.), and winterfat (*Krascheninnikovia lanata* [Pursh] A. Meeuse & Smit). The herbaceous layer is often sparse and dominated by perennial grasses, especially Indian ricegrass (*Achnatherum hymenoides* [Roem. & Schult.] Barkworth) and sand dropseed (*Sporobolus cryptandrus* [Torr.] A. Gray). The forb layer can be diverse, but forms sparse cover. These unique inclusions, which primarily occur on private and BLM lands, are valuable in providing structural and compositional diversity to the sagebrush steppe landscape.

This section's heterogeneous mix of semiarid, mesic, and montane sagebrush steppe groups influences the ecology of associated birds, mammals, reptiles, and invertebrates. The low vertical structural diversity of these habitats provides fewer habitat layers for wildlife, resulting in lower diversity in some taxa. But what this habitat may lack in variety, it makes up for in specificity. Characteristic sagebrush obligates in this section include Greater Sage-Grouse, Sage Thrasher, Sagebrush Sparrow, and Pygmy Rabbit. A large proportion of sagebrush steppe in this section comprises Greater Sage-Grouse Priority Habitat Management Areas (PHMAs) (Fig. 5.3). Sagebrush steppe types also support a suite of grassland-associated birds including Ferruginous Hawk, Golden Eagle, Long-billed Curlew, Burrowing Owl, Short-eared Owl, Common Nighthawk, and Grasshopper Sparrow. Grass-dominated sagebrush steppe provides important foraging areas preferred by Bighorn Sheep.

Target Viability

Good. Sagebrush steppe is generally in good ecological condition across this section. Sagebrush steppe communities are extensive, strongly continuous, and exhibit a diversity of age classes and structure. Most sagebrush steppe habitat in this section is in public ownership, and is therefore less vulnerable to rangewide threats of habitat fragmentation and conversion to agriculture prevalent in areas of mixed ownership. This system is relatively resilient to the fire/cheatgrass cycle affecting many areas in Idaho's Snake River Plain, but may become less so under future climate warming scenarios. Pockets of semi-desert shrubland & steppe–saltbush scrub within the sagebrush steppe target appear less viable. These sites are typically the hottest, driest, and lowest elevation sites in the section and, therefore, have low site potential compared to cool, mesic sagebrush sites (Maestas et al. 2014). Such sites are more sensitive to impacts from improper livestock grazing or noxious weed invasions due to low potential resilience and resistance.

Prioritized Threats and Strategies for Sagebrush Steppe

High Rated Threats to Sagebrush Steppe in the Beaverhead Mountains

Improper livestock grazing management

Sagebrush steppe ecosystems in this section did not evolve with large ungulate herds (e.g., American Bison), and their grasses were poorly adapted for introductions of domestic grazers. Consequently, legacy livestock grazing practices have impacted the composition, structure, and productivity of this system in some locations. These impacts included loss of the microbiotic layer, loss of native seral grasses, reduction in herbaceous biomass, increase of shrub cover, and facilitated invasions of exotic grasses and forbs. Past range management has involved the use of fire, herbicides, and chaining to remove dense sagebrush canopies and reestablish grass forage through reseeding of crested wheatgrass (*Agropyron cristatum*), a nonnative perennial bunchgrass. Present-day grazing continues to influence species composition and structure of sagebrush steppe communities. Grazing tends to increase shrub cover and reduce the understory of more palatable herbaceous vegetation. The encroachment of dry conifer woodlands into sagebrush habitats has generally been ascribed to some combination of fire exclusion, livestock grazing (both directly and through its influence on fire), and climate. Livestock grazing in semi-desert shrubland & steppe-saltbush scrub communities requires sensitive application due to low grazing capacities, slow rates of recovery for existing deteriorated areas, and potential damage to soils and microbiotic crusts. These sites are best suited for livestock use during dormant periods, as plants can withstand much less grazing pressure and have higher mortality rates if grazed during growth periods (West and Gasto 1978). These communities are highly susceptible to invasion by saltlover (*Halogeton glomeratus* [M. Bieb.] C.A. Mey.), prickly Russian thistle (*Salsola tragus* L.), and cheatgrass (*Bromus tectorum* L.) and are difficult and slow to restore.

SGCN species particularly sensitive to improper grazing include ground-nesting birds such as Greater Sage-Grouse, Long-billed Curlew, Burrowing Owl, Short-eared Owl, Common Nighthawk, Sagebrush Sparrow, and Grasshopper Sparrow, where removal of herbaceous vegetation reduces nest concealment, thereby increasing exposure to predation or nest parasitism. Areas with grazing-induced dense sagebrush cover are often avoided by foraging Ferruginous Hawks (Howard and Wolfe 1976). Cattle have been reported to have little deleterious effect on Bighorn Sheep if they do not graze on critical winter ranges (Tesky 1993).

A noteworthy long-term trend on public land has been replacement of season-long cattle grazing with various rotational grazing systems designed to maintain or improve rangeland health. However, challenges persist in the realm of insufficient funds for federal land management agency oversight and insufficient monitoring of allotments to assess rangeland health and evaluate trends in rangeland condition, as well as grazing permit compliance.

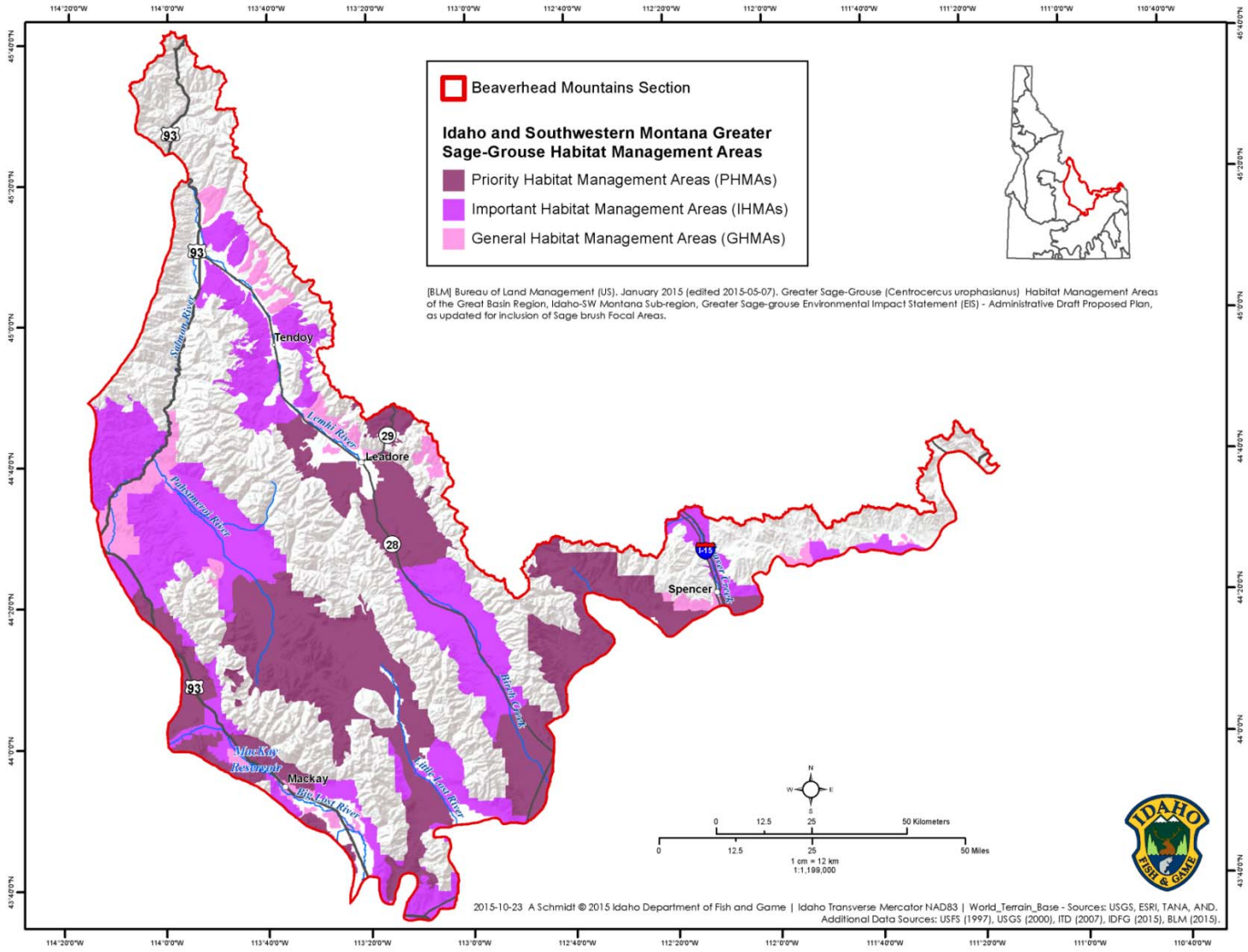


Fig. 5.3 Greater Sage-Grouse Habitat Management Areas in the Beaverhead Mountains Section

Objective	Strategy	Action(s)	Target SGCNs
Support proper livestock grazing management that maintains 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). Consider winter grazing regimes in areas with substantial inclusions of semi-desert shrubland & steppe-saltbush scrub habitat. Conduct fine-scale habitat assessments to inform grazing management. Consider resting (placing in nonuse status) a unit for a period to achieve identified resource objective(s). Build in support for an option of "grass reserve units." Seek and apply the best possible tools and techniques to influence the distribution of livestock. Consider the distribution of, and access to, stock water in springs, seeps, wet meadows, potholes across the uplands late in the summer relative to perennial stream access. Support adequate funding and personnel to collect and analyze livestock grazing-related monitoring and rangeland health data. 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 and other sagebrush-steppe dependent species
	Implement the livestock grazing management framework outlined in the Governor's Alternative (see Otter 2012).	Inform affected permittees and landowners regarding Sage-Grouse habitat needs and conservation measures (Idaho Sage-grouse Advisory Committee 2006). Incorporate Sage-Grouse habitat characteristics (Tables 3–5 of the Governor's Alternative) into relevant resource management plans as the desired conditions. Prioritize allotments for permit renewal and assessment process for allotments with declining Sage-Grouse populations. 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 not meeting habitat characteristics.	Greater Sage-Grouse and other sagebrush-steppe dependent species
Further	Assess the	Implement new, properly designed, and	Greater Sage-

Objective	Strategy	Action(s)	Target SGCNs
understand potential impacts to sagebrush-associated biota from livestock grazing	impacts (both negative and, potentially, positive) of livestock grazing on sagebrush-steppe obligate passerines.	replicated experiments involving a variety of alternative grazing treatments (including no grazing at all) across the spectrum of major shrub-steppe habitat types (Rotenberry 1998). Conduct experiments over multiple years (Rotenberry 1998).	Grouse and other sagebrush-steppe dependent species
Support the continued responsible use of federal lands for grazing to maintain open spaces and important habitat conditions that benefit wildlife.	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 and other sagebrush-steppe dependent species

Transportation and service corridors

Infrastructure such as roads, highways, and high-voltage transmission lines (Governor's Executive Order No. 2015-04; Otter 2015) is a major feature of most landscapes and is identified as a primary threat in the Governor's Alternative (Otter 2012). These featues impose an array of direct and indirect effects on wildlife. The most visible and well-documented impact of roads is direct mortality of wildlife through wildlife-vehicle collisions. Indirect effects on wildlife include habitat loss and fragmentation, increased human disturbance or access, facilitated spread of invasives, and increased risk of predation. Studies suggest populations of sagebrush steppe obligate and dependent wildlife species are particularly sensitive to these impacts (Braun 1998, Connelly et al. 2004). In the Beaverhead Mountains Section, major paved roads intersecting sagebrush steppe habitats include I-15, US 93, and State Highways 28, 29, and 33. These roads constitute a major anthropogenic footprint within the Challis and Upper Snake Sage-Grouse Planning Areas (SGPA). Both Challis and Upper Snake are among SGPAs with the greatest total major road mileage in Idaho (Idaho Sage-grouse Advisory Committee 2006). These SGPAs constitute 2 of 8 SGPAs in Idaho with >50% of their area potentially influenced by major roads, based on a 10 km (6.2 mi) buffer outward from each side of these roads to account for an influence from predation and noise disturbance (Connelly et al. 2004). Numerous secondary road systems (e.g., paved, county, primitive) also potentially influence sagebrush steppe habitat and associated wildlife through factors such as increased human access, off-highway vehicle use, spread of invasive species, increased risk of wildfire, and increased mortality from collisions. Major transmission lines also occur in this section, primarily located in highway right-of-ways. Tall structures such as transmission towers in sagebrush steppe ecosystems provide ravens and raptors with elevated substrates for perching and nesting where trees are rare or nonexistent. These structures are thought to concentrate ravens and raptors along utility corridors, which may increase the risk of predation to Greater Sage-Grouse, Pygmy Rabbit, and other sagebrush-dependent wildlife.

