13. Snake River Basalts Section

Section Description

The Snake River Basalts Section, part of the Snake River Plain Ecoregion, is located in south central and eastern Idaho (Fig. 13.1, Fig. 13.2). Much of the section is comprised of extensive plains, isolated buttes, and block–faulted mountains. The surface is a lava plateau with a thin windblown soil layer covering it. Lava flows and basalt are prevalent throughout the area and vary in thickness from less than 30 m (100 ft.) to thousands of meters. Shield volcanoes, cinder cones, and lava ridges are common. Craters of the Moon National Monument and Preserve, Hell's Half Acre Lava Field and the Great Rift are examples of the recent volcanic features. Many of these volcanic features also create hundreds, if not thousands, of lava tubes and caves. Elevation ranges from 900 to 2,000 m (3,000 to 6,000 ft). The Snake River, Teton River, Springfield Reservoir, American Falls Reservoir, Lake Walcott, and Mud Lake are major waterbodies, and few other perennial surface waterbodies are present. Precipitation ranges from 12–30 cm (5–12 in) annually and is evenly distributed throughout the fall, winter, and spring, but is low in the summer. Precipitation during summer months is generally lost to evaporation. Average annual temperature ranges from 4–13°C (40–58°F). The growing season ranges from 60–165 days, decreasing from west to east and with elevation. Enough precipitation falls in some foothills for dry farming.

Aged basaltic canyons, Gooding, Idaho © 2015 Ross Winton

The Snake River Basalts Section provides critical breeding and stopover habitat for hundreds of thousands of migratory shorebirds and waterbirds, waterfowl, and upland birds. There are 2 National Wildlife Refuges (NWR [Minidoka and Camas NWRs]) and eight state managed wildlife areas (Chester Segment Sand Creek, Cartier, Deer Parks, Mud Lake, Market Lake, Carey Lake, Sterling, and Niagara Springs Wildlife Management Areas [WMAs]) that provide secure habitat during migration, particularly in spring. The northern end of American Falls Reservoir is also recognized as critical habitat for migrating shorebirds.

Population centers include Arco, Driggs, Dubois, Rexburg, Idaho Falls, Pocatello, Burley, Gooding, and Twin Falls, and small communities are dispersed primarily along the Snake River

corridor and lesser waterways. The Snake River Basalts Section provides opportunities for outdoor recreational activities such as hunting, angling, hiking, bird watching, river rafting, and trail riding. Agriculture is important economically in the Snake River Basalts. Most land considered arable is under irrigated or dry-farm agriculture. Much of the remaining ground is grazed by livestock. Agricultural crops can provide value to wildlife but this often creates conflicts as well. Flood irrigation often acts as a surrogate for wetlands lost to development. However, sprinkler irrigation is quickly replacing the less efficient but more wildlife-friendly flood irrigation.

Wherever surface water exists in this arid environment, it is an important component of the landscape. Riparian corridors wind through arid desert creating habitat for a wide variety of obligate and semiobligate species. Riparian areas and wetlands tend to have the highest vegetation productivity within the landscape and are key habitat for foraging herbivores. There are two major impoundments on the Snake River (American Falls and Lake Walcott), two lesser impoundments in Idaho Falls and four more outside the section but that control water that passes through the system (Henrys Lake, Island Park Reservoir, Jackson Lake, Palisades Reservoir). Significant groundwater pumping from the Snake River Aquifer occurs and has caused concern for water users in the Twin Falls area. Aquifer recharge has become a significant issue and will impose greater influence in the future. The cottonwood forests that exist along the Snake and Teton Rivers are highly valued as habitat for a wide number of wildlife species, including the recently federally listed Yellow-billed Cuckoo (*Coccyzus americanus*). These forests are most valuable when left intact with multiple layers of vegetation.

The Snake River Basalts Section contains significant Priority and Important Greater Sage-Grouse (hereinafter, Sage-Grouse, *Centrocercus urophasianus*) habitat. Much of this habitat is reasonably intact but large wildfires continue to reduce habitat quantity and quality. In some areas, the habitat is being altered by invasion of nonnative annuals, especially cheatgrass (*Bromus tectorum*) which can change fire regimes. In other areas, increased intensity and frequency of wildfires has resulted in conversion from shrub-dominated habitats to nonnative annual grasslands which has reduced habitat value to shrubsteppe obligate species. Conversion of rangeland habitat to cultivars of a perennial nonnative grass, crested wheatgrass (*Agropyron cristatum*), has resulted in reduced habitat value for shrubsteppe obligate species across many thousands of acres within the Snake River Basalts. Crested wheatgrass has proven difficult to remove once established and is competitive enough to thwart establishment of native species.

The Bureau of Land Management has established three Areas of Critical Environmental Concern (ACEC) within the Snake River Basalts. They are: Snake River, North Menan Butte, and Nine Mile Knoll/St. Anthony Sand Dunes. US Department of the Interior (DOI), Bureau of Land Management (BLM), Idaho State Office BLM Manual 1613, dated 9/29/1988, describes ACEC as: "ACEC designations highlight areas where special management attention is needed to protect, and prevent irreparable damage to, important historic, cultural, and scenic values, fish, or wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards. The ACEC designation indicates to the public that the BLM recognizes that an area has significant values and has established special management measures to protect those values. In addition, designation also serves as a reminder that significant value(s) or resource(s) exist which must be accommodated when future management actions and land use proposals are

considered near or within an ACEC." There are also 4 BLM Resource Natural Areas (RNA) within the Snake River Basalts (St. Anthony Sand Dunes, North Menan Butte, Reid Canal Island, and China Cup Butte RNAs).

A major player in the Snake River Basalts is the Idaho National Laboratory (INL) run by the Department of Energy. At 890 square miles (569,135 acres), the INL is one quarter the size of Yellowstone National Park and almost the size of Rhode Island and is 6.48% of the total area of this section. It is a restricted-access facility with many thousands of acres of sage-steppe habitat. Facilities are concentrated in a few areas and roads are the only major developments on much of the INL. The INL completed a Candidate Conservation Agreement for Sage-Grouse with the US Fish and Wildlife Service (FWS) in 2014. This agreement outlines steps the INL will take to reduce impacts to Sage-Grouse and improve habitat. The INL is also involved in research on bats and big game species, among others.

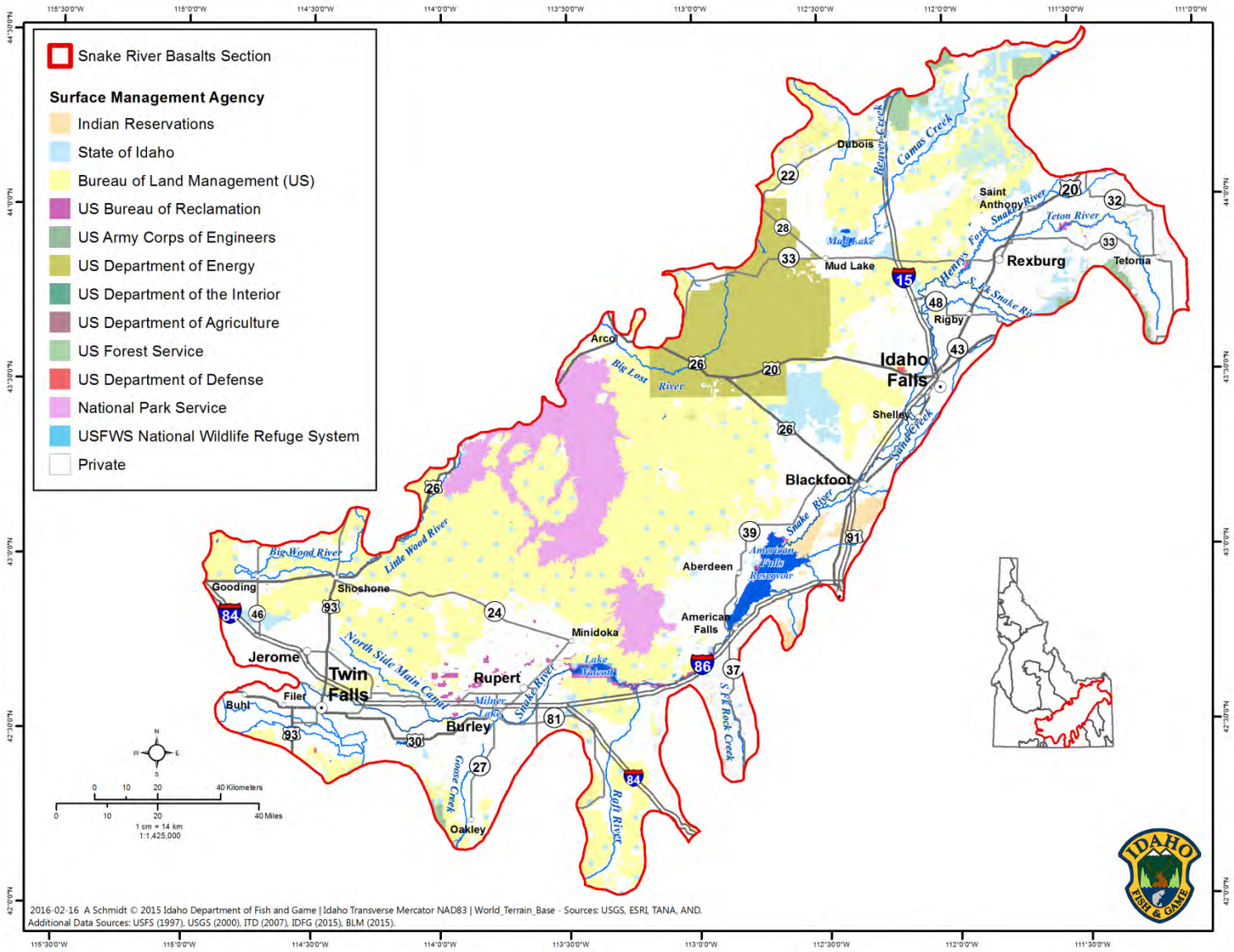

Fig. 13.1 Map of Snake River Basalts surface management

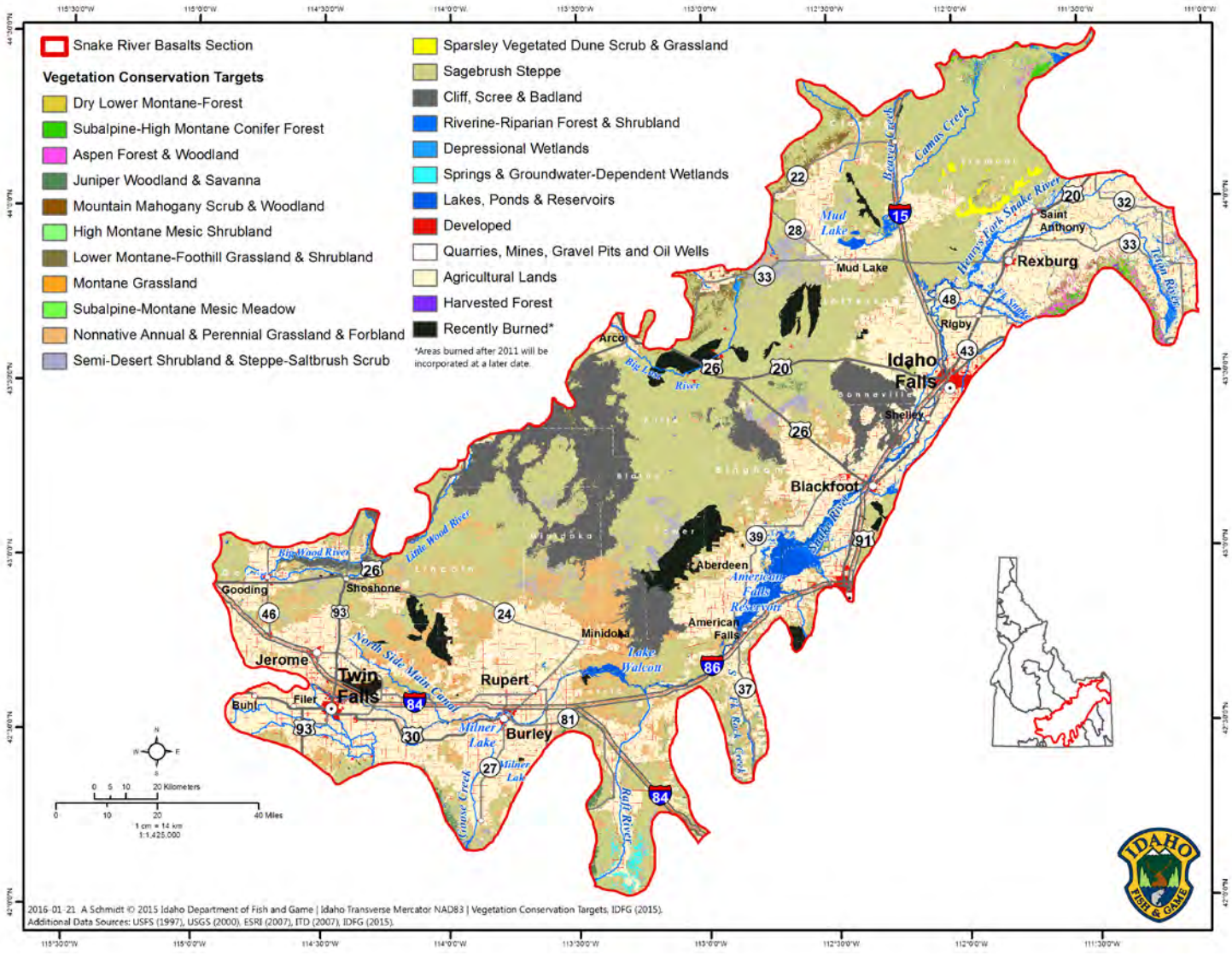

Fig. 13.2 Map of Snake River Basalt vegetation conservation targets

Conservation Targets in the Snake River Basalts

We selected nine habitat targets (four terrestrial and five aquatic or semi-aquatic) that represent the major ecosystems in the Snake River Basalts as shown in Table 13.1. Each of these systems provides habitat for key species of greatest conservation need (SGCN), i.e., "nested targets" (Table 13.2) associated with each target. All SGCN management programs in the Snake River Basalts 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.

Table 13.1 At-a-glance table of conservation targets in the Snake River Basalts

Target	Target description	Target viability	Nested targets (SGCN)	
Sagebrush Steppe	Sagebrush-steppe systems occur at all elevations across the Snake River Basalts. It is important to maintain a mosaic of sagebrush in different seral stages. The sagebrush-steppe target also includes native perennial grass and forb species associated with sagebrush communities.	*Fair*. Habitat is intact and in good ecological condition in some areas, but in others, particularly those dominated by invasive annual grasslands with an altered fire regime, they are in fair to poor condition.	*Tier 1*	Greater Sage-Grouse Morrison's Bumble Bee
			Tier 2	Pygmy Rabbit Hoary Bat Ferruginous Hawk Golden Eagle Burrowing Owl Long-billed Curlew Sharp-tailed Grouse Sagebrush Sparrow Sage Thrasher Idaho Point-headed Grasshopper A Metallic Wood-boring Beetle (*Chrysobothris idahoensis*)
			Tier 3	Western Small-footed Myotis Townsend's Big-eared Bat Little Brown Myotis Grasshopper Sparrow Common Nighthawk Short-eared Owl A Metallic Wood-boring Beetle (*Agrilus pubifrons*) Hunt's Bumble Bee Monarch A Mason Bee (*Hoplitis producta subgracilis*) A Long-horned Beetle (*Judolia gaurotoides*) Spur-throated Grasshopper (*Melanoplus*) Species Group
Managed Perennial Grasslands	This target includes Conservation Reserve Program (CRP) and other public and privately managed grasslands. CRP lands have been	*Good*. Currently, the maximum acres allowed by law are enrolled in these two programs. Many thousands of acres are in	*Tier 1*	Greater Sage-Grouse
			Tier 2	Sharp-tailed Grouse Burrowing Owl Ferruginous Hawk Long-billed Curlew Golden Eagle

Target	Target description	Target viability	Nested targets (SGCN)	
	converted from arable land into mixed native and nonnative perennial grasses and forbs as well as native shrubs under the CRP. This umbrella program also includes the State Acres for Wildlife program (SAFE). CRP occurs most extensively at lower elevations and is typically in close association with shrub–steppe habitats.	rhizomatous grass cover and habitat values would improve significantly through conversion to a mix of more wildlife-friendly species.	*Tier 3*	Grasshopper Sparrow Common Nighthawk Sandhill Crane Short-eared Owl
Sparsely Vegetated Dune Scrub & Grassland	Sparsely Vegetated Dune Scrub & Grassland systems that includes the St. Anthony Dunes, Dietrich Dunes, Walcott Dunes, and other unnamed scattered dune complexes in the section.	*Fair.* Large areas dominated by cheatgrass and other invasive perennial and annuals plant species.	*Tier 2* *Tier 3*	An Ant-like Flower Beetle (*Amblyderus owyhee*) A Miner Bee (*Calliopsis barri*) Idaho Dunes Tiger Beetle A Leafcutting Bee (*Ashmeadiella sculleni*) Wiest's Primrose Sphinx
Riverine–Riparian Forest & Shrubland	Rivers and streams, including aquatic habitats and their associated terrestrial riparian habitats. Includes the Main Snake, Henrys Fork, South Fork, and Teton rivers as well as the lower reaches of the Big Wood River.	*Fair* to *Good.* Many riverine systems are still mostly intact. Riparian habitats associated with riverine systems, particularly cottonwood forests, are at risk and require conservation action.	*Tier 1* *Tier 2* *Tier 3*	Yellow-billed Cuckoo Snake River Physa Bliss Rapids Snail Clark's Grebe Western Grebe Western Pearlshell Silver-haired Bat California Floater A Caddisfly (*Glossosoma idaho*) Western Ridged Mussel A Mayfly (*Parameletus columbiae*) Snake River Pilose Crayfish
Depressional Wetlands	Rainfed systems ranging from infrequent to semipermanent or permanently flooded. Includes playas, vernal pools, shallow marshes and meadows, and	*Fair.* Habitat area has been greatly reduced in many sites. Altered hydrologic regimes and issues with invasive weeds.	*Tier 2*	Northern Leopard Frog Western Toad Long-billed Curlew American Bittern White-faced Ibis American White Pelican Trumpeter Swan Western Grebe Black Tern Clark's Grebe

Target	Target description	Target viability	Nested targets (SGCN)	
	deep water marshes.		*Tier 3*	Franklin's Gull Sandhill Crane Monarch
Springs & Groundwater -Dependent Wetlands	Includes a subset of groundwater-dependent ecosystems such as springs and seeps, geothermal springs, alkaline-saline wetlands, and wet and mesic meadows.	*Fair* to *Good*. Habitat area has been greatly reduced in many sites.	*Tier 1*	Snake River Physa Bliss Rapids Snail
			Tier 2	Northern Leopard Frog Western Toad Black Tern White-faced Ibis Clark's Grebe Long-billed Curlew American Bittern Western Grebe Deseret Mountainsnail
			Tier 3	Franklin's Gull Sandhill Crane California Floater A Caddisfly (*Glossosoma idaho*) Western Ridged Mussel Pondsnail (*Stagnicola*) Species Group
Lakes, Ponds & Reservoirs	This ecosystem includes all irrigation/artificial ponds and natural lakes, dam-altered naturally formed lakes, and created waterbodies of all sizes that fit the lacustrine definition. Includes large reservoirs (American Falls and Mud Lake, Lake Walcott), irrigation/artificial ponds and natural lakes (Market & Mud Lakes). The greatest threat of change is the potential to heighten dams and increase storage capacity.	*Good.* Lakes and reservoirs in the Snake River Basalts are stable at this time.	*Tier 2*	Clark's Grebe Western Grebe California Gull Caspian Tern American White Pelican Trumpeter Swan White-faced Ibis
			Tier 3	Ring-billed Gull Pondsnail (*Stagnicola*) Species Group Franklin's Gull
Lava Flows, Kipukas, Caves & Tubes	Includes kipukas, caves, lava tubes, ice caves, and associated endemic plants and wildlife. Includes open woodlands within kipukas (limber	*Fair*. In theory, kipukas should be reference areas. However, invasive plant species and human uses have found their way into most	*Tier 1*	Blind Cave Leiodid Beetle
			Tier 2	A Metallic Wood-boring Beetle (*Chrysobothris horningi*) A Metallic Wood-boring Beetle (*Chrysobothris idahoensis*) A Cave Obligate Mite (*Flabellorhagidia pecki*) A Cave Obligate Millipede (*Idagona*

Target	Target description	Target viability	Nested targets (SGCN)
	pines, juniper, Douglas-fir in older lava flows).	kipukas. The location of many caves and lava tubes is not public knowledge and thus they may be reasonably safe from disturbance.	*westcotti*) A Cave Obligate Harvestman (*Speleomaster lexi*) A Cave Obligate Harvestman (*Speleomaster pecki*) *Tier 3* Western Small-footed Myotis Townsend's Big-eared Bat Little Brown Myotis A Yellow-masked Bee (*Hylaeus lunicraterius*)

Table 13.2 Species of greatest conservation need (SGCN) and associated conservation targets in the Snake River Basalts

Taxon	Conservation targets							
	Sagebrush Steppe	Mixed Perennial Grasslands	Sparsely Vegetated Dune Scrub & Grassland	Riverine–Riparian Forest & Shrubland	Depressional Wetlands	Springs & Groundwater-Dependent Wetlands	Lakes, Ponds & Reservoirs	Lava Flows, Kipukas, Caves & Tubes
AMPHIBIANS								
Western Toad (*Anaxyrus boreas*)[2]					X	X		
Northern Leopard Frog (*Lithobates pipiens*)[2]					X	X		
BIRDS								
Trumpeter Swan (*Cygnus buccinator*)[2]					X		X	
Greater Sage-Grouse (*Centrocercus urophasianus*)[1]	X	X						
Sharp-tailed Grouse (*Tympanuchus phasianellus*)[2]	X	X						
Western Grebe (*Aechmophorus occidentalis*)[2]				X	X	X	X	
Clark's Grebe (*Aechmophorus clarkii*)[2]				X	X	X	X	
American White Pelican (*Pelecanus erythrorhynchos*)[2]					X		X	
American Bittern (*Botaurus lentiginosus*)[2]					X	X		
White-faced Ibis (*Plegadis chihi*)[2]					X	X	X	
Ferruginous Hawk (*Buteo regalis*)[2]	X	X						
Golden Eagle (*Aquila chrysaetos*)[2]	X	X						
Sandhill Crane (*Grus canadensis*)[3]		X			X	X		
Long-billed Curlew (*Numenius americanus*)[2]	X	X			X	X		
Franklin's Gull (*Leucophaeus pipixcan*)[3]					X	X	X	
Ring-billed Gull (*Larus delawarensis*)[3]							X	
California Gull (*Larus californicus*)[2]							X	
Caspian Tern (*Hydroprogne caspia*)[2]							X	
Black Tern (*Chlidonias niger*)[2]					X	X		
Yellow-billed Cuckoo (*Coccyzus americanus*)[1]				X				
Burrowing Owl (*Athene cunicularia*)[2]	X	X						
Short-eared Owl (*Asio flammeus*)[3]	X	X						
Common Nighthawk (*Chordeiles minor*)[3]	X	X						
Sage Thrasher (*Oreoscoptes montanus*)[2]	X							
Sagebrush Sparrow (*Artemisiospiza nevadensis*)[2]	X							
Grasshopper Sparrow (*Ammodramus savannarum*)[3]	X	X						
MAMMALS								
Pygmy Rabbit (*Brachylagus idahoensis*)[2]	X							
Townsend's Big-eared Bat (*Corynorhinus townsendii*)[3]	X							X