Objective	Strategy	Action(s)	Target SGCNs
Reduce impacts of roads and	Coordinate the development	Avoid siting and construction of new power lines and associated features in "designated"	Greater Sage-Grouse and

Objective	Strategy	Action(s)	Target SGCNs
utility lines to sagebrush steppe-associated wildlife.	and siting of roads and utility lines with relevant agencies and industry.	habitat (see Avian Power Line Interaction Committee [APLIC]. 2015 Best Management Practices for Electric Utilities in Sage-Grouse Habitat.) Follow management actions outlined in the Governor's Executive Order No. 2015-04 (Otter 2015) as it pertains to PHMA (Core), IHMA, and GHMA when proposing to develop transportation and service corridors. Work with key agencies and stakeholders to ensure that roads, transmission lines and other linear infrastructure avoid sensitive habitat areas.	other sagebrush-steppe dependent species
	Minimize unrestricted cross-country travel (Otter 2012) in sensitive habitat—Priority (Core) and Important habitat areas for Sage-Grouse.	Limit OHV travel to existing roads, primitive roads, and trails in areas where travel management planning has not been completed or is in progress. Prioritize the completion of Comprehensive Transportation Management Travel Plans (CTMTPs) (Otter 2012). Locate areas and trails to minimize disturbance to Sage-Grouse and to protect ESA-listed species and their habitats; allow for route upgrade, closure of existing routes, timing restrictions, seasonal closures, and creation of new routes to help protect habitat and meet user group needs to reduce the potential for pioneering new unauthorized routes (BLM 2015). Conduct road upgrades and maintenance outside the Sage-Grouse breeding season to avoid disturbance on leks (BLM 2015).	Greater Sage-Grouse and other sagebrush-steppe dependent species
	Increase visibility of utility lines in key Sage-Grouse movement corridors	Identify and map areas where key Sage-Grouse movement corridors and utility lines overlap. In identified high-risk areas, mark utility lines with bird flight markers or other suitable device to reduce Sage-Grouse collisions.	Greater Sage-Grouse, Ferruginous Hawk, Golden Eagle, Sandhill Crane, Long-billed Curlew, Short-eared Owl

Fences

Due to a long history of livestock production, fences are ubiquitous throughout the sagebrush steppe habitats of this section. Sagebrush steppe wildlife is adapted to landscapes with few vertical features or obstructions. Consequently for wildlife inhabiting sagebrush steppe, fences can reduce habitat suitability through habitat fragmentation, obstruction of movement corridors (e.g., woven-wire fencing), and injury or mortality from fence collision. Avian SGCN potentially vulnerable to fence collisions and entanglement include Greater Sage-Grouse, Ferruginous Hawk, Golden Eagle, Burrowing Owl, and Short-eared Owl (Fitzner 1975). Fences pose particular

collision hazards to Greater Sage-Grouse when located <2 km from known leks, where fence segments lack wooden fence posts, and where fence segments exceed 4 m (13.1 ft) (Stevens et al. 2012). Fence marking may reduce risk of fence collision by Greater Sage-Grouse by as much as 83% (Stevens et al. 2012). Wooden fence posts may facilitate predation of Greater Sage-Grouse by eagles, hawks, and ravens. While fences pose some potential threat to sagebrush steppe habitat, it is important to recognize their utility in grazing management programs designed to achieve improved ecosystem health.

Objective	Strategy	Action(s)	Target SGCNs
To the extent practicable, reduce the impacts of fences and livestock management facilities on wildlife populations.	Implement grazing management programs that take into account wildlife habitats and needs (e.g., Otter 2012).	Mark fences to reduce wildlife collisions (Stevens et al. 2012a, b). Identify and remove unnecessary fences or other structures (Otter 2012, [BLM] Bureau of Land Management (US) 2015). When placing new fences or other structural range improvements (such as corrals, loading facilities, water tanks, and windmills), consider their impact on Sage-Grouse (Otter 2012) and other wildlife. Place new structures (e.g., corrals, loading facilities, water storage tanks, windmills) in accordance with guidance documents (e.g., Otter 2012 for Sage-Grouse leks) and within existing disturbance corridors or in unsuitable habitat (BLM 2015).	Greater Sage-Grouse, Ferruginous Hawk, Golden Eagle, Sandhill Crane, Long-billed Curlew, Burrowing Owl, Short-eared Owl

Noxious weeds and invasive annual grasses

The invasion of nonnative grasses and forbs is a major threat to sagebrush steppe habitats and in some areas takes precedence over all other ecological concerns. Invasive species are recognized as the primary extinction risk factor for Greater Sage-Grouse across its range (USDI-Fish and Wildlife Service 2005) and are identified as a primary threat to Sage-Grouse in Idaho by the Governor's Alternative (Otter 2012). The Beaverhead Mountains Section lies within the Mountain Valleys Sage-Grouse Conservation Area, which is considered at lower risk to invasive species than other areas of the state. The Challis and Upper Snake Sage-Grouse Working Groups of this section identified invasive plant species as high risk factors within their respective Planning Areas, citing adverse impacts from displacement of desirable species, altered fire frequencies, reduced value of sagebrush steppe habitat (Challis Sage-Grouse Local Working Group 2007, Upper Snake Sage-Grouse Local Working Group 2009). Noxious weeds (e.g., spotted knapweed) and invasive annual grasses (e.g., cheatgrass) have colonized some of sagebrush habitat types of this section at low- and mid-elevations. Though the cheatgrass/fire cycle is not as pervasive an issue in this section as the Snake River Plain, the predicted climate warming scenario for this region may generate the biophysical conditions favored for cheatgrass establishment.

Objective	Strategy	Action(s)	Target SGCNs
Effectively control and restore areas	Implement large-scale experimental	Implement *The Idaho Invasive Species Strategic Plan 2012–2016* ([ISDA] Idaho State Department of Agriculture 2012).	Greater Sage-Grouse and other

Objective	Strategy	Action(s)	Target SGCNs
dominated by invasive, nonnative annual grasses at a rate greater than the rate of spread.	activities to remove cheatgrass and other invasive annual grasses through various tools (DOI 2015).	Support the development of a framework for a national invasive species Early Detection and Rapid Response (EDRR) program (DOI 2105). 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. Promote certified weed-free seeds/forage (Idaho Sage-grouse Advisory Committee 2006). Work with County Cooperative Weed Management Areas to prevent the introduction, reproduction, and spread of designated noxious weeds and invasive exotic plants.	sagebrush-steppe dependent species

Species designation, planning and monitoring

Information is lacking on the status of sagebrush-associated grasshoppers in the Beaverhead Mountains Section. Some SGCN grasshoppers are Idaho endemics and many have gone undetected for multiple decades. As such, we identify the needs for 4 grasshopper species and the aggregated Spur-throated Grasshopper Group.

Objective	Strategy	Action(s)	Target SGCNs
Determine status of SGCN grasshopper populations.	Conduct surveys and implement long term grasshopper monitoring program.	Conduct surveys to determine occurrence, distribution, and habitat associations of sagebrush-associated grasshoppers. Conduct specific surveys for Gillette's Checkerspot. Protect known breeding sites.	A Grasshopper (*Argiacris amissuli*), A Grasshopper (*A. militaris*), Spur-throated Grasshopper Group
	Continue to investigate the ecology of the Idaho Point-headed Grasshopper.	Develop a long-term monitoring program to assess conservation status. Investigate the primary host plants of the Idaho Point-headed Grasshopper and its predicted response to climate change. Develop a species distribution model to inform monitoring program and habitat management.	Idaho Point-headed Grasshopper

Spotlight Species of Greatest Conservation Need: Pygmy Rabbit

The Pygmy Rabbit (*Brachylagus idahoensis*) is the smallest of North American rabbits and hares and a specialist of sagebrush deserts in portions of 8 western states including Idaho. Pygmy Rabbits are patchily distributed in areas with dense, mature sagebrush and deep, loamy soils suitable for digging residential burrow systems and separate shallow natal burrows (Green and Flinders 1980, Rachlow et al. 2005). Suitable habitats are found in intermontane valleys, alluvial fans, drainage bottoms, plateaus, and rolling sagebrush plains of Idaho at elevations ranging from 900 to 2,380 m (2,800 to 7,800 ft). Burrow systems are often associated with areas of distinctive mounded microtopography supporting taller sagebrush and deeper soils called "mima-mounds." Pygmy Rabbit is considered a sagebrush-obligate species because it's highly dependent on sagebrush for food and shelter throughout its life cycle. Sagebrush provides essential nutrition comprising 30 to 50% of the diet of Pygmy Rabbits during summer and >90% during winter (Wilde 1978, Green and Flinders 1980). Sagebrush also provides cover from predators and thermal extremes in the sage-steppe environment, and offers structural support to facilitate subnivean (under the snow) burrowing under deep snow conditions (Katzner and Parker 1997).

Pygmy Rabbit © 2008 Beth Waterbury

Pygmy rabbit populations in the Beaverhead Mountains Section are some of the most robust in the state given the large, continuous extent of suitable sagebrush-steppe habitats in public ownership. The upper Lemhi Valley has been a key site for cutting-edge research on Pygmy Rabbits lead by Dr. Janet Rachlow of the University of Idaho and many student and faculty collaborators (http://rachlowlab.weebly.com/pubs.html). Their work, supported by state and federal agencies, has significantly advanced the understanding of Pygmy Rabbit ecology and factors critical to conserving the species in Idaho and the Intermountain West.

Spotlight Species of Greatest Conservation Need: Idaho Point-headed Grasshopper

The Idaho Point-headed Grasshopper (*Acrolophitus pulchellus*) is a rare Idaho endemic insect found in dwarf-shrubland and steppe habitats of Idaho's Birch Creek and Big Lost River (Sinks) drainages. Prior to 2010, the species was known from only 17 records dating from 1883 to 1993. Surveys in 2010 confirmed its persistence at historical localities and increased knowledge of its distribution, habitat associations, and life history. Idaho Point-headed Grasshoppers occupy alluvial fan and stream terrace landforms characterized by sparse vegetation, surface gravels, vagrant lichens, and intact biological soil crusts. The species is thought to be ground-dwelling and a specialist feeder on stemless mock goldenweed (*Stenotus acaulis* [Nutt.] Nutt.), a cushion-form forb common to the Sinks Drainages to which the grasshopper is remarkably camouflaged. Key habitat occurs on public rangelands managed by the BLM and US Forest Service. Management that promotes proper livestock grazing management, restricts OHV travel to

designated routes, controls noxious weeds, and uses native species for range restoration will help to conserve Idaho Point-headed Grasshopper populations and their habitat.

Female (left) and male Idaho Point-headed Grasshoppers on stemless mock goldenweed © 2010 Beth Waterbury

Target: Alpine and High Montane Scrub, Grassland and Barrens

The Beaverhead Mountains Section contains the greatest area and highest proportion of alpine landcover (5%) than any other section in Idaho. Alpine communities are found at elevations ranging from 2,100 to 3,650 m (7,000–12,000 ft) and occur in notable extents in the Lemhi and Big Lost River mountain ranges. Wind and its effect on snow movement has a strong local effect, producing wind-scoured fell fields, dry turf, snow accumulation heath communities, and short-growing-season snowbed sites. Fell fields are typically free of snow during the winter as they are found on ridgetops, upper slopes and exposed saddles, whereas dry turf is found on gentle to moderate slopes, flat ridges, valleys, and basins where soils are relatively stabilized and water supply is more constant. Vegetation occurs as a mosaic of small patch plant communities. Alpine bedrock and scree types consist of exposed rock and talus in steep upper mountain slopes and windswept summits. Sparse cover of forbs, grasses, low shrubs, and scrubby trees may be present with total vascular plant cover typically less than 10–25%. The hydrology is strongly associated with snowmelt and springs which often sustain high mountain lakes. Backcountry recreation use includes hiking, angling, backpacking, and horse-packing in summer, and snowmobiling and skiing in winter. Alpine communities of this section provide nesting habitat for Black Rosy-Finch, and year-round habitat for Hoary Marmot. Mountain goats occupy alpine areas with sufficient steep, rocky escape terrain. Winter distribution concentrates on wind-scoured ridges and south-facing slopes where forage is available. Wolverines are strongly associated with alpine climatic conditions and habitats, particularly in summer.

Rocky Canyon, Lemhi Range © 2006 Chris Murphy

Target Viability

Good. A significant portion of alpine habitats in this section are protected as wilderness study areas or roadless areas. Remaining alpine habitats are characterized as "de facto" wilderness due to remoteness, minimal roads and infrastructure, and generally inhospitable conditions for human habitation. Recreational activities are perceived as being low density and low impact on alpine habitats and wildlife. Alpine-associated biota are sensitive to climatic factors and are likely to have low adaptive capacity to climate change.

Prioritized Threats and Strategies for Alpine and High Montane Scrub, Grassland and Barrens

High Rated Threats to Alpine and High Montane Scrub, Grassland and Barrens in the Beaverhead Mountains

Changes in precipitation and broad-scale hydrologic regimes

Observed and predicted trends in climate vary widely across Idaho because of the state's complex topography. Nowhere is this variation more pronounced than in alpine habitats, which contain some of the sharpest environmental gradients found in continental regions. Despite the buffering effect of complex terrain, climate model projections for Idaho and the Pacific Northwest predict progressively warmer and wetter conditions, with worsening summer drought. Given projected temperature increases, the region is expected to transition from a snow-dominated system to one more rain-dominated. Changes in the length and depth of snow cover may influence the composition and distribution of alpine flora and fauna. Overall, high-elevation species ranges are expected to contract as a result of vertical migration, because the amount of mountainous land area decreases as one gains elevation and less area is available for species to inhabit. The most vulnerable species may be those that are genetically poorly adapted to rapid environmental change, reproduce slowly, disperse poorly, or are isolated or highly specialized.

Objective	Strategy	Action(s)	Target SGCNs
Increase understanding of adaptation responses of alpine biota to climate change.	Support and conduct research into ecological aspects of climate change in alpine systems.	Work with researchers to develop models to predict how wildlife species will cope with changing climatic and environmental conditions. Conduct wildlife species vulnerability assessments supported by predictive models referenced above.	Golden Eagle, Clark's Nutcracker, Black Rosy-Finch, Wolverine, Grizzly Bear, Mountain Goat, Bighorn Sheep, Hoary Marmot, Alpine Tiger Beetle, Beartooth Copper, A Grasshopper (*Argiacris militaris*), A Grasshopper (*Barracris petraea*), Spur-throated Grasshopper Group
Maintain connectivity among patchy alpine habitats	Identify and secure a connected network of alpine habitats to facilitate	Identify, assess, and prioritize critical connectivity gaps for a range of alpine-associated wildlife species. Work with communities, government agencies, academia, and organizations to identify	Golden Eagle, Clark's Nutcracker, Black Rosy-Finch, Wolverine,

Objective	Strategy	Action(s)	Target SGCNs
	dispersal, migrations, and range shifts caused by climate change.	opportunities for maintaining and restoring landscape connectivity.	Grizzly Bear, Mountain Goat, Bighorn Sheep, Hoary Marmot, Alpine Tiger Beetle, Beartooth Copper, A Grasshopper (*Argiacris militaris*), A Grasshopper (*Barracris petraea*), Spur-throated Grasshopper Group

Species designation, planning and monitoring

Alpine systems are challenging to inventory due to logistical difficulties of access, short growing or reproductive seasons, and variable weather influenced by high mountain topography. Consequently, population data are lacking for many alpine-associated species. Concerns about the status of alpine obligates in the face of climate change have underscored the need to gather data on all aspects of their ecology, distributions, and populations. Alpine SGCN for which significant data gaps exist are addressed below. These species could be effectively monitored through a multispecies monitoring approach.

Objective	Strategy	Action(s)	Target SGCNs
Determine status of SGCN alpine obligates	Conduct surveys and implement long term monitoring programs for Black Rosy-Finch.	Conduct breeding season surveys to determine distributions and characterize nesting habitat. Implement monitoring programs in occupied habitats. Monitor nonbreeding populations to better understand the scale and scope of threats in anthropogenic environments.	Black Rosy-Finch
	Conduct surveys and implement long-term monitoring programs for Hoary Marmot.	Conduct breeding season surveys to determine distributions and characterize alpine habitats. Implement monitoring programs in occupied habitats. Assess the importance of predation as a mortality factor and identify important predators.	Hoary Marmot
	Conduct surveys and implement long-term monitoring for a suite of alpine-associated invertebrates.	Conduct surveys and monitoring for Alpine Tiger Beetle. Conduct surveys and monitoring for Beartooth Copper. Conduct surveys and monitoring for SGCN	Alpine Tiger Beetle, Beartooth Copper, A Grasshopper (*Argiacris militaris*), A

Objective	Strategy	Action(s)	Target SGCNs
		alpine associate grasshoppers.	Grasshopper (*Barracris petraea*), Spur-throated Grasshopper Group

Target: Riverine–Riparian Forest and Shrubland

Riverine–riparian systems comprise the most diverse, dynamic, and complex habitat types in the Beaverhead Mountains Section, but account for only 1% of its area. They occur on floodplains and terraces of permanent and intermittent rivers and streams, but may also be found along backwaters, lakes, ponds, reservoirs, and irrigation ditches. Dominant trees include black cottonwood (*Populus trichocarpa*) and quaking aspen (*Populus tremuloides*). Shrub components include willow (*Salix* sp.), water birch (*Betula occidentalis*), mountain alder (*Alnus rhombifolia*), red-osier dogwood (*Cornus sericea*), Wood's rose (*Rosa woodsii*), common snowberry (*Symphoricarpos albus*) and golden currant (*Ribes aureum*). Herbaceous understories are diverse, varying in response to the amount of light-penetrating overstory canopies and disturbance history.

Salmon River, Lemhi County © 2010 Jon Flinders

In the Beaverhead Mountains Section, riverine systems are remarkably varied in size, composition, and structure. Most 1st- and 2nd-order streams include habitat within the relatively high-gradient channels of headwater and small streams. Examples include innumerable montane and subalpine streams draining the Beaverhead, Salmon River, Lemhi, Lost River, Centennial, and Henrys Lake mountains. Characteristic vegetation may include conifer and deciduous broad-leaved trees with highly diverse shrub and herbaceous understories. The upper reaches of 3rd-order streams, such as the Lemhi and Pahsimeroi rivers, occupy broad, low-gradient valleys and are dominated by willow and water birch. Lower reaches can support modest cottonwood galleries. The Salmon River and Big Lost River are the principle 4th-order streams in this section. Portions of their floodplains support some of the best late-seral cottonwood galleries in this section, although they are somewhat fragmented due to agricultural clearing, livestock grazing, and land development on surrounding private lands. Riparian systems of the Little Lost, Birch, Medicine Lodge, and Beaver–Camas drainages contain

a diverse mix of shrubs dominated by willows (e.g., *Salix exigua*, *S. lasiolepis*, *S. lutea*, *S. lucida* ssp. *caudata*, *S. melanopsis*), water birch (*Betula occidentalis*), and gray alder (*Alnus incana*).

Riverine–riparian systems provide important habitat for a diverse array of aquatic and terrestrial biota, including keystone species such as American Beaver, salmon, and cottonwood. Riverine–riparian systems of this section provide migration corridor, juvenile rearing, spawning, or resident habitat for 5 species of ESA-listed fish. These systems also support numerous aquatic invertebrates (e.g. Western Pearlshell, Lolo Sawfly), breeding populations of amphibians (e.g., Western Toad), and avian SGCN including Harlequin Duck, Common Nighthawk, and Lewis's Woodpecker. The juxtaposition of riparian forests to cliffs and rock outcrops provides abundant roosting and foraging habitat for bats. Fisher occupies montane riparian forests in the Beaverhead Mountains, and Grizzly bears patrol select streams in the Greater Yellowstone Area foraging for spawning cutthroat trout.

Target Viability

The riverine habitats in this section rate an overall good condition based on free-flowing status of the Salmon River and its primary tributaries (e.g., no manmade barriers), relatively low level of watershed development, large connected habitats for listed salmonids and anadromous Pacific Lamprey, and an abundance of roadless and little-roaded federal lands that have high ecological integrity. These areas account for a substantial portion of the section and serve as habitat strongholds for multiple species of fish and wildlife. However, some riverine–riparian habitats are not pristine and have been affected to varying degrees by land uses including irrigated agriculture, livestock grazing, road construction, logging, and mining. Over a century of instream flow alterations have substantially altered the riparian zones of numerous streams. Over 4,000 points of water diversion have been constructed in the watersheds of this section for dryland irrigation, some resulting in complete hydrologic disconnect from higher-order streams. Conservation programs designed to reconnect priority tributaries (e.g., Lemhi and Pahsimeroi watersheds) are making significant gains in opening access to additional spawning and rearing habitat for Chinook Salmon, Steelhead, and other focal fish and wildlife species.