Taxon	Conservation targets							
	Sagebrush Steppe	Mixed Perennial Grasslands	Sparsely Vegetated Dune Scrub & Grassland	Riverine–Riparian Forest & Shrubland	Depressional Wetlands	Springs & Groundwater-Dependent Wetlands	Lakes, Ponds & Reservoirs	Lava Flows, Kipukas, Caves & Tubes
Silver-haired Bat (*Lasionycteris noctivagans*)[2]				X				
Hoary Bat (*Lasiurus cinereus*)[2]	X							
Western Small-footed Myotis (*Myotis ciliolabrum*)[3]	X							X
Little Brown Myotis (*Myotis lucifugus*)[3]	X							X
ARACHNIDS								
A Cave Obligate Harvestman (*Speleomaster lexi*)[2]								X
A Cave Obligate Harvestman (*Speleomaster pecki*)[2]								X
A Cave Obligate Mite (*Flabellorhagidia pecki*)[2]								X
BIVALVES								
Western Pearlshell (*Margaritifera falcata*)[2]				X				
California Floater (*Anodonta californiensis*)[3]				X		X		
Western Ridged Mussel (*Gonidea angulata*)[3]				X		X		
AQUATIC GASTROPODS								
Pondsnail (*Stagnicola*) Species Group[3]						X	X	
Snake River Physa (*Physa natricina*)[1]				X		X		
Bliss Rapids Snail (*Taylorconcha serpenticola*)[1]				X		X		
TERRESTRIAL GASTROPODS								
Deseret Mountainsnail (*Oreohelix peripherica*)[2]						X		
MILLIPEDES								
Idaho Lava Tube Millipede (*Idagona westcotti*)[2]								X
INSECTS								
An Ant-like Flower Beetle (*Amblyderus owyhee*)[2]			X					
A Metallic Wood-boring Beetle (*Agrilus pubifrons*)[3]	X							
A Metallic Wood-boring Beetle (*Chrysobothris horningi*)[2]								X
A Metallic Wood-boring Beetle (*Chrysobothris idahoensis*)[2]	X							X
Idaho Dunes Tiger Beetle (*Cicindela arenicola*)[2]			X					
A Long-horned Beetle (*Judolia gaurotoides*)[3]	X							
Blind Cave Leiodid Beetle (*Glacicavicola bathyscioides*)[1]								X
A Mayfly (*Parameletus columbiae*)[3]				X				
A Miner Bee (*Calliopsis barri*)[2]			X					
Hunt's Bumble Bee (*Bombus huntii*)[3]	X							
Morrison's Bumble Bee (*Bombus morrisoni*)[1]	X							

Taxon	Conservation targets							
	Sagebrush Steppe	Mixed Perennial Grasslands	Sparsely Vegetated Dune Scrub & Grassland	Riverine–Riparian Forest & Shrubland	Depressional Wetlands	Springs & Groundwater-Dependent Wetlands	Lakes, Ponds & Reservoirs	Lava Flows, Kipukas, Caves & Tubes
A Yellow-masked Bee (*Hylaeus lunicraterius*)[3]								X
A Leafcutting Bee (*Ashmeadiella sculleni*)[3]			X					
A Mason Bee (*Hoplitis producta subgracilis*)[3]	X							
Monarch (*Danaus plexippus*)[3]	X				X			
Wiest's Primrose Sphinx (*Euproserpinus wiesti*)[3]			X					
Idaho Point-headed Grasshopper (*Acrolophitus pulchellus*)[2]	X							
Spur-throated Grasshopper (*Melanoplus*) Species Group[3]	X							
A Caddisfly (*Glossosoma idaho*)[3]				X		X		
CRUSTACEANS								
Snake River Pilose Crayfish (*Pacifastacus connectens*)[3]				X				

Target: Sagebrush Steppe

Sagebrush Steppe is among the largest targets on the landscape and one of the highest conservation priorities for the Snake River Basalts section. Sagebrush spans a wide variety of plant communities and as a habitat it is diverse. In the Snake River Basalts, not all landscapes having sagebrush face the same management priorities or have the same conservation value or management needs. Variation in stand structural characteristics, vegetation composition, and disturbance regimes shapes the suitability and habitat value of various landscapes, which, in turn, drives habitat management priorities for different regions. Although resource management programs affecting wildlife habitat within sagebrush steppe are currently dominated by considerations for Sage-Grouse populations, many other species are reliant on sagebrush-steppe habitat. Some areas have minimal to no value for Sage-Grouse management but are important for other high-priority species or species assemblages such as the Long-billed Curlew (*Numenius americanus*), Common Nighthawk (*Chordeiles minor*), and several Coleopteran and Hymenopteran insect species.

Most of the sagebrush steppe in the Snake River Basalts lies within the Idaho Desert and Idaho Southern Greater Sage-Grouse conservation areas (see Fig. 2-14, Idaho and Southwestern Montana Greater Sage-Grouse Approved RMP Amendment, hereafter Idaho and Southwestern Montana GRSG ARMPA; BLM 2015), but also extends into significant portions of the Idaho West Owyhee Greater Sage-Grouse Conservation Area; the entire area includes a mix of designated Priority (PHMA), Important (IHMA), and General (GHMA) Greater Sage-Grouse Habitat Management Areas (see Fig. 13.3), as developed by the State and federal land management agencies (see Attachment 1, Fig. 2-1; BLM 2015).

Sagebrush-steppe habitat in the Snake River Basalts Section, Indian Creek, Idaho © 2004 Mark Fleming

The largest area of sagebrush steppe in the Snake River Basalts is often called the Big Desert and encompasses the INL, non-lava portions of Craters of the Moon National Monument and Preserve, and surrounding areas north and west of the Snake River. The Big Desert sagebrush community is described as an intermixing of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) and Great Basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) mixed with several shrub species including green rabbitbrush (*Chrysothamnus viscidiflorus*). Habitats found

at the base of the Big and Little Lost River drainages also possess a mosaic of other sporadically occurring shrubs such as shadscale saltbush (*Atriplex confertifolia*) and winterfat (*Krascheninnikovia lanata*). The herbaceous stratum of this plant community is typically sparse to moderate in terms of cover. Species composition of native grasses may be quite variable from one stand to another; however, bottlebrush squirreltail (*Elymus elymoides*), Sandberg bluegrass (*Poa secunda*), streambank wheatgrass (*Elymus lanceolatus*), and Indian ricegrass (*Achnatherum hymenoides*) are among the most abundant grass species. Forbs present on more diverse sites may include: Hood's phlox (*Phlox hoodii*), *Chenopodium* spp., *Eriogonum* spp., and western tansymustard (*Descurainia pinnata*). Cover from nonnative species ranges from absent to moderate, the most abundant of which are cheatgrass, crested wheatgrass, and desert alyssum (*Alyssum desertorum*)(Shive et al. 2011).

Within the Snake River Basalts, the Sand Creek Desert makes up a good portion of the northeastern part of the section and encompasses most of the lowland desert sagebrush habitats north and west of the Henrys Fork. Moser and Murphy (2015) describe two dominant plant communities in the Sand Creek Desert, basin big sagebrush or mountain big sagebrush, with basin big sagebrush tending to co-dominate in areas of deeper sand. Where found, bitterbrush/needle and thread communities are often associated basin big sagebrush. Rocky Mountain juniper (*Juniperus scopulorum*) and taller shrubs, such as chokecherry (*Prunus virginiana*), are also common in areas with less consolidated sandy substrates. Common native perennials include needle and thread, western wheatgrass (*Pascopyrum smithii*), Idaho fescue (*Festuca idahoensis*), Sandberg bluegrass, and Parsnipflower buckwheat (*Eriogonum heracleoides*). Soils are excessively well drained, with fine Aeolian deposited sands atop basaltic bedrock. In addition to being botanically diverse, the Sand Creek Desert also provides important winter range for a wide variety of wildlife species in the Greater Yellowstone Ecosystem.

The Raft River and Rockland valleys are associated with the Snake River Basalts Section and are surrounded by higher elevation habitats included in the Northwest Basin and Range Section. The lowland habitats in these two valleys are dominated by Wyoming/Great Basin big sagebrush greasewood complex. Vegetation cover of this community type consists of the shrub community of Great Basin big sagebrush, Wyoming big sagebrush, green rabbitbrush, greasewood (*Sarcobatus vermiculatus*), and scattered juniper (*Juniperus osteosperma*) trees (BLM 2010). The understory is a sparse mix of both native and nonnative grasses and forbs. Common grasses include Sandberg bluegrass, squirreltail, Indian ricegrass, Great Basin wild rye (*Elymus cinereus*), crested wheatgrass, and cheatgrass. Common forbs include halogeton (*Halogeton glomeratus*), Hood's phlox, and globemallow (*Sphaeralcea ambigua*). Much of the ground is bare or consists of cryptogrammic soils or rock (BLM 2010). Sage- and Sharp-tailed Grouse lek and raise broods in the lowland areas of both river valleys. Pygmy rabbits (*Brachylagus idahoensis*) are also known to occur in areas dominated with mature stands of sagebrush and having suitable soil substrates.

Target Viability

Fair. Sagebrush steppe condition varies across the section from poor to very good. Habitat in areas dominated by cheatgrass are highly susceptible to wildfire and are generally in poor condition. Habitats within the Big Desert east of Craters of the Moon National Monument and Preserve and on the INL site are made up of a mosaic of successional stages as a result of fire

but in general are intact and relatively healthy. Likewise, Sand Creek Desert sagebrush steppe is in relatively good condition and there remain large pockets of mature intact Basin and Wyoming Big Sage communities. Wildfire and the introduction and spread of invasive weeds that perpetuate increased fire cycle are the greatest threat to sagebrush-steppe habitats in the Snake River Basalts Section. Historically, livestock grazing was heavy in the most xeric habitat types, and in combination with extensive fire in some locations has led to degraded habitat quality and low native species presence.

Spotlight Species of Greatest Conservation Need: Short-eared Owl

Within the Snake River Basalts, Short-eared Owls (*Asio flammeus*) are associated with open landscapes such as marshes, grasslands, shrubsteppe, and agricultural lands (e.g., pastures, stubble fields, and hayfields). Breeding habitats typically support sufficient vegetation (primarily grasses and forbs) to provide ground-nesting and roosting cover and are in close proximity to productive and open hunting areas with abundant supplies of small mammals. Short-eared Owl feeds almost exclusively on small mammals with voles (*Microtus* spp.) making up the bulk of its diet. Miller et al. (*In Review*) estimated 3,046 adults in Idaho during the breeding season in 2015, with a significant percentage of those birds being located in the Snake River Basalts and Owyhee Uplands sections. This species' nomadic lifestyle makes assessing population status difficult. All available data suggest significant declines throughout its range. BBS data in particular suggest a decline in the western BBS region and Idaho from 1966–2013 (−1.8% and −2.7% per year, respectively) and 2003–2013 (−1.4% and −3%, respectively) and as such they have been identified as a common bird in steep decline (NABCI 2014). However, there are deficiencies in the data sets used to calculate these estimates (primarily low sample size and extremely low relative abundance for this species since they are only sporadically detected using standard BBS protocols). Conservation of this species is closely tied to the restoration of shrubsteppe habitats in concert with Greater Sage-Grouse conservation activities. It is also a high priority to continue to work with the Pacific Flyway Council's Nongame Technical Committee and partners to develop a coordinated monitoring project that will be used to target habitat conservation for this species.