Prioritized Threats and Strategies for Riverine–Riparian Forest and Shrubland

High Rated Threats to Riverine–Riparian Forest and Shrubland in the Beaverhead Mountains

Water diversions

Diversion of water from the rivers and streams in the Beaverhead Mountains Section was coincident with Euro-American settlement of the region beginning in the 1860s. Water diversions co-occurred with numerous other human impacts to riparian systems including harvest of riparian forests for fuel, shelter, and land clearing, livestock grazing, wetland drainage, mining, and logging. As noted above, thousands of active water diversions exist in this section in support of agriculture. The engineering of water diversions constitutes a major perturbation of fluvial processes and riparian conditions in this arid landscape. Water diversions can drastically alter stream flow regimes producing many synergistic effects including disruption of flood and

channel forming processes, floodplain/stream linkages, recruitment of riparian vegetation, fish migration and access to suitable spawning and rearing habitat, and water temperature regimes for coldwater fish. High water temperatures typically coincide with high ambient air temperatures in late summer. Agricultural water diversions are at their highest and streamflows generally are at their lowest during this time frame. Reductions in streamflow, coupled with warm air temperatures, can create thermal barriers that block migration of adult native salmonids to spawning grounds, decrease juvenile salmonid rearing habitat, and result in poor growth and survival (Maret et al. 2005). Human activities that remove riparian shading can accentuate this increased water temperature.

Objective	Strategy	Action(s)	Target SGCNs
Minimize impacts to riverine–riparian systems from water diversions.	Increase tributary connectivity to benefit native fish populations.	Improve connectivity of tributaries that are currently intercepted by irrigation complexes. Modify diversion structures (e.g., gravel pushup dams) to provide for anadromous and resident fish migration. Implement fish screening in tributaries after dewatering and passage issues are resolved.	Pacific Lamprey, Steelhead, Sockeye Salmon, Chinook Salmon
	Implement irrigation efficiencies to improve minimum streamflows.	Purchase instream water rights or negotiate flow agreements with water users to enhance instream flows. Consolidate irrigation ditches to increase water savings.	Pacific Lamprey, Steelhead, Sockeye Salmon, Chinook Salmon
	Reduce instream water temperatures.	Restore and protect shade-providing and bank-stabilizing riparian vegetation.	Pacific Lamprey, Steelhead, Sockeye Salmon, Chinook Salmon

Active riparian vegetation removal

Many of the same attributes that contribute to the high productivity and biodiversity of riparian systems are of high economic value to human society. Consequently, the floodplains of the Beaverhead Mountains Section are productive not only for their complex wildlife habitats and linkages to aquatic biota, but also because they are the most productive lands for agriculture and are highly desirable for human dwellings. This is reflected in the high proportion of private landownership in the low ground topography of this section. Livestock and hay production agriculture is prevalent along the major tributaries and rivers in this section. Clearing and occasional burning of riparian vegetation is commonly employed to maximize pasture area and set back riparian succession. Development of "riverfront" homesites has accelerated loss and fragmentation of riparian habitat through clearing to improve river views and to create fire-defensible space around structures. Riparian vegetation removal may be subsidized under government programs to reduce the risk of fire in wildland-urban interface environments. Significant losses of late-seral cottonwood gallery forests have occurred in recent years under the U.S. Army Corps of Engineers' levee system vegetation management, designed to reduce flood risk to communities living and working behind these levees.

Objective	Strategy	Action(s)	Target SGCNs
Conserve, maintain and restore riparian habitats on public and private lands.	Increase public awareness of the multiple values and benefits of riparian habitat.	Incorporate and implement appropriate riparian management and stewardship guidelines in public and private land management programs/decisions. Distribute *Stream Care: A Guide for Property Owners in the Upper Salmon River Watershed* pamphlet to riverfront landowners. Incorporate riparian ecology information and management guidelines into wildland fire education programs. Designate suitable sites as Important Bird Areas to foster community interest.	Pacific Lamprey, Steelhead, Sockeye Salmon, Chinook Salmon, Western Toad, Common Nighthawk, Lewis's Woodpecker, all SGCN bats, Fisher, all SGCN bivalves, Lolo Mayfly, A Mayfly (*Conygma dimicki*), Monarch, Gillette's Checkerspot, Lolo Sawfly, Tiny Forestfly, Caddisfly Group
	Conserve riparian habitats through land use planning.	Develop land use ordinances that establish adequate setbacks and limits on riparian vegetation removal on all watercourses, including ephemeral streams. Encourage "no net loss" policies for late-seral cottonwood forests. Negotiate variances on vegetation standards for US Army Corps of Engineers-maintained levees. Minimize vegetation clearing for road building on public lands.	Pacific Lamprey, Steelhead, Sockeye Salmon, Chinook Salmon, Western Toad, Common Nighthawk, Lewis's Woodpecker, all SGCN bats, Fisher, all SGCN bivalves, Lolo Mayfly, A Mayfly (*Conygma dimicki*), Monarch, Gillette's Checkerspot, Lolo Sawfly, Tiny Forestfly, Caddisfly Group
	Conserve riparian habitats through active restoration and protection programs.	Restore riparian vegetation through planting of native trees and shrubs. Identify and survey intact blocks of mature cottonwood forest, using agency or citizen scientists.	Pacific Lamprey, Steelhead, Sockeye Salmon, Chinook Salmon,

Objective	Strategy	Action(s)	Target SGCNs
		Use voluntary cooperative efforts (i.e., Conservation Reserve Enhancement Program [CREP]) and incentive programs to conserve, maintain and restore riparian habitats on private lands.	Western Toad, Common Nighthawk, Lewis's Woodpecker, all SGCN bats, Fisher, all SGCN bivalves, Lolo Mayfly, A Mayfly (*Conygma dimicki*), Monarch, Gillette's Checkerspot, Lolo Sawfly, Tiny Forestfly, Caddisfly Group

Improper livestock grazing management

Riparian areas have historically and continue to be of vital importance to the livestock industry due to their productivity and nexus with water. Livestock tend to congregate in riparian and wetland areas and use the vegetation much more intensively than the vegetation of adjacent uplands. Many of the broad floodplain riparian zones of the Beaverhead Mountains Section, formerly complex mosaics of deciduous forest, beaver marsh, and wet prairie, have been converted to simple agro-ecosystems of pastures and croplands. Within public lands grazing allotments, headwaters and tributaries have maintained relatively good riparian functionality. However, downstream lower gradient stream reaches have been considerably altered by the effects of forage removal, soil compaction, streambank trampling, channelization, and the introduction of invasive plants. Resulting losses of ecosystem structure and composition, particularly in deciduous woodland riparian stands of cottonwood, alder, or willow, decrease riparian habitat value for terrestrial wildlife (e.g., avian nesting) and aquatic biota.

Objective	Strategy	Action(s)	Target SGCNs
Maintain riverine health and riparian habitat quality in the presence of livestock grazing.	Develop and implement livestock grazing management regimes that are compatible with riparian conservation objectives.	Selectively fence livestock from riparian zones, streambanks, and restoration sites and provide off-stream water sources. Manage seasonal timing of grazing to increase cottonwood, willow, aspen, and grass cover. Plant and maintain riparian vegetation between pastures and waterways to help filter and minimize high-nutrient runoff. Control invasive weeds to prevent colonization in sensitive riparian habitats.	Pacific Lamprey, Steelhead, Sockeye Salmon, Chinook Salmon, Western Toad, Sandhill Crane Common Nighthawk, Lewis's Woodpecker, all SGCN bats, Fisher, Grizzly Bear, all SGCN bivalves, Lolo Mayfly, A

Objective	Strategy	Action(s)	Target SGCNs
			Mayfly (*Conygma dimicki*), Monarch, Gillette's Checkerspot, Lolo Sawfly, Tiny Forestfly, Caddisfly Group

Changes in precipitation and broad-scale hydrologic regimes

Anthropogenic climate change is altering stream hydrology and its associated biota in the Rocky Mountain West (Rieman and Isaak 2010). The timing of stream runoff steadily advanced during the latter half of the 20th century and now occurs 1–3 weeks earlier due largely to concurrent decreases in snowpack and earlier spring melt (Stewart et al. 2005). Climate models predict a trend toward a decrease in snow water equivalent and a general increase in winter precipitation in the form of rain, particularly at lower elevations. Generally drier conditions are anticipated for the southern Rocky Mountains, inclusive of the Beaverhead Mountains Section. Climate change could profoundly impact aquatic and riparian systems by increasing water temperatures, variability in flow timing and amount, and risk of extreme climate events such as floods, droughts, and wildfires. These stresses in turn may effect changes in the composition of the riparian plant community and its susceptibility to invasions by invasive plants. Projected changes may detrimentally impact aquatic and riparian species, such as Chinook Salmon, Bull Trout, Lewis's Woodpecker, and aquatic invertebrates that are the focus of conservation efforts in this section.

Objective	Strategy	Action(s)	Target SGCNs
Restore streams to improve stream geomorphology, increase water quality, extend the hydroperiod, and provide in-stream and riparian wildlife habitat.	Manage American Beaver (*Castor canadensis*) populations to maximize dam densities in compatible landscapes.	Evaluate status of beaver populations in the Section. Identify key watersheds for increased beaver dam densities. Restore riparian habitat where conditions limit beaver populations in key watersheds. Conduct outreach to engage stakeholders in key areas. Engage trappers and sportsman organizations in management programs to maximize beaver populations and long-term fur harvest opportunities. Manage trapping seasons to ensure that beavers continue to contribute to healthy riparian systems in the Beaverhead Mountains Section. Where appropriate, conduct translocation projects.	Pacific Lamprey, Steelhead, Sockeye Salmon, Chinook Salmon, Western Toad, Sandhill Crane Common Nighthawk, Lewis's Woodpecker, all SGCN bats, Fisher, Grizzly Bear, all SGCN bivalves, Lolo Mayfly, A Mayfly (*Conygma dimicki*), Monarch, Gillette's Checkerspot,

Objective	Strategy	Action(s)	Target SGCNs
		Manage beavers to minimize property damage and conflicts.	Lolo Sawfly, Tiny Forestfly, Caddisfly Group
	Implement irrigation efficiencies to improve minimum streamflows.	Purchase instream water rights or negotiate flow agreements with water users to enhance instream flows. Consolidate irrigation ditches to increase water savings.	Pacific Lamprey, Steelhead, Sockeye Salmon, Chinook Salmon, Western Toad
Increase acreage of riparian habitat in protected status.	Develop policies, programs, and incentives to conserve highest quality riparian habitats.	Identify, assess, and prioritize largest and most continuous patches of cottonwood forest and target for protection. Conserve highest quality cottonwood forests through land exchanges, conservation easements, or purchase.	Pacific Lamprey, Steelhead, Sockeye Salmon, Chinook Salmon, Western Toad, Sandhill Crane Common Nighthawk, Lewis's Woodpecker, all SGCN bats, Fisher, Grizzly Bear, all SGCN bivalves, Lolo Mayfly, A Mayfly (*Conygma dimicki*), Monarch, Gillette's Checkerspot, Lolo Sawfly, Tiny Forestfly, Caddisfly Group

Species designation, planning and monitoring

Information is lacking on the status of aquatic invertebrates in the Beaverhead Mountains Section. These taxa include 3 aquatic bivalves, the Pondsnail Species Group, and 7 insects associated with riverine systems. Data needs for these species are addressed below. These taxa could be effectively monitored through a multispecies monitoring approach.