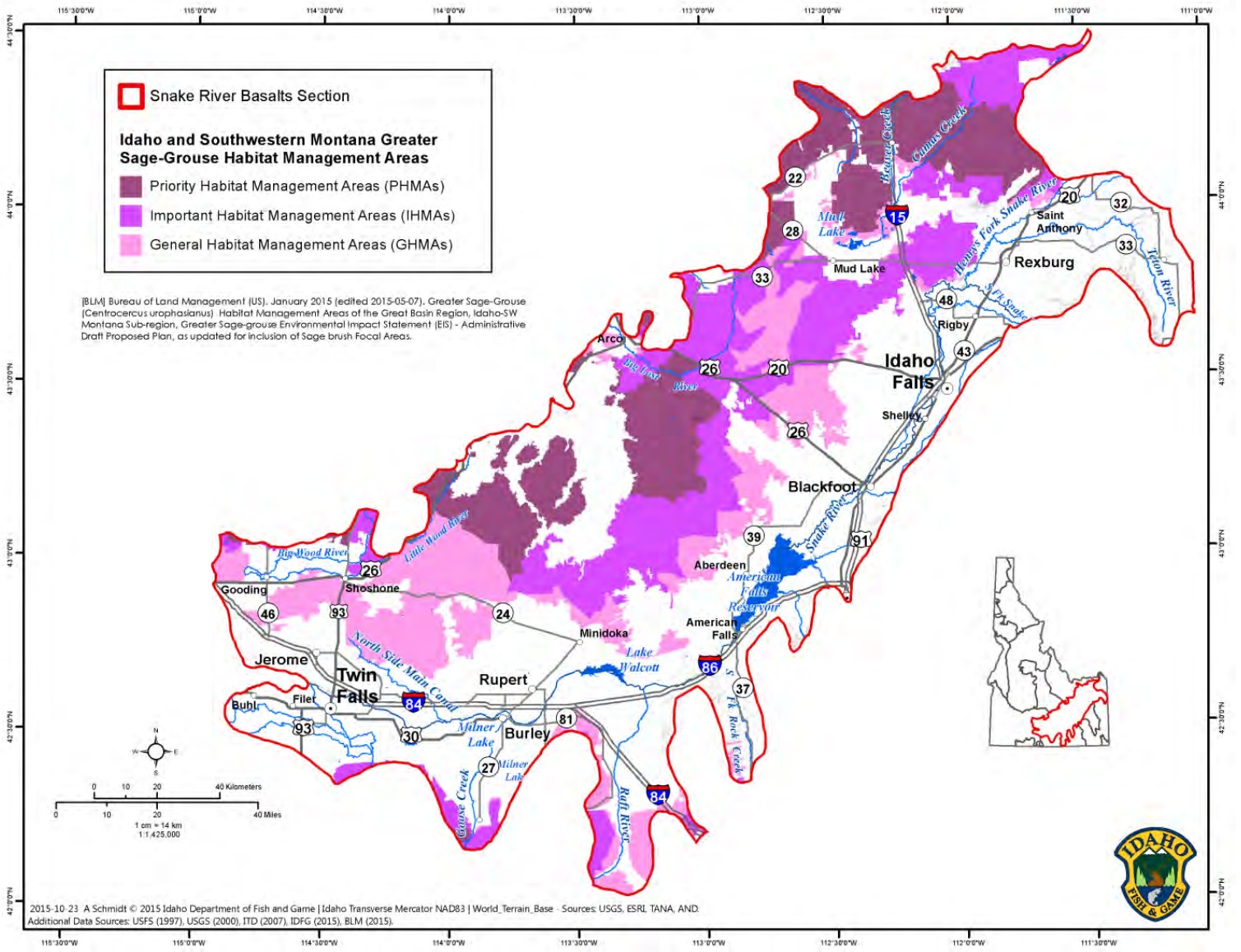

Fig. 13.3 Idaho and Southwestern Montana Greater Sage-Grouse Habitat Management Areas

Prioritized Threats and Strategies for Sagebrush Steppe

Very High rated threats to Sagebrush Steppe in the Snake River Basalts

Increased frequency & intensity of wildfire

The increased frequency and severity of wildfire is considered a primary threat to the sagebrush-steppe ecosystem and to the many sagebrush-steppe species that depend on it, including Sage-Grouse (Otter 2012, US Fish and Wildlife Service 2014). The accelerated invasion of nonnative annual grasses—in particular cheatgrass and medusahead—and the spread of juniper into the sagebrush-steppe ecosystem (coupled with the effects of intensified drought and climate change), create conditions that lead to larger, more intense rangeland fires across the Great Basin (DOI 2015).

Objective	Strategy	Action(s)	Target SGCNs
Manage wildfires to minimize loss of sagebrush habitat.	Improve fire suppression protocols and resource allocations to limit habitat losses to wildfire.	Support development and implementation of Rangeland Fire Protection Associations (RFPAs) (e.g., Idaho Code § 38-104B and Governor's Executive Order 2015-04) (Otter 2015). During high fire danger conditions, stage initial attack and secure additional resources closer to priority areas, with particular consideration of the West Owyhee, Southern, and Desert Conservation Areas to ensure quicker response times in or near Sage-Grouse habitat (BLM 2015). Create and maintain effective fuel breaks to modify fire behavior and increase fire suppression effectiveness based on criteria outlined in the Governor's Alternative (Otter 2012).	Greater Sage-Grouse Short-eared Owl Sage Thrasher Sagebrush Sparrow
Work with researchers to develop new techniques for annual grass weed control.	Engage with and explore the effectiveness of new soil bacteria as a biocontrol for invasive annual grasses.	Support and collaborate with researchers at the University of Idaho to gauge the effectiveness of soil bacteria and other new treatments for cheatgrass and other invasive annual grasses.	Greater Sage-Grouse Long-billed Curlew Sage Thrasher Sagebrush Sparrow Grasshopper Sparrow
Develop more aggressive strategies to reduce fuel loads (Otter 2012).	Improve targeting of fuels reduction opportunities and implementation (DOI 2015).	Explore opportunities to provide support to livestock grazing permittees and private landowners to implement fuel treatment actions as part of strategic, landscape efforts (DOI 2015). Work with livestock producers to implement fuel treatments on their lands and allotments (DOI 2015). Implement aggressive and targeted application of both proven techniques and the rapid investigation and	Greater Sage-Grouse Sage Thrasher Sagebrush Sparrow

Objective	Strategy	Action(s)	Target SGCNs
		implementation of new practices to control cheatgrass and mitigate habitat impacts from unwanted rangeland fire (DOI 2015).	
Increase post-fire restoration success (DOI 2015).	Expand the use of native seeds and seedlings to accelerate efforts to improve and restore post-fire rangeland health (DOI 2015).	Collect native seed for use in developing commercial seed and for long-term seed banking to ensure conservation of germ plasm to promote climate resilience and long-term rangeland health (DOI 2015). Coordinate and collaborate across agencies on climate trend data as it relates to seeds (DOI 2015). Increase seed production and the grow-out of genetically appropriate native plant species for the restoration (DOI 2015). Limit the use of nonnative species (e.g., to achieve site stabilization, wildfire breaks, or invasive plant control) to transitional, noninvasive species, replaced by natives in subsequent ecological restoration or during natural successional processes (DOI 2015).	Greater Sage-Grouse Short-eared Owl Sage Thrasher Sagebrush Sparrow
Commit to multiyear investments in restoration (DOI 2015).	Support long-term strategies for the restoration of sagebrush-steppe ecosystems, including consistent long-term monitoring protocols and adaptive management for restored areas (DOI 2015).	Map hot spots of restoration activity or investment to help identify trends and opportunities for greater efficiency and leveraging of funds (DOI 2015). Support a cross-jurisdictional consortium of agencies, organizations and partners dedicated to implementation of restoration, monitoring, and adaptive management activities (DOI 2015).	Greater Sage-Grouse Short-eared Owl Sage Thrasher Sagebrush Sparrow
Maintain intact sagebrush stands to limit fragmentation and minimize direct habitat loss.	Protect Wyoming big sagebrush from destruction by wildfire.	Suppress wildfires in Sage-Grouse habitat, commensurate with threatened and endangered species habitat or other critical habitats to be protected (BLM 2015). Develop fuel breaks in areas dominated by invasive annual grasses adjacent to Wyoming big sagebrush stands.	Greater Sage-Grouse Western Small-footed Myotis Little Brown Myotis Townsend's Big-eared Bat Hoary Bat

Noxious weeds & invasive annual grasses

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

2012–2016 ([ISDA] Idaho State Department of Agriculture 2012). In addition, the accelerated invasion of nonnative annual grasses—in particular cheatgrass and medusahead—is one of the primary drivers of larger, more intense rangeland fires across the Great Basin and directly threatens the habitat of Sage-Grouse and other sagebrush-steppe dependent wildlife (DOI 2015). In the Snake River Basalts, noxious weeds and invasive annual grasses (e.g., cheatgrass) have colonized many of the sagebrush habitat types. In addition, species such as knapweed crowd out native grasses and most forbs.

Objective	Strategy	Action(s)	Target SGCNs
Limit introduction of new weeds into areas where they do not occur.	Improve weed management tools and techniques. Aggressively manage nonnative undesirable plant species.	Implement *The Idaho Invasive Species Strategic Plan 2012–2016* ([ISDA] Idaho State Department of Agriculture 2012). Develop integrated weed management programs that include chemical, mechanical, biological, newly registered biocides, and subsequent restoration practices (DOI 2015). Develop large-scale application of integrated weed management programs that include chemical, mechanical, biological, newly registered biocides, and subsequent restoration practices (DOI 2015). Support the use of Plateau® herbicide in controlling cheatgrass. Promote certified weed-free seeds/forage (Idaho Sage-grouse Advisory Committee 2006). Target areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species (BLM 2015). Support the development of a framework for a national invasive species Early Detection and Rapid Response (EDRR) program (DOI 2015).	Greater Sage-Grouse Monarch

High rated threats to Sagebrush Steppe in the Snake River Basalts

Improper livestock grazing management

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

Livestock grazing can affect wildlife habitat in many ways (Krausman et al. 2009). For example, livestock grazing can change habitat features that directly influence birds by reducing plant

species diversity and biomass (Reynolds and Trost 1981, Bock and Webb 1984, Saab et al. 1995). Alternatively, changes in water and nutrient cycling caused by grazing can promote the spread of invasive species, which then degrade native bird habitats by altering fire and disturbance regimes (Rotenberry 1998). Sagebrush systems are particularly sensitive to grazing disturbance (Mack and Thompson 1982).

In the Snake River Basalts, factors that contribute to this problem include the lack of Allotment Management Plans (AMPs), insufficient funds for federal land management agency oversight, and insufficient monitoring (i.e., lack of appropriate rangeland health assessment monitoring data gathered annually on a consistent basis to support trend analysis). Consequently, some management decisions are compromised by a lack of appropriate data.

Objective	Strategy	Action(s)	Target SGCNs
Manage livestock to maintain rangeland health and habitat quality (Otter 2012).	Manage the timing, intensity, duration, and frequency of grazing practices to manipulate vegetative condition (Otter 2012).	Prioritize permit renewals and land health assessments for allotments with declining Sage-Grouse populations (Otter 2012). Inform affected permittees and landowners regarding Sage-Grouse habitat needs and conservation measures (Idaho Sage-grouse Advisory Committee 2006). Incorporate GRSG Seasonal Habitat Objectives (Table 2-2 in BLM 2015) into relevant resource management plans and projects. Use the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015) with an appropriate sampling design to conduct fine-scale habitat assessments to inform grazing management. Undertake adaptive management changes related to existing grazing permits when improper grazing is determined to be the causal factor in not meeting habitat objectives (Otter 2012).	Greater Sage-Grouse Long-billed Curlew Monarch
	Maintain MOU between ISDA and BLM as it pertains to grazing management.	Involve permittees in providing monitoring information, the interpretation of monitoring data, and providing input into grazing management adjustments to meet the goals and objectives of federal land management agencies and the permittees (Sanders 2006).	
Assess the impacts (both negative and, potentially, positive) of livestock grazing on sagebrush-steppe obligate passerines (Rotenberry 1998).	Design experiments involving a variety of alternative grazing treatments (including no grazing at all) across the spectrum of	Implement grazing alternatives based on project outcome. Conduct experiments over multiple years (Rotenberry 1998). Work with the University of Idaho to consider adding a sagebrush-obligate passerine component to its long-term study of the impacts of spring grazing on Sage-Grouse.	Sage Thrasher Sagebrush Sparrow

Objective	Strategy	Action(s)	Target SGCNs
	major shrubsteppe habitat (Rotenberry 1998).		
Maintain or enhance wildlife values on working ranches.	Develop partnerships that help keep sustainable grazing the prevailing land use (Krausman et al. 2009).	Work with NRCS and local Soil and Water Conservation Districts to provide technical assistance to private landowner/grazers and collaborate on habitat improvement projects to improve private lands for wildlife. Work with local Soil and Water Conservation Districts to get fish, wildlife, and habitat priorities incorporated into District priorities.	Greater Sage-Grouse Long-billed Curlew
Support the continued responsible use of federal lands for grazing to maintain open spaces and important habitat conditions (e.g., year-round water sources) that benefit wildlife (WGA Policy Resolution 2015-03).	Implement Western Governors' Association (WGA) policy for public lands grazing (for details, see WGA Policy Resolution 2015-03).	Use sound, science-based management decisions for federal lands and base these decisions upon flexible policies that take into account local ecological conditions and state planning decisions.	Greater Sage-Grouse Long-billed Curlew
Create range status assessments to determine preseason range readiness.	Implement large-scale experimental 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 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).	Greater Sage-Grouse

Species designation, planning & monitoring

We have an inadequate understanding of the current population status of several Hymenopteran (*Bombus huntii*, *Bombus morrisoni*, *Hoplitis producta subgracilis*), Coleopteran (*Agrilus pubifrons*, *Chrysobothris idahoensis*, *Judolia gaurotoides*), and Orthopteran (*Acrolophitus pulchellus*) insect species associated with sagebrush steppe in the Snake River Basalts. The status

of their populations and their life histories have not been fully documented or updated. To better understand these species and their habitat needs, surveys of historic sites are needed to determine occupancy and also provide a template for other potentially suitable habitat to survey to add to the knowledge of their distribution.

Objective	Strategy	Action(s)	Target SGCNs
Determine the status of the historic populations of several sagebrush-associated SGCN species.	Conduct surveys throughout the section, prioritized by SGCN tier and specific microhabitat association.	Conduct yellow pan trap and sweep surveys for *Agrilus pubifrons*, *Bombus huntii*, *Bombus morrisoni*, *Chrysobothris idahoensis*, *Hoplitis producta subgracilis*. Conduct surveys for *Acrolophitus pulchellus* in suitable habitats in the Little and Big Lost drainages. Attempt to survey for *Judolia gaurotoides* using Lindgren Funnels, purple sticky traps and flower sweeps. Assess collection records for these species in nondigitized regional collections. Examine the distribution of *Melanoplus* and assess species distribution and interspecies relatedness. Examine the distribution and habitat use of bat species associated with sagebrush steppe.	*Acrolophitus pulchellus* *Agrilus pubifrons* *Bombus huntii* *Bombus morrisoni* *Chrysobothris idahoensis* *Hoplitis producta subgracilis* *Judolia gaurotoides* Monarch *Melanoplus* Species Group Western Small-footed Myotis Little Brown Myotis Townsend's Big-eared Bat Hoary Bat

Target: Managed Perennial Grasslands

Sharp-tailed Grouse on CRP in the Rockland Valley, Idaho, 2010 IDFG

CRP and SAFE are working lands conservation programs administered by the US Department of Agriculture (USDA) Farm Service Agency (FSA), which convert eligible croplands to permanent vegetation. In Idaho, these programs converted predominantly dryland wheat land to a mixture of perennial grasses and forbs. Both programs are limited and administered on a county basis. CRP acres are limited in each county to 20% of the arable land. Within the Snake River Basalts, only one county has reached maximum acres enrolled as of 2015. There are currently (as of 2015)168,760 acres

enrolled in CRP within the Snake River Basalts, of which 59,308 acres are considered high quality (CRP-SAFE: native grass mix, forb heavy mix, pollinator mix).

The Federal Farm Bill must be reauthorized every five years by Congress. The 2014 Farm Bill required a 39% reduction in CRP from the 2002 limit to 9.7 million hectares (24 million acres) nationwide by 2017. Hoffman and Thomas (2007) suggest the possible loss of CRP lands is the single most important immediate threat to Sharp-tailed grouse (STG; *Tympanuchus phasianellus columbianus*) in Idaho and across the subspecies' range (Excerpt, Idaho Department of Fish and Game 2015).

Target Viability

Good. The Managed Perennial Grasslands habitat target is in "Good" condition across the section based on 3 Key Ecological Attributes: Abundance and patch size of CRP and SAFE stands, vegetative condition of the stands, and presence of desired indicator species. Power County has reached its maximum allowed acres under CRP but this county is split between the Overthrust Mountains and the Snake River Basalts. A decline in the acreages within the section in Power County may not necessarily result in a negative net impact to the target SGCN if those acres were merely moved to another county. In that case, the benefits of the target habitat are still available to the SGCNs. Loss of acres within these counties due to Federal cuts would negatively impact the target SGCNs. Cassia and Twin Falls counties are a large presence in the section but have a much greater portion of their arable land under irrigation. Because this increases the monetary value of that land, much less of it is enrolled in CRP and SAFE. There is little likelihood that will ever change. The current number of acres enrolled is rated as "Good." The average block size of CRP within the section is 22 hectares (55 acres) which is considered "Fair." Weed control is required as part of the CRP contract so invasive species are not a significant problem. Because of this regulatory control, invasive plant species are rated as in "Good" condition. Increased emphasis on native species (grasses, forbs and shrubs) is improving the value of the stands for wildlife and has been rated as "Fair." Finally, the presence of Sharp-tailed Grouse is being evaluated and will be rated when data are analyzed. The future of the program will be dependent on renewal of the Federal Farm Bill.

Spotlight Species of Greatest Conservation Need: Sharp-tailed Grouse

The Sharp-tailed Grouse is one of seven subspecies (one extinct) of Sharp-tailed Grouse in North America (Connelly et al. 1998). Of the six extant subspecies of Sharp-tailed Grouse, the CSTG has experienced the greatest decline in distribution and abundance (Hamerstrom and Hamerstrom 1961, Miller and Graul 1980). CSTG have been petitioned twice (1995 and 2004) for listing under the Endangered Species Act. Under both petitions, the finding was CSTG were not warranted (US Department of the Interior 2000, 2006). Idaho supports ~60-65% of the remaining CSTG in the United States (Hoffman and Thomas 2007).

CSTG appear to have benefitted more from CRP than any other prairie grouse (Rodgers and Hoffman 2005) and are closely linked to the success of the CRP and SAFE programs (Mallett 2000). Since its inception in 1985, CRP has provided many thousand acres of nesting and brood-rearing habitat on private lands in Idaho, resulting in an apparent increase in CSTG populations (Excerpt, Idaho Department of Fish and Game 2015).

Prioritized Threats and Strategies for Managed Perennial Grasslands

High rated threats to Managed Perennial Grasslands in the Snake River Basalts

Changes in precipitation patterns

Intensified drought and climate change are drivers in creating conditions that lead to larger, more intense and more frequent wildfires. Fire is often used as a tool for improving CRP and SAFE fields. Fire removes excessive vegetation and stimulates growth. However, some fields have been enrolled long enough that sagebrush is encroaching with an appropriate understory. With SAFE contracts, shrub establishment is a component of the restoration plan and wildfire would be detrimental to program objectives. In these instances, wildfire can reverse an appropriate habitat trend. In addition, reduced precipitation degrades the condition of the current CRP plantings, thereby reducing the habitat value, and reduces the likelihood of successful new seedings.

Objective	Strategy	Action(s)	Target SGCNs
Reduce the chance of wildfire affecting CRP and SAFE fields.	Develop appropriate fire suppression plans.	Work with NRCS, private landowners, and neighboring Federal land managers to reduce vulnerability of CRP acres to wildfire.	Greater Sage-Grouse Sharp-tailed Grouse

Conversion of CRP & SAFE acreage when withdrawn from programs

Although there have been recent general enrollment opportunities, the total number of CRP acres in Idaho has declined. This is because high grain prices have encouraged producers to remove acres from the program, and the 2008 and 2014 Congressional reductions in the number of acres that could be enrolled. SAFE acres have helped to mitigate the loss of CRP acres. Although CRP and SAFE efforts have enhanced habitat for grouse and other SGCNs, they are not permanent solutions. CRP and SAFE contracts are active for 10 years and a landowner has the option to buy-out of their contract earlier with a penalty. Often these acres are converted back to agricultural production or rangeland after they are withdrawn which reduces the habitat value for wildlife. The Natural Resource Conservation Service (NRCS) is exploring options to use their conservation programs to preserve the benefits of CRP and SAFE after the contracts expire. This effort would strive to keep expired CRP and SAFE lands in a grass-based system. To date, success has been limited due to high agricultural commodity prices and incentives within the commodity title of the Farm Bill to put expired land back into agricultural production (Excerpt, Idaho Department of Fish and Game 2015).

Objective	Strategy	Action(s)	Target SGCNs
Reduce the number of acres being withdrawn from CRP and SAFE.	Support legislation to renew CRP in future Farm Bills.	Work with NRCS, FSA, and the Idaho Congressional delegation to ensure renewal (and expansion) of CRP.	Greater Sage-Grouse Sharp-tailed Grouse Grasshopper Sparrow
	Support legislation that provides a financial incentive to stay in the programs.	Work with NRCS, FSA, and the Idaho Congressional delegation to ensure that CRP and SAFE payments are high enough to entice landowners to keep their land in the programs.	

Objective	Strategy	Action(s)	Target SGCNs
	Support legislation that establishes contracts longer than 10 years.		
Influence the land use of acres removed from CRP and SAFE so that wildlife values are protected.	Provide financial incentives to leave acres in perennial grasses. Develop alternative uses for retired CRP and SAFE acres that benefit wildlife.	Work with FSA and other agencies and organizations to develop cost-share programs and alternative uses for acres no longer in CRP. Work with FSA and NRCS to develop and promote land uses that provide income for landowners and habitat value for wildlife.	Greater Sage-Grouse Sharp-tailed Grouse Grasshopper Sparrow

Target: Sparsely Vegetated Dune Scrub & Grassland

This target includes sparsely vegetated dune and grassland systems including the St. Anthony Dunes, Walcott Dunes, Deitrich Dunes, and other unnamed scattered dune complexes in the section. The landscape around these complexes is made up of a mix of cultivated lands and sagebrush steppe or annual grass-dominated uplands. Dunes create habitats not found anywhere else in Idaho and are occupied by several endemic invertebrates.

Early to mid-seral sand dune habitat in the Snake River Basalts. Walcott Dunes, Idaho © 2014 Ross Winton

Target Viability

Fair. Dune habitat condition is fair. This area has large areas dominated by cheatgrass and other invasive annuals. Nevertheless, the presence of unique sand dune habitat make this an important biodiverse area. In recent decades there has been substantial loss of sand-dominated habitats in the Snake River Basalts Section, with much of the remaining habitat being dominated by invasive plants.

Spotlight Species of Greatest Conservation Need: Idaho Dunes Tiger Beetle

Idaho Dunes Tiger Beetle (*Cicindela arenicola*) is found in intact early and mid-seral sand-dominated habitats in south-central and eastern Idaho. Habitat suitability is affected by nonnative vegetation encroachment (e.g., cheatgrass, prickly Russian thistle [*Kali tragus*], and tall tumblemustard [*Sisymbrium altissimum* L.] and nonnative grasses [*Agropyron cristatum* and *Agropyron fragile*]) (Anderson 1992, Bauer 1996, Bosworth et al. 2010) and changing precipitation patterns crucial to spring emergence and reproduction. This species of ground beetle is a sand-obligate species that requires healthy early-seral dune habitats and open sand. Habitat loss is a significant threat to the persistence of the species and efforts to reestablish stabilized dunes and protect currently open early seral habitat should be a priority.