Objective	Strategy	Action(s)	Target SGCNs
Determine status of SGCN invertebrates associated with riverine–riparian habitats.	Conduct surveys and implement long-term monitoring programs for SGCN aquatic bivalves.	Conduct surveys for Western Pearlshell to determine distributions and characterize habitat; implement long-term monitoring. Conduct surveys for California Floater to determine distributions and characterize habitat implement long-term monitoring.	Western Pearlshell, California Floater, Western Ridged Mussel

Objective	Strategy	Action(s)	Target SGCNs
		Conduct surveys for Western Ridged Mussel to determine distributions and characterize habitat; implement long-term monitoring.	
	Conduct surveys and implement long-term monitoring programs for SGCN Pondsnails.	Conduct surveys for Pondsnails to determine distributions and characterize habitat; implement long-term monitoring.	Pondsnail Species Group
	Conduct surveys and implement long term monitoring programs for SGCN insect taxa.	Conduct surveys for Lolo Mayfly to determine distributions and characterize habitat; implement long-term monitoring. Conduct surveys for A Mayfly (*Cinygma dimicki*) to determine distributions and characterize habitat; implement long-term monitoring. Conduct surveys for Lolo Sawfly to determine distributions and characterize habitat; implement long-term monitoring. Conduct surveys for 4 species of Caddisfly to determine distributions and characterize habitat; implement long-term monitoring.	Lolo Mayfly, A Mayfly (*Cinygma dimicki*), Lolo Sawfly, A Caddisfly (*Eocosmoecus schmidi*), A Caddisfly (*Rhyacophila oreia*), A Caddisfly (*Goereilla baumanni*), A Caddisfly (*Sericostriata surdickae*)

Spotlight Species of Greatest Conservation Need: Lewis's Woodpecker

Lewis's Woodpecker (*Melanerpes lewis*) is a locally common but patchily distributed woodpecker of open ponderosa pine forest, open riparian woodland dominated by cottonwood, and logged or burned pine forest. Breeding populations occur throughout Idaho except in the southeastern portion of the state (Tobalske 1997). Lewis's Woodpecker is among the most unique of North American woodpeckers in the development of flycatching behavior, nest preference for well-decayed snags or old nest holes of primary excavators, and its striking plumage of glossy greenish-black, silver-white, and salmon-red described as "a curious mix" by famed explorer and namesake Meriwether Lewis. Suitable nesting habitat includes an open canopy (30% tree canopy closure), availability of nest cavities and perches, dead and downed woody debris, a brushy understory offering ground cover, and abundant insect prey (Saab and Dudley 1998). Outside of the breeding season, Lewis's Woodpecker is nomadic, following locally abundant food resources including fruit and nuts. Partly due to this nomadic nature, population size for this species is difficult to determine (Bock 1970, Tobalske 1997).

Lewis's Woodpecker is a The State of the Birds 2014 Yellow Watch List species due to declining population trends and predicted severe deterioration in the future suitability of breeding conditions (Rosenberg et al. 2014). Primary conservation actions and management considerations to benefit this species include retention of cottonwood riparian forests and snag components, maintenance of natural stream flow patterns that promote natural recruitment of cottonwood seedlings, proper livestock grazing management to maintain understory shrub communities, and introduction of fire in lower montane conifers to restore open forest structure and create burned forest habitat.

Lewis's Woodpecker © 2006
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Target: Springs and Groundwater-Dependent Wetlands

Big Springs, Pahsimeroi Valley © 2015 Windy Davis

These mesic systems are scarce resources in the semi-arid Beaverhead Mountains Section, and are generally regarded as biodiversity hotspots. These habitats are typically seeps, springs, and wet meadows occurring on gentle to steep slopes from floodplain to montane forest elevations. Meadows are often dominated by rhizomatous graminoids, such as sedges, grasses, and rushes, and forbs are diverse and often lush. Unique examples of this type in this section include the Birch Creek Fen, a groundwater-fed peatland with numerous rare plants located at the Lemhi-Clark county line, and Chilly Slough, a large, spring-fed, wet-meadow-stream complex located in the Thousand Springs Valley, north of the town of Mackay, in Custer County, Idaho.

The interface of these mesic systems with adjacent arid uplands creates the ultimate platform for biotic diversity. Springs, seeps, and wet meadows function as critical surface water sources linking uplands, riparian zones, and stream channels. They serve as important foraging areas for avian communities, particularly if associated with nearby riparian or forest habitats (Saab and Rich 1997). In mosaics with sagebrush steppe, springs, seeps, and wet meadows are a critical habitat component for several avian SGCN including Greater Sage-Grouse, Sandhill Crane, Long-billed Curlew, Burrowing Owl, and Short-eared Owl (Rich et al. 2005). The grasses present in mesic meadows are important in providing food and cover for birds directly, and in providing a substrate for a volume and diversity of insects that serve as additional food items. Connelly et al. (2000) recognized wet meadows as important late brood-rearing habitat for Sage-Grouse, characterized by relatively moist conditions with succulent forbs in or adjacent to sagebrush cover. As elements within forested communities, these systems provide important breeding habitats for amphibians. Because of the abundance of insects, these systems are important foraging sites for bats.

Target Viability

Poor. These systems form relatively rare islands of robust herbaceous vegetation within large patches of more xeric systems such as sagebrush steppe, lower montane grasslands, and dry lower montane forests. These sites are highly attractive to domestic livestock and wildlife as sources of palatable green forage and free water. A legacy of heavy livestock grazing and continued season-long grazing in some areas have altered the structure, composition, and

function of these habitat types. Springs, seeps, and wet meadows are also attractive features to OHV recreationists whose use may cause soil compaction and erosion, alter hydrologic processes, destroy vegetation, and facilitate the colonization of invasive weeds.

Prioritized Threats and Strategies for Springs and Groundwater-Dependent Wetlands

Very High Rated Threats to Springs and Groundwater-Dependent Wetlands in the Beaverhead Mountains

Changes in precipitation and broad-scale hydrologic regimes

Precipitation is critical to the existence of springs, seeps, and groundwater-dependent wetlands, and the size, frequency, and duration of precipitation events are key factors influencing their recharge. Climate change is expected to decrease ground and surface water quantity and increase the duration and intensity of drought, and these systems will be a direct indicator of these changes. Decreased discharge would likely result in reduced flow from springs, lower base flow in feeder streams, and loss of groundwater-fed wetlands. Factors such as higher air temperatures and evaporation could further exacerbate drying trends. Springs, seeps, and meadows in poor or compromised ecological condition may lack the resiliency needed to persist under drought conditions. The implications for Greater Sage-Grouse and sympatric wildlife are concerning, as springs, seeps, and wet meadows within sagebrush steppe habitats are often the only natural water sources across vast areas.

Objective	Strategy	Action(s)	Target SGCNs
Increase health and resiliency of springs, seeps, and groundwater-dependent wetlands to combat the effects of climate change.	Implement climate mitigation strategies to improve the resilience and resistance of springs, seeps, and groundwater dependent wetlands.	Realign, restore, and renovate key mesic systems that are not functioning properly. Reduce or eliminate additive nonclimate ecosystem stresses (e.g., high road densities, water depletions, water pollution). Locate and collect locally-sourced seeds of desirable native plant species for revegetation and restoration efforts. Ensure that administrative and permitted activities on public lands do not contribute to the reduction of surface or groundwater that supplies springs, seeps, small ponds, and wetlands. Monitor ecological condition at springs, seeps, and groundwater-dependent wetlands for future evaluation of possible effects from climate change.	Western Toad, Greater Sage-Grouse, Ferruginous Hawk, Golden Eagle, Sandhill Crane, Long-billed Curlew, Burrowing Owl, Short-eared Owl, Common Nighthawk, all SGCN bats, Grizzly Bear, Bighorn Sheep, Monarch, Gillette's Checkerspot

High Rated Threats to Springs and Groundwater-Dependent Wetlands in the Beaverhead Mountains

Improper livestock grazing

Livestock impacts to springs, seeps, and wet meadows are widespread in the Beaverhead Mountains Section. Livestock tend to congregate in riparian and wetland areas due to the availability of palatable forage and prolonged plant phenology. Direct impacts to vegetation result from herbage removal by foraging livestock. Where use is high for a sequence of years, the composition of the plant community may change as the more palatable species lose vigor and decrease throughout the site. This impact is heightened during drought periods. Trampling by livestock can penetrate, compact, and reconfigure wetland soils into hummocks and pugs. Hummocks are elevated soil and vegetation pedestals separated by inter-hummock channels of bare, compacted soil (pugs) caused by the shearing and compressional impacts of livestock hooves. Soil compaction restricts root growth, reduces soil water-holding capacity, reduces soil productivity, and contributes to water runoff and soil erosion (Fitch and Ambrose 2003).

Objective	Strategy	Action(s)	Target SGCNs
Manage livestock grazing to improve springs and ground-water dependent systems.	Manage grazing intensity, frequency, and/or season of use to provide sufficient opportunity to encourage plant vigor, regrowth, and organic matter contribution to soils.	Selectively fence livestock from springs, seeps, wetlands, and restoration sites and provide off-stream water sources. Limit duration of hot season use. Employ rest/rotation grazing systems. Build in support for an option of "grass reserve units." Manage the timing of grazing to minimize compaction of medium texture soils that are seasonally saturated, and the intensity of use to minimize churning of soils that are saturated. Seek and apply the best possible tools and techniques to influence the distribution of livestock.	Western Toad, Greater Sage-Grouse, Ferruginous Hawk, Golden Eagle, Sandhill Crane, Long-billed Curlew, Burrowing Owl, Short-eared Owl, Common Nighthawk, all SGCN bats, Grizzly Bear, Bighorn Sheep, Monarch, Gillette's Checkerspot

Target: Lakes, Ponds and Reservoirs

Lakes, ponds, and reservoirs are rare water features in the Beaverhead Mountains Section, but they are of high importance from standpoints of fish and wildlife diversity, water storage, and recreation. These ecosystems include aquatic habitats in permanently- to seasonally-flooded natural lakes and deep ponds in topographic depressions and dammed river channels. Examples in this section include Williams Lake in the Salmon River Mountains, Summit Reservoir on the Pahsimeroi/Little Lost divide, and Mackay Reservoir in the Big Lost River Valley. Also included in this system are high mountain lakes occurring at upper montane, subalpine, and alpine elevations. They typically occur in glacial cirques and hanging valleys where bedrock or moraine deposits form the depression containing the lake or pond.

Mackay Reservoir inlet © 2010 Beth Waterbury

The prevalence of rugged mountain topography in this section forms hundreds of high mountain lakes. These can occur as a series (e.g., paternoster lakes) and in hanging valleys where 1st-order creeks connect many of the lakes.

Lakes, ponds, and reservoirs of this section provide rare and strategic "stepping stone" refugia for waterbirds, waterfowl, and shorebirds migrating through the arid, intermountain expanse of the Pacific Flyway. Open water habitat and lacustrine fringe wetlands provide breeding and foraging habitat for many SGCN including Western Toad, Sandhill Crane, Long-billed Curlew, Common Nighthawk, and all SGCN bats. The larger lakes, particularly Mackay and Summit reservoirs, are seasonally visited by migratory or dispersing Western Grebe, Clark's Grebe, American White Pelican, Common Loon, Franklin's Gull, Ring-billed Gull, California Gull, Caspian Tern, and Black Tern. Many high mountain lakes harbor populations of introduced cutthroat (*Oncorhynchus clarkii*), Rainbow (*O. mykiss*), and Brook (*Salvelinus fontinalis*) trout to provide recreational opportunities for anglers. Williams Lake and Mackay Reservoir are regionally important year-round fisheries that constitute an important component of local recreation economies. Williams Lake, Mackay Reservoir, and Summit Reservoir are also popular bird-watching destinations.