Prioritized Threats and Strategies for Sparsely Vegetated Dune Scrub & Grassland

Very High rated threats to Sparsely Vegetated Dune Scrub & Grassland in the Snake River Basalts

Invasive plant species

Mitigating the loss of unstabilized sand-dominated habitat as a result of invasive plant species is the highest priority for this target. Vegetation encroachment and succession, while a natural process, is increased in systems becoming over-colonized by invasive species. Idaho Dunes Tiger Beetle, An Ant-like Flower Beetle (*Amblyderus owyhee*), Wiest's Primrose Sphinx, and a wide variety of other sand-associated fauna are dependent on early to mid-successional habitats with active moving sand. The effects of encroaching invasive weeds on Idaho sand-associated species has been well documented for several decades.

Objective	Strategy	Action(s)	Target SGCNs
Remove invasive weeds from early and mid-seral habitats and reduce spread from adjacent areas.	Test the effectiveness of best available annual-grass-mitigating actions.	Conduct trials using prescribed fire, Imazapic (a selective herbicide), and when released, annual grass biopesticides.	Idaho Dunes Tiger Beetle An Ant-like Flower Beetle (*Amblyderus Owyhee*) Wiest's Primrose Sphinx Moth
Determine potential impacts of cheatgrass treatment herbicides on tiger beetle viability.	Where appropriate, assess the exposure to herbicides and evaluate potential impacts on beetle populations.	Conduct bioassays of intended treatment herbicides on endemic invertebrates occupying sand-dominated systems in southern Idaho.	Idaho Dunes Tiger Beetle

High rated threats to Sparsely Vegetated Dune Scrub & Grassland in the Snake River Basalts

Introduction, maintenance & spread of crested wheatgrass

Many historic sand-dominated habitats have been seeded over in recent decades either through intentional means (Idaho State Conservation Effort 1996) or as a part of reseeding efforts after wildlife where dunes habitat and sagebrush steppe are often indistinguishable. This practice has been documented primarily in south-central Idaho in an attempt to convert dune systems into agricultural lands. Care should be taken when reseeding with nonnative perennial species as sand-dominated systems can become permanently stabilized and habitat can be directly or indirectly lost through the source sand on which they depend. In some cases, the fires that cause significant losses to sagebrush-steppe habitats actually encourage the reestablishment of dormant dune systems.

Objective	Strategy	Action(s)	Target SGCNs
Develop restoration strategies that identify sand-dominated habitats in fire prone areas and ensure that they are not permanently stabilized.	Identify sand-dominated sites, e.g., those in Makela 1994.	Incorporate sand-dominated habitats into fire restoration strategies in southern Idaho, and attempt to retain them on the landscape. Develop a list of suitable native species for reseeding that would not significantly alter sand systems, such as Indian ricegrass or yellow wildrye (*Leymus flavescens* [Scribn. & J.G. Sm.] Pilg.).	Idaho Dunes Tiger Beetle

Species designation, planning & monitoring

We have an inadequate understanding of the current population status of Idaho Dunes Tiger Beetle. Regular status assessments of occupied and recently-colonized habitats are important as the effectiveness of management actions continues to be evaluated. Likewise, the status of the populations of Wiest's Primrose Sphinx Moth, An Ant-like Flower Beetle (*Amblyderus owyhee*), A Miner Bee (*Calliopsis barri*), and A Leafcutting Bee (*Ashmeadiella sculleni*) and their life histories have not been fully documented or updated. To better understand these species and their habitat needs, surveys of historic sites are needed.

Objective	Strategy	Action(s)	Target SGCNs
Monitor the status of Idaho Dunes Tiger Beetle populations.	Conduct regular monitoring of occupied, historic, and potentially recent colonization sites at St. Anthony, Dietrich Dunes, Walcott Dunes, and other suitable and historic localities.	Conduct a population survey of adults and larvae at all historic, current, and potential sites every 2–3 years to determine status and effectiveness of treatments when and where they are conducted. Explore the potential for translocation of gravid or recently-emerged adults from core habitat areas to locations where extirpation has occurred.	Idaho Dunes Tiger Beetle
Determine the status of the historic populations of several sand-associated	Conduct surveys in Lincoln, Jerome, Minidoka, Power, Blaine, Butte, Bingham, Bonneville,	Conduct light-trap surveys in the summer to survey for *Amblyderus owyhee*. Conduct yellow pan trap and sweep surveys for *Calliopsis barri*, and *Ashmeadiella sculleni*. Conduct night evening primrose surveys for *Euproserpinus wiesti* attendance. Assess	*Amblyderus owyhee* Wiest's Primrose Sphinx Moth *Calliopsis barri* *Ashmeadiella*

Objective	Strategy	Action(s)	Target SGCNs
SGCN species.	Jefferson, Madison, Freemont, and Clark counties.	collection records for these species in nondigitized regional collections.	*sculleni*

Target: Riverine–Riparian Forest & Shrubland

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

Little Wood River north of Richland, Idaho © 2014 Ross Winton

The Snake River Basalts Riverine–Riparian Forest & Shrubland target is dominated by the Snake River system which runs the length of the ecoregion and is comprised of: the South Fork, Henrys Fork, and Main Snake River. Most other rivers and streams are tributaries to this main artery. The

most important tributaries are: Teton River, Big Wood River, Little Wood River, and Raft River. Camas Creek flows into a closed basin. Within the Snake River Basalts, the Henrys Fork begins north of Chester, Idaho and extends to the confluence with the South Fork near Menan, Idaho. The Henrys Fork has significant riparian/wetland areas associated with numerous sloughs along its length. Two WMAs, Chester Segment of Sand Creek WMA and Cartier WMA, protect some of these resources, and BLM owns significant property along the river including some of the larger islands. Farming and rural housing developments occur to river's edge in many places. There are three irrigation diversions and one irrigation/hydropower diversion. Teton River joins the Henrys Fork just west of Sugar City, Idaho. Teton Regional Land Trust has been active in conserving lands within the Chester area. Much of the river bank in that area is under conservation easement to preclude further development.

The upper Teton River includes Teton Basin from Driggs, Idaho north and west. This section of the river is slow with meandering oxbows. It is mostly private, but again, the Teton Regional Land Trust has been active in this area with conservation easements and restoration projects to conserve and restore this river stretch. The Teton River flows through a canyon section of largely public property beginning several miles north of Highway 33. Beginning downstream of Bitch Creek, the river is heavily impacted both instream and on adjacent sidehills, by the flooding and failure of Teton Dam in 1975. Sediment slumping and rockslides from the hillsides have altered river function by creating new rapids and broad shallow pools. This is most obvious at the dam site. Recovery has been slow and full recovery isn't expected without intervention. Below the dam, the river runs through 100% private land. It is farmed to river's edge in many locations, but rural housing developments are few. Both the Teton River and the Henrys Fork are subject to flooding during wet years. Recharge of adjacent wetlands, channel movement, and other ecological functions occur at these times. Because of the low gradient of these rivers, the floodplain is extensive.

The South Fork of the Snake River flows 66 miles (11 miles of which are in the Snake River Basalts Section) across eastern Idaho from the outlet of the Palisades Reservoir to the confluence with the Henrys Fork River near Rexburg, Idaho. The South Fork Snake supports the largest cottonwood riparian forest left in the western United States (BLM 2010). Common plant community types on established flood plains along the South Fork include narrowleaf cottonwood/red osier dogwood (*Populus angustifolia/Cornus sericea*), narrowleaf cottonwood/silverberry (*P. angustifolia/Elaeagnus commutata*), and narrowleaf cottonwood/goldenaster (*P. angustifolia/ Heterotheca villosa*). Wetter, more recently disturbed riparian sites, are frequently represented by the presence of narrowleaf cottonwood seedlings/saplings, reed canarygrass (*Phalaris arundinacea*) water birch (*Betula occidentalis*), sandbar willow (*Salix exigua*), and yellow willow (*Salix eriocephala*). On drier sites, particularly outside of the levy along the lower South Fork Snake (below Heise), Rocky Mountain juniper, Canada goldenrod (*Solidago canadensis*), skunkbush sumac (*Rhus tilobata*), and licorice root (*Glycyrrhiza lepidota*) are common understory components (Merigliano 1996).

The Deer Parks area of the Main Snake River lies just downstream from the confluence of the Henrys Fork and the South Fork Snake rivers. Forested riparian habitat of the Deer Parks area of the Main Snake River has similar plant species composition to that found along the South Fork Snake. However, large monotypic stands of sandbar willow are common and the forest patches

are generally less extensive. Land ownership along the Deer Parks reach of the Snake River is primarily BLM with scattered private parcels. From Roberts to Idaho Falls, the cottonwood and riparian forests along the Main Snake are almost completely absent, reduced to a narrow band at water's edge. Scattered islands, some private, some owned by BLM, provide remnant habitat. However, these are often highly disturbed sites. Farmed fields extend to the banks of the river and subdivisions are expanding along the banks. There are two irrigation diversions and two hydropower diversions in this reach.

Between Idaho Falls and Blackfoot, the Main Snake River flows largely through private lands. Much of the river is farmed or grazed to high water's edge. Between Firth and Blackfoot, there are increasing acres of cottonwood riparian forest, some owned by BLM but mostly privately owned. Remnant cottonwood forests are highly fragmented and disturbed and several are platted for subdivisions. Numerous residences have been built within the 50-100 year flood plain and the river is highly constrained to its present location.

Interior forested riparian communities along the Main Snake River from Blackfoot, Idaho to American Falls Reservoir are characterized by a narrowleaf cottonwood overstory with scattered box elder (*Acer negundo*). The forest mid-story is variably comprised of Russian olive (*Elaeagnus angustifolia*), Rocky Mountain juniper, and willow species. Common understory shrubs include skunkbush, gooseberry (*Ribes* spp.), and snowberry (*Symphoricarpos* spp.). Plant communities along the river banks are variably comprised of narrowleaf cottonwood, willow, and scattered red-osier dogwood. Dominant herbaceous vegetation at drier riparian sites includes western wheatgrass with patches of cheatgrass, rush (*Juncos* spp.), and licorice root. Herbaceous vegetation at wetter sites consists of quackgrass (*Agropyron repens*), timothy (*Phleum* spp.), Kentucky bluegrass (*Poa pratensis*), scattered sedge (*Carex* spp.) and rush, and various mesic forbs (BLM 2009).

Below American Falls Dam, the river changes dramatically. The riparian area is a narrow band as the river moves through rangeland and farm fields. Cottonwood forests are absent, although they existed historically, and basalt constrains the river in places. Minidoka NWR is part of this river reach and offers protection for wildlife species. From Milner Dam to Hansen Bridge, the Main Snake River runs through private land. Even the islands in this stretch are privately owned. This section is the beginning of a deepening canyon stretch where agriculture is eventually confined to the rim and does not reach the river. During the irrigation season, over half of the water is diverted at Milner Dam for irrigation. From Hansen Bridge to Shoshone Falls, there is significant BLM property and the river remains constrained in basalts. Twin Falls Hydropower project is in this section, further changing hydrology. Shoshone Falls is a major landmark and historic obstacle to fish dispersal upstream and has often been used as a dividing line between western and eastern species within the Great Basin.

Target Viability

Fair to *Good.* Within the Snake River Basalts, the Snake River system is impounded by four major dams that significantly change the hydrograph (Island Park, Palisades, American Falls, and Lake Walcott). Numerous smaller dams, largely for irrigation diversion or hydropower generation, also form impediments to water flow and animal movements. There may be hundreds of irrigation

diversions between Palisades and Island Park reservoirs and Twin Falls near the western edge of the ecoregion.

Riparian habitats associated with riverine systems, particularly cottonwood forests, are at risk and require conservation action. Long-term viability is questionable because flood control projects have changed the hydrograph. Riparian areas seldom receive flows high enough to cause the scouring needed to expose bare mineral soil for cottonwood regeneration. Constrained flows also reduce the ability of the rivers to develop natural channels.