Target Viability

Viability of these lacustrine habitats is considered good. Long-term viability of the larger lakes and reservoirs in this section is deemed stable due to priority maintenance of human beneficial uses (irrigation, recreation) that directly and indirectly conserve fish and wildlife habitats. Viability

of high mountain lake systems is generally considered good due to low levels of human disturbance and protections afforded by Roadless Areas, Wilderness Study Areas, and the inherent remoteness and isolation of these lakes. Ecological and biological aspects of maintaining healthy amphibian populations and potential impacts to downstream native fish populations are considered in determining how alpine lakes are managed (IDFG 2013). The primary issues in this system are short- and long-term impacts of climate change.

Prioritized Threats and Strategies for Lakes, Ponds, and Reservoirs

High Rated Threats to Lakes, Ponds, and Reservoirs in the Beaverhead Mountains

Changes in precipitation and broad-scale hydrologic regimes

Climate models predict a trend toward a decrease in snow water equivalent and a general increase in winter precipitation in the form of rain, particularly at lower elevations. Generally drier conditions are anticipated for the southern Rocky Mountains, inclusive of the Beaverhead Mountains Section. Snowpack volume size strongly affects the hydrologic budget of lakes, ponds, and reservoirs in this section, as well as the timing of ice-off. Declines in snowpack and warming temperatures may reduce the volume and area of open water habitat used by fish and wildlife. Predicted changes in ambient air temperatures will subsequently affect the thermal characteristics of lakes, ponds, and reservoirs. Resulting warmer water temperatures could lead to enhanced nutrient inputs and affect water quality by promoting algal blooms and impairing food web functions and seasonal patterns of productivity.

Objective	Strategy	Action(s)	Target SGCNs
Increase health and resiliency of springs, seeps, and groundwater-dependent wetlands to combat the effects of climate change.	Implement climate mitigation strategies to improve the resilience and resistance of lakes, ponds, and reservoirs.	Research options for managing this habitat under forecasted climate models. Work with other relevant agencies, organizations, and user groups across the Beaverhead Mountains Section to address climate change mitigation for lakes, ponds, and reservoirs under forecasted conditions (i.e., drought) to include development of proactive management alternatives implementable at the local project level. Reduce or eliminate additive nonclimate ecosystem stresses (e.g., recreational impacts, water inefficiencies, water pollution). Ensure that administrative and permitted activities on public lands do not contribute to the reduction of surface or groundwater that supplies lakes, ponds, and reservoirs. Monitor ecological condition at lakes, ponds, and reservoirs for future evaluation of possible effects from climate change. Conduct microclimate monitoring to better identify and understand local pockets of environmental opportunity to enhance habitat	Western Toad, Sandhill Crane, Long-billed Curlew, Common Nighthawk, Silver-haired Bat, Hoary Bat, Western Small-footed Myotis, Little Brown Myotis

Objective	Strategy	Action(s)	Target SGCNs
		resistance to climate induced stressors. Support efforts to increase public awareness of climate change impacts to local landscapes and wildlife dependent on them.	

Target: Agricultural Lands

Agricultural lands in the Beaverhead Mountains Section comprise about 4% of the land base and include irrigated forage crops and pasture tied to beef-cattle production. Forage crops are primarily improved pasture grasses with legume components that are irrigated by flood, wheel line, or center pivot systems. Some alfalfa and grain crops are also produced. Primary agricultural areas in this section are the Salmon, Lemhi, Pahsimeroi, Little Lost, and Big Lost river valleys. Most of these lands are sited in productive valley floodplains with availability of water and milder climates. Hay and pasture crops, which are largely flood-irrigated, emulate native mixed-grass and tall-grass prairie habitats for breeding grassland birds, including Bobolink, Sandhill Crane, Long-billed Curlew, and Short-eared Owl. These "surrogate" grasslands are large enough in size to support viable populations of these avian SGCN. Because of their customary proximity to riverine and riparian areas, agricultural lands encompass important anadromous fish migration, rearing, and spawning habitats, and late-seral cottonwood forests required for Great Blue Heron rookeries and Bald Eagle nesting.

Lemhi Valley hayfield © 2014 Beth Waterbury

Target Viability

Fair. Conservation work on behalf of ESA-listed salmonids drives the conversion of flood irrigation methods preferred by grassland birds to center pivot systems. Center pivot irrigation is facilitating the conversion of grass/legume hay crops to more lucrative and intensively farmed crops such as alfalfa or grains that have relatively little benefit to grassland birds. The ability for grassland birds to successfully breed on working lands hinges on hay cutting regimes that are compatible with the bird's nesting phenology. As ground-nesters, grassland birds are highly susceptible to mortality and nest failure from hay cutting that overlaps directly with peak nesting. Early and frequent mowing of hay crops can destroy nests and eggs, kill fledglings, or cause adults to

abandon their nests. Agricultural lands in this section are under increasing pressure from subdivision and development.

Prioritized Threats and Strategies for Agricultural Lands

High Rated Threats to Agricultural Lands in the Beaverhead Mountains

Loss and conversion of hayfields and pasturelands

Conversion of current flood irrigation systems to center pivot agriculture often results in crop conversions to more intensively-farmed commodities (e.g., alfalfa). Such conversions would result in loss of breeding habitat suitability for Bobolink. Nesting Bobolinks prefer areas with reliable irrigation flow and wetter portions of flood irrigated fields (Wittenberger 1978). Reliably moist areas promote the growth of forbs which provide greater cover (Bollinger 1995), correlate to a predictable abundance of caterpillars (the primary food of nestlings) (Wittenberger 1978), and may be critical for maintaining temperature and concealment of nests (Pleszczynksa 1978). Hay growers producing for beef-cattle tend to cut hay at later dates largely compatible with the nesting phenology of grassland birds. Conversion to grass mixtures with shorter growing seasons would result in higher susceptibility to mortality and nest failure from hay cutting that overlaps with peak nesting.

Objective	Strategy	Action(s)	Target SGCNs
Maintain and enhance hay-producing agriculture in the Beaverhead Mountains Section.	Develop incentives to keep working lands in hay and pasture production.	Partner with Natural Resources Conservation Service (NRCS), other relevant agencies, and hay producers to use existing Farm Bill programs (i.e., Conservation Stewardship Program, Environmental Incentives Program) to conserve hay and pasture agriculture. Develop new financial incentive programs to conserve hay and pasture agriculture.	Western Toad, Greater Sage-Grouse, Ferruginous Hawk, Golden Eagle, Sandhill Crane, Long-billed Curlew, Burrowing Owl, Short-eared Owl, Common Nighthawk, Bobolink, Monarch
	Maintain flood-irrigation methods in hayfields and pasturelands	Work with NRCS to develop a flood-irrigation special initiative under EQIP or flood-irrigation enhancement under CSP. Closely evaluate effects of flood irrigation conversion to center pivot irrigation on terrestrial wildlife.	Western Toad, Greater Sage-Grouse, Ferruginous Hawk, Golden Eagle, Sandhill Crane, Long-billed Curlew, Burrowing Owl, Short-eared Owl, Common Nighthawk, Bobolink, Monarch
	Foster a community conservation	Actively partner with hay producers to promote and implement sustainable, cooperative conservation practices.	Western Toad, Greater Sage-Grouse,

Objective	Strategy	Action(s)	Target SGCNs
	ethic that values working lands.	Support beef cattle marketing alliances that increase the brand and market value of locally-sourced, grass-fed beef. Support programs (e.g., Land and Water Conservation Fund) that provide funding support for conservation easements.	Ferruginous Hawk, Golden Eagle, Sandhill Crane, Long-billed Curlew, Burrowing Owl, Short-eared Owl, Common Nighthawk, Bobolink, Monarch

Spotlight Species of Greatest Conservation Need: Bobolink

The Bobolink (*Dolichonyx oryzivorus*) is a medium-sized bird of the Blackbird family that breeds in grassland and low-intensity agricultural habitats of Idaho. Nesting habitat includes large hayfields, pastures, fallow fields, and meadows with high grass-to-forb ratios and few shrubs or trees. Bobolinks and other grassland-dependent birds have experienced some of the most pronounced declines among bird groups on the North American continent (Sauer et al. 2005). The Bobolink is identified as a State of the Birds 2014 Watch List species (Rosenberg et al. 2014) and a "Common Bird in Steep Decline" whose continental populations have declined by ≥50% over the past 40 years (Berlanga et al. 2010).

Rangewide Bobolink declines are attributed to a large net loss of hayfields and changes in timing and frequency of hay cutting. As a late migrant and ground-nester, Bobolinks are highly susceptible to mortality and nest failure from hay cutting that overlaps directly with peak nesting (Nocera et al. 2005). In the Beaverhead Mountains Section, Bobolinks are closely tied to working ranchlands—and specifically to private ranchlands in hay and beef cattle production where hay cutting regimes (early to mid-July) are largely compatible with Bobolink nesting. In less compatible areas of Idaho, delayed haying initiatives and other Farm Bill and working lands conservation programs offer viable options to conserve Bobolinks while defraying hay producers' costs for potential declines in hay nutritional quality or monetary value.

Bobolink male © 2014 Dave Faike

Target: Bighorn Sheep

Bighorn Sheep in the Beaverhead Mountains Section are patchily distributed along its peninsular mountain ranges. Habitats are typified by rugged canyons, sagebrush steppe foothills, and dry coniferous forests and grasslands. Summer ranges often extend to alpine grasslands, while winter ranges are mostly sagebrush or mountain mahogany types where snow depths are moderated. Bighorn Sheep populations are managed in Idaho with a separate species management plan (IDFG Bighorn Sheep Management Plan 2010). Sheep occurrence In the Beaverhead Mountains Section is defined within 7 Population Management Units (PMUs), described in detail in the Bighorn Sheep Management Plan (2010): Tower–Kriley, North Beaverhead, South Beaverhead, North Lemhi, South Lemhi, Lost River, and Lionhead. The north part of the Middle Main Salmon River PMU also occurs in this section.

Bighorn Sheep ewe and lamb ©2010 Greg Painter

Both the Tower–Kriley and Lionhead PMUs have small (<30 individuals), isolated populations whose greatest value is wildlife viewing and education (IDFG 2010). Management direction for these PMUs is to maintain or increase numbers. The South Lemhi and South Beaverhead PMUs each have <50 individuals Management direction for both PMUs is to reduce risk of contact with domestic sheep and try to increase populations where separation can be maintained. These PMUs were the focus of a study initiated in 2011 to determine use areas, seasonal movements, population estimates, survival rates, production, and health status. The North Beaverhead and North Lemhi PMUs are larger populations that appear to be increasing. A 2014 aerial survey of the North Beaverhead PMU indicated an all-time high population of 85–90 sheep with a lamb:ewe ratio of 50 (IDFG 2014). Both PMUs are at risk from disease transmission from domestic sheep, primarily farm flocks on private land. Management direction is to continue increasing populations, reduce contact with domestic sheep, and pursue habitat improvement opportunities. These PMUs were also the focus of the 2011 study mentioned above. The Lost River PMU is a relatively large population of about 260 individuals with a ewe:lamb ratio of 41 according to a March 2015 aerial survey (IDFG 2015). In 2005, this PMU received an augmentation of 62 sheep from Montana. Just prior to that augmentation, IDFG entered into a Memorandum of Understanding (MOU) with the BLM and USFS to enhance management of Bighorn Sheep. More recently, this population has become a focus for trophy ram hunting opportunity. The management direction for this PMU is to increase the population via habitat maintenance or improvement.