Spotlight Species of Greatest Conservation Need: Yellow-billed Cuckoo

In Idaho, Yellow-billed Cuckoo occurs most frequently in low-elevation cottonwood forests (Groves et al. 1997a, Taylor 2000, Idaho CDC 2005) with thick willow dominated understories (Laymon et al. 1993). Sites with 80 ha or greater of intact mature cottonwood forest are highly likely to be occupied by this species (Laymon 1998). Sites with flowing water also increase the likelihood of occupancy because of an increase in prey base and cooler temperatures, which provide optimal conditions for nesting (Johnson 2014). Invasive species and other factors that cause a degradation of habitat are major threats to Yellow-billed Cuckoo (Saab 1999, Johnson 2013). The South Fork and mainstem of the Snake River comprise stronghold habitat for the federally listed, western distinct population segment of Yellow-billed Cuckoo (Reynolds and Hinckley 2005).

Spotlight Species of Greatest Conservation Need: Snake River Physa

This aquatic snail is endemic to Idaho, occurring in a limited reach of the middle Snake River. The historic range is thought to extend from the Hagerman reach to Grandview. Recent investigations have shown this species to occur outside of this historic range to as far downstream as Ontario, Oregon and as far upstream as Minidoka Dam. Fewer than 50 individuals are thought to have been collected from the Snake River (US Fish and Wildlife Service 1995). No live individuals have been found in recent years and the current status of populations is unknown. It occupies swift currents on a variety of substrates, but little is known of its biology or true distribution in the Snake River.

Prioritized Threats and Strategies for Riverine–Riparian Forest & Shrubland

High rated threats to Riverine–Riparian Forest & Shrubland in the Snake River Basalts

Dams & water diversions

Flooding and the associated scouring and sediment changes are critical for many river systems. Flooding recharges riverside wetlands, creates favorable seedbeds for some species, and redistributes fine and coarse materials. High flows also establish new channels, create oxbows, and keep low gradient rivers moving within their floodplain. Dams and water diversions change the hydrograph of a river. Periods of flooding may be shortened or stopped completely.

Discharges from dams can come at unusual times and can be restricted during critical periods for wildlife. Rivers are no longer allowed to move within their floodplains.

Objective	Strategy	Action(s)	Target SGCNs
Improve recharge to the rivers and associated wetlands.	Support aquifer recharge.	Actively participate in efforts to increase appropriate aquifer recharge efforts that will benefit fish and wildlife resources.	Yellow-billed Cuckoo Snake River Physa Bliss Rapid Snail California Floater A Caddisfly (*Glossoma idaho*) Silver-haired Bat Western Ridged Mussel A Mayfly (*Parameletus columbia*) Western Pearlshell Snake River Pilose Crayfish
Improve compliance with water use.	Idaho Department of Water Resources (IDWR) and water masters evaluate adjudication and enforce rules.	Encourage water masters to resolve conflicts quickly.	Yellow-billed Cuckoo Snake River Physa Bliss Rapid Snail California Floater A Caddisfly (*Glossoma idaho*) Silver-haired Bat Western Ridged Mussel A Mayfly (*Parameletus columbiae*) Western Pearlshell Snake River Pilose Crayfish
Improve hydrograph to better mimic natural variation.	Work with Bureau of Reclamation (BOR) to find ways to reshape flows.	Maintain appropriate winter flows to minimize impacts to aquatic species. Build in periods of high flows annually to mimic spring runoff. Seek opportunities to create flows that can periodically mimic a 25-year event.	Yellow-billed Cuckoo Snake River Physa Bliss Rapid Snail California Floater A Caddisfly (*Glossoma idaho*) Silver-haired Bat Western Ridged Mussel A Mayfly (*Parameletus columbiae*) Western Pearlshell Snake River Pilose Crayfish
Reduce the trend in cottonwood forest loss.	Work with landowners to protect remaining cottonwood forest.	Support efforts to use LWCF funds to acquire an interest in cottonwood forest areas. Educate landowners/managers about the values of cottonwood forests and work with landowners to restore cottonwood forests when possible. Work with county Planning and Zoning to discourage subdivision development within floodplains and particularly within cottonwood forests.	Yellow-billed Cuckoo Silver-haired Bat

Improper livestock grazing

Livestock seek out wetlands for forage and for shade. When livestock grazing is uncontrolled, livestock use within the riparian/wetland areas may become excessive. Too much vegetation may be removed or trampled, undercut banks may collapse, sediment increases, and the water course shallows. As a result, water temperatures increase, sometimes dramatically.

Objective	Strategy	Action(s)	Target SGCNs
Improve wetland habitats impacted by grazing.	Control livestock grazing in sensitive riparian areas.	Create exclusion fencing along aquatic areas.	Yellow-billed Cuckoo Snake River Physa Bliss Rapid Snail California Floater A Caddisfly (*Glossoma idaho*) Silver-haired Bat Western Ridged Mussel A Mayfly (*Parameletus columbiae*) Western Pearlshell Snake River Pilose Crayfish
	Encourage livestock managers to take proactive steps to reduce the amount of time livestock spend in riparian areas.	Encourage salting at least ¼ mile away from riparian/wetland areas where possible.	Yellow-billed Cuckoo Snake River Physa Bliss Rapid Snail California Floater A Caddisfly (*Glossoma idaho*) Silver-haired Bat Western Ridged Mussel A Mayfly (*Parameletus columbiae*) Western Pearlshell Snake River Pilose Crayfish
Improve riparian vegetation.	Reduce livestock use of woody plants.	Encourage managers to restrict riparian use during the autumn months when livestock are more likely to browse on shrubs.	Yellow-billed Cuckoo Silver-haired Bat Western Grebe Clark's Grebe

Rural housing development

Rural housing development is increasing along most river corridors. Cottonwood forests are particularly attractive for development. Development not only fragments habitat but also impacts floodplain functions. Once development occurs, flood control in several forms is required to protect the infrastructure. Cottonwood forests and associated riparian/wetland areas can be expected to decline and eventually disappear with continued development.

Objective	Strategy	Action(s)	Target SGCNs
Reduce the trend in cottonwood forest loss.	Work with landowners to protect remaining cottonwood forest.	Support efforts to use LWCF funds to acquire an interest in cottonwood forest areas. Educate landowners/managers about the values of cottonwood forests. Work with landowners to restore cottonwood forests when possible. Work with county Planning and Zoning to	Yellow-billed Cuckoo Silver-haired Bat

Objective	Strategy	Action(s)	Target SGCNs
		discourage subdivision development within floodplains and particularly within cottonwood forests. Work with Land Trusts to protect relatively intact areas. Work with landowners to reduce fragmentation impacts from vehicles and noxious weeds.	
Restore riverbanks to native vegetation.	Work with private landowners to restore select areas.	Work with NRCS to develop/promote incentives and programs to restore riverine habitats.	Yellow-billed Cuckoo Silver-haired Bat Clark's Grebe Western Grebe

Groundwater withdrawal for agricultural & urban use

In recent decades, agricultural irrigation practices have been transitioning from traditional surface water diversion and transport to direct on-site groundwater pumping. In certain parts of the Snake River Basalts, this over-utilization of water withdrawn from the aquifer has led to a lowering of the water table which has caused many streams, and in some cases rivers, to lower significantly or disappear altogether. In addition, wells removing water for large urban areas also lowers the water table and causes normally standing water to more rapidly percolate through underlying substrates.

Objective	Strategy	Action(s)	Target SGCNs
Find alternative water use techniques that minimize water consumption while allowing more water to persist in rivers and streams.	Work with land and water managers to identify opportunities for increasing the availability or decreasing utilization of water resources.	Work with partners and agencies to encourage aquifer recharge to revitalize ground water resources. Reduce use and increase regulation of ground water resources.	Yellow-billed Cuckoo
Work with IDWR to determine criteria that establish suitable periods for recharge.	Create a balance between winter/ spring high flows and the need to maintain water in rivers and streams for wildlife year-round.	Recharge aquifer during periods of excess while not taxing aquatic systems during sensitive periods.	Yellow-billed Cuckoo Snake River Physa Bliss Rapid Snail California Floater A Caddisfly (Glossoma idaho) Silver-haired Bat Western Ridged Mussel A Mayfly (*Parameletus columbiae*) Western Pearlshell Snake River Pilose Crayfish

Target: Depressional Wetlands

Vernal pools, playas, old oxbows, or meanders that are disconnected from river floodplains (often supporting swamp forests or emergent marshes), and many constructed wetlands (with emergent marsh and aquatic bed habitats) are common examples of Depressional Wetlands. Elevation contours are closed, thus allowing the accumulation of surface water from adjacent uplands. The direction of flow is normally from the surrounding uplands toward the center of the depressional wetland. Dominant hydrodynamics are seasonal vertical fluctuations. Depressional Wetlands lose water through intermittent or perennial drainage from an outlet, by evapotranspiration, or infiltration to ground water.

Emergent marshes, typically supporting tall plants such as broadleaf cattail (*Typha latifolia L.*) and hardstem bulrush (*Schoenoplectus acutus* [Muhl. ex Bigelow] Á. Löve & D. Löve), occur throughout the Snake River Basalts and are important for breeding and migratory waterbirds, as well as amphibians. They most frequently occur in agricultural and urban landscapes where they occupy created and managed wetlands and pond fringes. Examples include wildlife habitat wetlands on Idaho Department of Fish and Game (IDFG) WMAs (Mud Lake and Market Lake WMAs) and Camas NWR, gravel mine ponds, urban landscape and rural farm ponds, reservoir fringes, and irrigation and storm-water detention and treatment wetlands. Accumulated water as a result of agricultural practices such as flood-irrigation and low-lying flooded portions of fields are also important depressional features in the Snake River Basalts due to their importance for migrating and breeding waterbirds.

Camas National Wildlife Refuge wetland marshes. Camas NWR, Idaho © 2006 Colleen Moulton

In the Snake River Basalts, shallow open water areas in emergent marshes and on the fringes of reservoirs or ponds support beds of submerged and floating aquatic vegetation, which are important food sources for migratory waterfowl. Emergent marshes with seasonal drawdown periods, such as at the many managed marshes, often have mudflats, which are important for shorebirds. Playas also occur in closed topographic depressions such as craters and intermixed among tube and other lava features. Playas are intermittently and unpredictably flooded and typically have alkaline water and evaporative salt deposits (though not always). These playas offer important resting and feeding stations for migratory waterfowl, shorebirds, and wading

birds. Locations in the northern portions of the Big Desert (e.g., Big Lake) possess intermittently flooded playas and large alkali flats primarily within the boundaries of the INL site.

Target Viability

Fair. Habitat area has been greatly reduced in many sites. Altered hydrologic regimes and issues with invasive weeds are key threats. Changes in precipitation patterns have also reduced the seasonal presence of standing water in vernal pools and playas.

Spotlight Species of Greatest Conservation Need: White-faced Ibis

There are 6 colonies of White-faced Ibis (*Plegadis chihi*) in Idaho, and two of the largest colonies are located at Market and Mud Lake WMAs. This species requires deep wetland bulrush (*Scirpus* L.) marshes for breeding and shallowly-flooded habitat for foraging, which includes both natural wetlands and flood-irrigated agricultural fields. Loss of flood-irrigated habitats within 20 km of White-faced Ibis breeding colonies threatens the viability of Ibis. Fluctuating water levels in reservoirs is also a significant issue for White-faced Ibis and several other waterbirds species. Historically, White-faced Ibis and other water birds foraged in naturally occurring wetlands, floodplains, and wet meadows. Flood irrigation agriculture closely mimics the historic cycle of spring over-bank flooding of wet meadows in which these birds depend on to forage. Work in the Snake River Basalts Section indicates that White-faced Ibis in particular are highly reliant upon these flood-irrigated habitats (Moulton et al. 2013). However, since 1995, surface-irrigated habitats in the Intermountain West have declined by 23% (123,000 acres/year) while sprinkler-irrigated acres have increased. Currently, there is adequate nesting habitat to support existing or expanded ibis colonies. The limiting factor for maintaining or expanding the population is maintaining abundant foraging habitat.

Prioritized Threats and Strategies for Depressional Wetlands

High rated threats to Depressional Wetlands in the Snake River Basalts

Groundwater withdrawal for agricultural and urban use

In recent decades, agricultural irrigation practices have been transitioning from traditional surface water diversion and transport to direct on-site groundwater pumping. In certain parts of the Snake River Basalts, this overuse of water withdrawn from the aquifer has led to a lowering of the water table which has caused many depressional associated wetlands and marshes to lower or disappear altogether. In addition, wells removing water for large urban areas also lowers the water table and causes normally standing water to more rapidly percolate through underlying substrates.