Bighorn sheep have high cultural, hunting, and watchable wildlife value to tribal members, local residents, and visitors to the area. Populations in this section face threats from habitat loss,

transmission of disease from domestic sheep and goats (including pack goats and weed-eating goats), poaching, vehicle collisions, and disturbance from human activities during critical lifecycle stages.

Target Viability for Bighorn Sheep

Bighorn sheep are widely distributed across the Beaverhead Mountain Section and some PMUs have good viability in terms of population structure and habitat quality. The North and South Beaverhead PMUs have the potential to mix with Montana populations, which have experienced recent disease exposure. Tower–Kriley, North and South Lemhi, and Lost River PMUs also have risk of disease exposure. Vehicle collisions may be a significant source of mortality for the Tower–Kriley PMU and limit population growth. Although habitat conditions are good throughout sheep seasonal ranges, opportunities for habitat enhancement projects should always be exploited for improvement or maintenance.

Prioritized Threats and Strategies for Bighorn Sheep

High rated threats to Bighorn Sheep in the Beaverhead Mountains

Noxious weeds and invasive nonnative plants

The semi-arid nature of Bighorn Sheep habitat in the 7 PMUs in this section makes it susceptible to noxious weed invasion, particularly after wildfires or prescribed fires. Cheatgrass, spotted knapweed, and rush skeletonweed could all affect winter range productivity. Little fire activity has taken place in recent history. Most natural starts have been suppressed making noxious weed infestations relatively small. Most current infestations are limited to road or trail corridors.

Objective	Strategy	Action(s)	Target SGCNs
Control or eradicate noxious weeds.	Work with USFS, BLM, and other partners to control or reduce noxious weed occurrence (IDFG 2010).	Participate in County Cooperative Weed Management Area partnerships. Identify and map noxious weed patches and share maps and associated data with the appropriate land manager. Provide technical assistance and encouragement to land managers for post-fire habitat restoration activities in key Bighorn Sheep habitats. Provide native grass and shrub seed recommendations to land managers.	Bighorn Sheep

Disease transmission

Bighorn sheep are vulnerable to disease transmission from domestic sheep and goats throughout most of their range in the Beaverhead Mountains Section. Domestic sheep and goats can potentially pose a risk of contact to Bighorn Sheep both on private and public land that is near Bighorn Sheep distribution. Small farm flocks pose a risk primarily where Bighorn Sheep winter range is adjacent to private property. This could occur in all PMUs except Lionhead. USFS domestic sheep allotments that border or overlap Bighorn Sheep distribution

could pose an increased threat of interaction between Bighorn Sheep and domestic sheep and goats. Even with aggressive efforts to separate them, foraying wild sheep could come in contact with domestic sheep and goats. A third possible source of disease transmission is incidental contact with pack goats on backcountry trails. All PMUs but Tower–Kriley have backcountry trails within their boundaries.

Objective	Strategy	Action(s)	Target SGCNs
Reduce disease transmission to Bighorn Sheep from domestic sheep and goats.	Actively monitor Bighorn Sheep movements and health status.	Capture or euthanize Bighorn Sheep after contact if found in an area (removal zone) where contact with domestic sheep or goats is likely (IDFG 2010). Encourage double-fencing where appropriate and practical (WAFWA 2007; (IDFG and ISDA 2008). Work with ranchers to seasonally coordinate grazing patterns (WAFWA 2007; IDFG and ISDA 2008).	Bighorn Sheep
Educate the public about wild/domestic sheep disease transmission.	Engage in productive dialogue with various user groups.	Schedule speaking engagements with Idaho Wool Growers Association to 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 with Bighorn Sheep.	Bighorn Sheep

Medium rated threats to Bighorn Sheep in the Beaverhead Mountains

Off Highway Vehicle (OHV) use on undesignated routes or in undesignated areas

Research is lacking into the specific effects of off-highway vehicle (OHV) use on Bighorn Sheep behavior and habitat use (IDFG 2010). However, the large body of research on other wild ungulate species indicates that OHV disturbance can have significant impacts on behavior and habitat use (Wisdom et al. 2004). Also, OHVs allow much greater access to the remote places Bighorn Sheep inhabit. This may result in increased disturbance and displacement, higher potential for illegal harvest, and lower herd productivity. All PMUs in this section are subject to some level of OHV impacts.

Objective	Strategy	Action(s)	Target SGCNs
Manage motorized recreation. The Department will work with other land and resource management agencies to ensure that	Enforce Travel Management Plans. The Department will support investigations into the effects of different types and levels of human activities	Provide law enforcement officers and conservation officers maps and locations of potential conflicts between Bighorn Sheep and motorized recreation. Increase BLM/USFS law enforcement officer and IDFG conservation officer patrols in areas where Bighorn Sheep are vulnerable to motorized disturbance. Use remote camera technology to monitor	Bighorn Sheep

Objective	Strategy	Action(s)	Target SGCNs
critical areas of habitat are protected from inadvertent disturbance associated with recreation activities such as hiking, OHV use, low-altitude aerial activity, rock climbing, or trail riding (IDFG 2010).	on Bighorn Sheep (IDFG 2010). In areas where recreation is considered to be a factor limiting the success of a Bighorn Sheep population, IDFG will work with land managers and the public to mitigate the effects of disturbance associated with recreation (IDFG 2010).	potential conflict areas.	
Increase awareness about OHV impacts on Bighorn Sheep.	Provide education to OHV users.	Develop pamphlet outlining potential impacts from motorized disturbance and tips for minimizing disturbance. Post signs at specific roads/trailheads urging users to comply with Travel Management Plans and minimize disturbance.	Bighorn Sheep

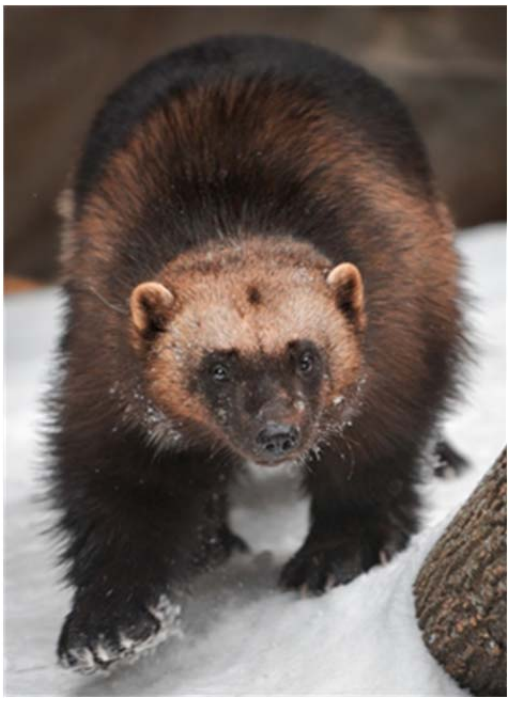
Altered fire regimes

Natural fire intervals have been altered throughout Bighorn Sheep range in the Beaverhead Mountains Section. Little fire activity has taken place within PMU boundaries in recent history. Most natural starts have been suppressed, particularly where lower elevation winter range is near to ranch and residential structures. Some natural starts in higher elevation portions of the North Lemhi and Lost River PMUs have been allowed to burn within predefined perimeters. Many years of fire suppression has resulted in lowered productivity of Bighorn Sheep range, primarily because of conifer encroachment and subsequent loss of mountain shrub/grassland communities (Dibb and Quinn 2008).

Objective	Strategy	Action(s)	Target SGCNs
Improve quality and quantity of Bighorn Sheep habitat (IDFG 2010).	Where succession and conifer encroachment have significantly affected Bighorn Sheep habitats, IDFG will work closely with land managers and encourage them to adopt fire and habitat management practices to benefit Bighorn	Identify and map conifer encroachment on Bighorn Sheep winter range where habitat quantity and quality are compromised. Provide technical assistance and encouragement to land managers for habitat improvement projects. Provide native grass and shrub seed recommendations to land managers.	Bighorn Sheep

Objective	Strategy	Action(s)	Target SGCNs
	Sheep (IDFG 2010).		

Target: Wolverine



Wolverine © Geoffrey Kuchera

The Wolverine is a large, rare mustelid that occupies remote subalpine and alpine habitats of the Beaverhead Mountains Section. An estimated population of ≤18 individuals occurs within major blocks of primary habitat in the Beaverhead, Centennial, Lemhi, and Lost River mountain ranges (Idaho Department of Fish and Game 2014). This population is part of the larger metapopulation of wolverines occupying the northern U.S. Rocky Mountains. Primary habitats correspond to public lands managed by the Salmon–Challis and Caribou–Targhee National Forests. Most primary wolverine habitat within these forests is managed for multiple-use, with a few areas designated as roadless in each mountain range. Dozens of historic and contemporary wolverine records exist for this section, and verified observations (e.g., specimens, DNA samples, diagnostic photos, captures) are regularly reported for all mountain ranges except the Lost River Range.

Two "Tier I" Wolverine Priority Conservation Areas (PCA) are identified for this section along the Centennial and Henrys Lake mountains (Idaho Department of Fish and Game 2014). Tier I denotes PCAs with the highest conservation need based on potential wolverine use, cumulative threats, and amount of unprotected habitat. The balance of PCAs in this section ranked "Tier II" based on lower levels of cumulative threats. The divide along the Centennial and Beaverhead mountains, and to a lesser degree the Lemhi Range, comprises a key "central artery" for wolverine gene flow in the northern Rocky Mountains linking the Greater Yellowstone Ecosystem with the Salmon–Selway and Northern Continental Divide ecosystems (Schwartz et al. 2009). The mountains of this section comprise the southern periphery of occupied wolverine habitat in the northern Rockies and are particularly vulnerable to climate-driven reductions in size and connectivity of habitat islands (Aubrey et al. 2007, Schwartz et al. 2009, Copeland et al. 2010).

Target Viability

Fair. Wolverine habitat in the Beaverhead Mountains Section occurs in disjunct "sky island" patches on the periphery of core populations in the Salmon–Selway Ecosystem and the species' overall distribution in North America. Climate warming and shrinking snow cover may amplify the fragmented nature of wolverine habitat in this section resulting in diminished connectivity and a subpopulation more vulnerable to extirpation. The narrow, island-like configuration of primary

wolverine habitat in this section provides extensive front-country access for licensed trappers and potential risk of nontarget wolverine capture. Dispersed snow sports recreation, transportation corridors, and residential/commercial development are considered low level threats in this section.

Prioritized Threats and Strategies for Wolverine

High Rated Threats to Wolverine in the Beaverhead Mountains

Connectivity, small populations, and extirpation risk

Wolverine populations at the southern end of their current US range (i.e., Beaverhead Mountain Section) exhibit low effective population sizes (number of individuals in a population who contribute offspring to the next generation), restricted gene flow, and perhaps some degree of population fragmentation. Given populations are small and movement between populations is limited, populations are more susceptible to inbreeding. Genetic exchange with the larger Canadian–Alaskan population is deemed necessary to ensure genetic viability in the long term. Connectivity between wolverine habitats and subpopulations is critically important to avert further isolation and localized extirpation risk. Climate pattern uncertainty further compounds the challenges to wolverine demography. Climate models tested by McKelvey et al. (2011) predicted that large (>1,000 km^2) continuous areas of wolverine habitat will likely persist into the 21st century (e.g., northwestern Montana, along the Montana–Idaho border, Greater Yellowstone Area). However, these models predicted that central Idaho may be lost as a population source given highly fragmented spring snow cover and associated loss of connectivity. Consequent loss of habitat suitability (i.e., spring snow cover, warming temperatures) may result in extirpation of wolverines from a significant portion of currently occupied range (Copeland et al. 2010, U.S. Fish and Wildlife Service 2010).

Objective	Strategy	Action(s)	Target SGCNs
Facilitate connectivity among wolverine subpopulations to enhance genetic exchange and population demographics.	Identify and characterize movement corridors important for maintaining genetic exchange and diversity among wolverine subpopulations.	Refine and aggregate wolverine movement corridor and genetic exchange models to predict existing movement pathways. Contribute wolverine genetic samples to connectivity model analysis	Wolverine
Conserve habitat to support viable wolverine populations	Secure appropriate conservation status on priority movement corridors to achieve an ecologically connected network of public/private conservation	Conserve corridors and transitional habitats between ecosystem types through both traditional and nontraditional mechanisms (e.g., land exchanges, conservation easement tax incentives, Land and Water Conservation Fund) to enhance habitat values and maintain working landscapes under climate change. Identify, assess, and prioritize critical connectivity gaps and needs across current conservation areas, including areas likely to serve as refugia in a changing climate.	Wolverine

Objective	Strategy	Action(s)	Target SGCNs
	areas to facilitate migrations, range shifts, and other transitions caused by climate change.	Assist private landowners with information and resources to conserve wildlife corridors across their properties. Support and strengthen conservation programs (e.g., Farm Bill, Partners for Fish and Wildlife, etc.) that provide resources for conserving wolverine habitat and connectivity. Provide wolverine and other wildlife data and maps to local governments, land managers, and transportation departments to avoid, minimize, or mitigate impacts from new infrastructure developments on wolverine habitats. Continue the partnership with Idaho Transportation Department (ITD) and Federal Highway Administration (FHWA) to develop and monitor traffic volume, wildlife-vehicle collisions, and other metrics needed to identify connectivity and high risk areas for road mortality or road crossing avoidance. Work with ITD to design connectivity and crossing mitigation consistent with FHWA *Handbook for Design and Evaluation of Wildlife Crossing Structures in North America.* Work with ITD to avoid and reduce barriers or impediments to connectivity and crossings.	
Collaborate across multiple jurisdictions and spatial scales to achieve wolverine conservation.	Facilitate local conservation actions tiered to statewide objectives (IDFG 2014).	As warranted, establish and support local working groups to advise conservation activities in Wolverine Priority Conservation Areas.	Wolverine
Support the development and use of inventory and monitoring systems to assess wolverine vulnerability to climate change.	Support, coordinate, and where necessary develop inventory, monitoring, observation, and information systems at multiple scales to detect and describe potential climate impacts on wolverines.	Develop, refine, and implement monitoring protocols that provide key information needed for managing and conserving wolverine and alpine/subalpine communities in a changing climate. Work with researchers to develop regionally downscaled Global Climate Models (using the most current models and emission scenarios) and associated climate indicators (e.g., snow data) to support a wolverine vulnerability assessment. Produce regional to subregional projections of future climate change impacts on physical, chemical, and biological conditions for Idaho ecosystems, particularly alpine and subalpine communities.	Wolverine

Target: Pollinators

Pollinators contribute substantially to the food production systems of Idaho, to the economic vitality of the agricultural sector, and to the biodiversity in the ecosystems they inhabit. Pollinators are keystone species in most terrestrial ecosystems, playing a critical role in maintaining natural plant communities and ensuring production of seeds in most flowering plants. Pollinators also comprise a major prey item for many birds and mammals. The viability of pollinator populations has been impacted over recent decades from habitat loss, pesticide use, and introduced diseases. In recognition of widespread pollinator declines, President Obama issued a memorandum in June 2014 directing executive departments and agencies to create a federal strategy to promote the health of pollinators. This memorandum has elevated conservation concern, fostered partnerships, and generated financial resources to effect pollinator conservation in the US.

Monarch butterflies and showy milkweed © 2014 Beth Waterbury

Little is known about pollinator assemblages in the Beaverhead Mountains Section. A recent survey by IDFG in Lemhi County documented breeding populations of Monarch (Waterbury and Ruth 2015) and additional SGCN pollinators including 5 bee species and 2 butterflies are likely to occur based on estimated range (Table 5.2). Surveys and monitoring are needed to assess their current status, distribution, and potential threats in this section.

Target Viability

Good. Pollinator viability is presumed to be secure based on extensive area and relatively good ecological condition of native plant communities in surrounding public lands. The majority of agricultural land consists of hayfields planted to mixes selected for beef-cattle production containing cultivar grasses, legumes (i.e., clovers, alfalfa), and residual native grasses, which attract a diversity of insects and pollinators. Monarch surveys in Lemhi County documented various anthropogenic impacts at 90% of showy milkweed (*Asclepias speciosa*) sites including herbicide spraying and mowing of roadside populations, burning of irrigation ditches, herbicide spraying at margins of cultivated fields, livestock trampling, and OHV impacts (Waterbury and Ruth 2015). Use of glyphosate and neonicotinoid pesticides, implicated in declining bee populations, is low in this section (Thelin and Stone 2013).

Prioritized Threats and Strategies for Pollinators

High rated threats to Pollinators in the Beaverhead Mountains

Anthropogenic impacts to Monarch breeding habitat

The North American Monarch Conservation Plan identified several factors contributing to the steady decline of monarchs (Commission for Environmental Cooperation 2008). A key factor is the loss of Monarch breeding habitat due to ongoing declines of native milkweeds (*Asclepias* spp.), their obligate larval host plants. Milkweed losses are attributed to an array of factors including urban development, broad-scale use of post-emergent herbicides in agro-systems, and intensive management of roadside vegetation (e.g., herbicide application, mowing). Factors most relevant in the Beaverhead Mountains Section appear to be loss and degradation of milkweed due to intensive roadside and agricultural management (Waterbury and Ruth 2015).

Objective	Strategy	Action(s)	Target SGCNs
Work with key constituencies to adopt best management practices to protect, create, and enhance milkweed habitats.	Work with Idaho Transportation Department and local governments to adopt voluntary Monarch-friendly management techniques in road right-of-ways.	Avoid broadcast herbicide or insecticide spraying of roadside vegetation; spot-spray invasive weeds with a well-targeted technique. Delay roadside mowing of milkweed until after August 15 to minimize impacts to breeding monarchs. Limit roadside mowing to the first 8 ft of the roadside inslope. Plant native seed mixes including local species of milkweed during right-of-way construction.	Monarch
	Work with ranchers to adopt voluntary Monarch-friendly management techniques on agricultural lands.	Promote milkweed plantings in field margins as a means to restore monarch habitat in agricultural landscapes. Create and use demonstration sites based on this model. Connect landowners with opportunities or incentives through Farm Bill, NRCS, or U.S. Fish and Wildlife Service conservation programs to create, enhance, or manage lands to support monarchs. Identify existing and potential agricultural production systems that are compatible with Monarch habitat, and devise strategies to maintain and expand these systems (e.g., cost sharing, market incentives, and certification programs) to create markets for ecosystem services. Use prescribed burning between late September and April 1. Avoid broadcast herbicide or insecticide spraying of milkweed patches; spot-spray invasive weeds with a well-targeted technique.	Monarch

Objective	Strategy	Action(s)	Target SGCNs
		Develop best management practices for minimizing the susceptibility of livestock to accidental milkweed poisoning, while maintaining usefulness of the habitat to monarchs.	
	Right-of-way habitat management	Develop guidelines for monarch habitat creation, enhancement, maintenance and monitoring in utility or railroad ROW areas. Identify potential rights-of-way partners and encourage Monarch-friendly management on their land. Provide information and resources necessary to be successful in creating, enhancing, or maintaining monarch habitat in these areas.	Monarch
	Increase planting of small garden habitats for monarchs.	Facilitate expansion of Monarch Waystation, Wild for Monarchs, North American Butterfly Association Butterfly Habitat, National Wildlife Federation certified habitats, and other programs throughout breeding range. Provide support for creation of schoolyard gardens by working through existing granting programs.	Monarch
Increase public awareness of monarchs and their milkweed host plants.	Develop public education and outreach materials for milkweeds.	Develop materials to share information about milkweeds, and to address concerns about weediness and toxicity held by some portions of the general public. Develop and distribute promotional materials describing the importance of milkweed to monarchs.	Monarch

Species designation, planning and monitoring

In addition to conservation actions to address specific threats, some SGCN pollinators require inventory and monitoring to assess their current status and distribution in Idaho. As such, we identify needs for 7 species in the table below and identify appropriate actions.

Objective	Strategy	Action(s)	Target SGCNs
Determine status of target pollinators potentially occurring in the Beaverhead Mountains Section.	Conduct surveys to detect occurrence of target pollinators.	Conduct pan trap and netting surveys for bees in spring, summer, or fall depending on bee species preference for certain genera of plants. Conduct hand net surveys for Beartooth Copper and Gillette's Checkerspot adults and visual surveys for larvae in June/July.	Morrison Bumble Bee, Western Bumble Bee, Suckley Cuckoo Bumble Bee, Hunt's Bumble Bee, A Mason Bee (*Hoplitis producta*), Beartooth Copper, Gillette's

Objective	Strategy	Action(s)	Target SGCNs
			Checkerspot

Beaverhead Mountains Section Team

An initial version of the Beaverhead Mountains Section project plan was completed for the 2005 Idaho State Wildlife Action Plan (formerly Comprehensive Wildlife Conservation Strategy). A small working group developed an initial draft of the Section Plan (Miradi v. 0.##), 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 January 2015 (this input was captured in Miradi v. 0.##). That draft was then subsequently distributed for internal review within the Idaho Department of Fish and Game in June 2015. 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.##. Individuals, agencies, and organizations involved in this plan are listed in Table 5.3.

Table 5.3 Individuals, agencies, and organizations involved in developing this plan[a]

First name	Last name	Affiliation
Beth	Waterbury*	Idaho Department of Fish and Game
Jody	Brostrom	U.S. Fish and Wildlife Service
Rita	Dixon* [b]	Idaho Department of Fish and Game
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Colleen	Moulton	Idaho Department of Fish and Game
Chris	Murphy	Idaho Department of Fish and Game
Mark	Olson	Natural Resources Conservation Service
Chuck	Peterson	Idaho State University
Nick	Salafsky	Foundations of Success
Greg	Schoby	Idaho Department of Fish and Game
Bret	Stansberry	Idaho Department of Fish and Game
Jeremey	Varley	Lemhi County Cooperative Weed Management Area

[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.

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