Objective	Strategy	Action(s)	Target SGCNs
Maintain/restore natural wetlands in the proper functioning condition.	Work with private landowners and land managers to identify opportunities for increasing the availability of natural wetlands.	Work with partners, such as Ducks Unlimited, to identify areas within 20 km of the colonies that were historically classified as natural wetlands and have hydrologic potential for restoration. Work with Land Trusts to determine opportunities for restoration on	White-faced Ibis Sandhill Crane Franklin's Gull Monarch Northern Leopard Frog Western Toad Trumpeter Swan

Objective	Strategy	Action(s)	Target SGCNs
		private lands with high hydrologic potential for restoration. Work with private landowners and federal agencies to identify areas suitable for using beavers to restore wetland habitats.	
	Work with private landowners and managers to identify opportunities for maintaining/ restoring natural wetlands within 20 km of White-faced Ibis breeding colonies.		

Conversion from flood-irrigated agriculture to center-pivot irrigation

Flood-irrigated agricultural lands provide valuable waterbird foraging habitat. In some areas, this habitat component is lost when traditional flood irrigation is replaced by center-pivot irrigation. However, decisions to convert to center pivot are often contingent on overriding needs to improve water-use efficiency to retain stream and river flows. Thus, these decisions involve competing interests of flooded wildlife habitat, in-stream habitat needs of aquatic species, aquifer withdrawals, and aquifer recharge.

Many flood-irrigated habitats (FIH) occur in historic wet meadow and wetland footprints of intermountain valleys and basins. These FIHs, particularly perennial pasture and hayfields in the historic floodplain, serve as surrogate wetlands that largely mimic the historic ecological function of natural flooding in the floodplain. These surrogate wetland functions are particularly manifested when diverted surface water for flood-irrigation originates from snowpack-driven rivers and streams. Although the timing and duration of surface flooding on FIHs varies widely, many reflect annual environmental variation in snowpack and streamflow conditions. The spread of surface water across FIH mimics natural hydrologic processes and contributes to important ecological functions including soil hydration, aquifer recharge, water recycling/circulation, ameliorating stream temperatures through soil saturation and discharge, and increasing persistence of hydric habitats during the growing season.

Over the past 2 decades, an alarming trend in water use conversion has occurred. Since 1995, surface-irrigated habitats in the Intermountain West have declined by 23% (123,000 acres/year) while sprinkler-irrigated acres have increased correspondingly. This conversion may reflect the direct, unidirectional loss of up to 1.85 million acres of potential wetland habitat for wildlife. Sixteen percent of those FIHs have been converted to sprinkler irrigation. Sprinkler irrigation techniques dramatically reduce the amount of standing or flowing surface water on fields, which makes them less attractive as foraging habitat for wetland birds. Aside from the direct loss of habitat to birds and other wildlife, this trend may have negative implications for watershed resiliency that affects fisheries, floodplain fragmentation, and tolerance of climatic variability. Throughout the West, the conversion to sprinkler irrigation has been incentivized through federal programs, including the USDA Farm Bill programs, for perceived water use efficiencies. However, studies have indicated that incentivizing sprinkler conversion may not provide the intended or perceived water savings, economic return, or environmental benefits. Typically, sprinkler irrigation originates as a groundwater withdrawal with virtually no groundwater return or input

while flood irrigation imparts surface withdrawal resulting in a groundwater input. The latter is more representative of historical floodplain hydrologic processes.

Work in eastern Idaho indicates that White-faced Ibis in particular are highly reliant upon these flood-irrigated habitats (Moulton et al. 2013). The loss of these habitats is of highest concern within 20km of breeding colonies, as it threatens the viability of ibis in Idaho.

Objective	Strategy	Action(s)	Target SGCNs
Maintain flood-irrigated agricultural fields.	Work with the NRCS on incentives to maintain flood agriculture. Work with the NRCS on incentives to maintain flood agriculture within 20 km of White-faced Ibis breeding colonies.	Work with NRCS to develop flood irrigation initiatives through the Regional Conservation Partnership Program. Work with NRCS to develop a flood irrigation enhancement for the Conservation Stewardship Program. Work with Ducks Unlimited and other NGOs to conduct habitat projects that encourage retention of flood-irrigation agriculture. Use Habitat Improvement Program funding to leverage funds to encourage retention of flood-irrigation agriculture. Work with FWS to determine if Partners for Wildlife funding may be used to help private landowners wanting to provide flood irrigated lands for wildlife.	White-faced Ibis Monarch
Determine acreage of flood-irrigated habitat needed to sustain healthy breeding populations of White-faced Ibis and other wetland-dependent species.	Work with partners to develop a west-wide assessment of flood-irrigation needs for wildlife.	Work with Pacific Flyway Nongame Technical Committee and Western Working Group of Partners in Flight to develop and implement assessment.	White-faced Ibis Sandhill Crane Franklin's Gull Long-billed Curlew

Target: Springs & Groundwater-Dependent Wetlands

This target contains a subset of groundwater-dependent ecosystems (GDEs), specifically springs and groundwater-dependent slope wetlands (e.g., meadows, seep-fed tree- or shrub-dominated wetlands). Springs are GDEs where groundwater discharges at the ground surface, often through complex subsurface flow paths (Stevens and Meretsky 2008), including both cold and hot (geothermal) springs. Spring-dependent communities of plants and animals often exist where springs emerge. A variety of other wetland types are also dependent on groundwater-fed subsurface flows and seasonal seeps. For our purposes, GDE wetlands include fens; marshes, shrublands, and woodland swamps in sloped settings; wet and mesic meadows; and alkaline-saline wetlands. Groundwater-dependent wetlands often occur on sloping land with gradients

that range from steep hillsides to nearly imperceptible slopes. Slope wetlands differ from Depressional Wetlands by the lack of closed contours. Groundwater sources can originate from either a regional aquifer or from localized infiltration of surface water (e.g., precipitation, seasonal flooding). Water flow is downslope and unidirectional. Groundwater-dependent wetlands lose water primarily by subsurface outflow, surface flows, and evapotranspiration. Groundwater-dependent wetlands may develop channels, but the channels serve only to convey water away from the groundwater-dependent wetland. Definitions are modified from US Forest Service Gen. Tech. Report WO-86a (March 2012) and Brinson et al. (1995).

In the Snake River Basalts, GDE wetlands are important and widespread. Most occurrences of GDEs are in the form of springs and seeps emanating from basalt canyon walls, talus, and toeslopes of bluffs. These include geothermal springs concentrated near Craters of the Moon National Monument and Preserve, but also occurring elsewhere (e.g., along the Snake River). Seasonally-moist sloped seeps are widely scattered throughout the section, perched on basaltic or rhyolitic bedrocks. These form isolated pockets of wet or mesic meadow vegetation within extensive sagebrush steppe and are important for a variety of wildlife, including Greater Sage-Grouse.

Market Lake wetlands and migrating waterfowl, Market Lake WMA, Idaho © 2012 Terry Thomas

Numerous high volume springs fed by the Snake River aquifer emerge from basalt walls and alcoves on the northern side of the Snake River canyon on the western border of the Snake River Basalts section. These springs are highly valued for their high water quality and unique aquatic ecosystems that support a variety of rare species. Housing development, aquaculture, and other developments, water quality impairments, groundwater pumping for irrigation, roads, and water diversion are all threats to this ecosystem.

The Snake River Basalts section supports several large groundwater-dependent wetland complexes in high desert basins, which represent several of the most important wetlands in the state. Important GDE wetlands include Camas NWR, Mud Lake and Market Lake WMAs, and Crystal Springs. They support seasonally- and shallowly-flooded sedge (Carex L. spp.) and rush (Juncus L. spp.) wet meadows and common spikerush (Eleocharis palustris [L.] Roem. & Schult.)

communities. These basins are seasonally flooded by runoff in the spring but sustained by groundwater seepage in the summer. These two characteristics make many of these locations depressional and groundwater dependent wetlands. These wetland complexes support numerous nesting waterbird species, and attract large numbers of migratory waterfowl and shorebirds.

Target Viability

Poor. Habitat area has been greatly reduced in many sites. Lowered water table leads to severely altered hydrologic regimes. These springs and wetlands are also highly susceptible to aquatic and terrestrial weed invasion. Housing development, aquaculture and other developments, water quality impairments, groundwater pumping for irrigation, and water diversion are all threats to this ecosystem.

Spotlight Species of Greatest Conservation Need: Bliss Rapids Snail

The Bliss Rapids Snail is an endemic species that inhabits springs and spring-influenced river reaches. Occupied sites are in flowing water having coarse, stable substrates and excellent water quality. Water temperatures generally range from 15 to 16 °C. This species is typically absent from areas with impoundments and major depth fluctuations, warm-water environments, whitewater, and sites dominated by aquatic macrophytes (Hershler et al. 1994, US Fish and Wildlife Service 1995). This aquatic snail is endemic to the Snake River and associated springs. Historically, this species occurred from Indian Cove Bridge to Twin Falls (Hershler et al. 1994). Populations occur in the lower reaches of the Malad River and in the Snake River between the springs above Hagerman and King Hill (W. Clarke, Idaho Power Company, pers. comm.).

Prioritized Threats and Strategies for Springs & Groundwater-Dependent Wetlands

High rated threats to Springs & Groundwater-Dependent Wetlands in the Snake River Basalts

Groundwater withdrawal for agricultural & urban use

In recent decades, agricultural irrigation practices have been transitioning from traditional surface water diversion and transport to direct on-site groundwater pumping. In certain parts of the Snake River Basalts, this over-utilization of water withdrawn from the aquifer has led to a lowering of the water table, which has caused diminished flows in many Snake River adjacent springs and lowered water levels in many GDEs in the section.

Objective	Strategy	Action(s)	Target SGCNs
Find alternative water use techniques that minimize water consumption while allowing more water to persist in the aquifer and	Work with land and water managers to identify opportunities for increasing the availability or decreasing utilization of	Work with partners and agencies to encourage aquifer recharge to revitalize ground water resources. Reduce use and increase regulation of ground water resources.	Bliss Rapids Snail Deseret Mountainsnail Northern Leopard Frog Western Toad White-faced Ibis Sandhill Crane California Floater A Caddisfly (*Glossosoma idaho*)

Objective	Strategy	Action(s)	Target SGCNs
emerge as springs or wet marshes.	water resources.		Western Ridged Mussel Franklin's Gull Pondsnail (*Stagnicola*) Species Group
Work with IDWR to determine criteria that establish suitable periods for recharge.	Create a balance between winter/ spring high flows and the need to maintain water in rivers and streams for wildlife year-round.	Recharge aquifer during periods of excess while not taxing aquatic systems during sensitive periods.	Snake River Physa Bliss Rapids Snail Deseret Mountainsnail Northern Leopard Frog Western Toad Black Tern Long-billed Curlew American Bittern White-faced Ibis Sandhill Crane California Floater A Caddisfly (*Glossosoma idaho*) Western Ridged Mussel Franklin's Gull Pondsnail (*Stagnicola*) Species Group

Improper livestock grazing

In the context of this target, "improper" is defined as grazing beyond the capacity of the resource in either direction (e.g., overuse such as along riparian areas that need protection; need for seasonal adjustments). Livestock grazing can affect wildlife habitat in many ways (Krausman et al. 2009). For example, changes in water and nutrient cycling caused by grazing can promote the spread of invasive species, which then degrade native bird habitats by altering fire and disturbance regimes (Rotenberry 1998). In the Snake River Basalts, factors that contribute to this problem include the lack of AMPs, insufficient funds for federal land management agency oversight, and insufficient monitoring (i.e., lack of appropriate rangeland health assessment monitoring data gathered annually on a consistent basis to support trend analysis). Consequently, some management decisions are compromised by a lack of appropriate data.

Objective	Strategy	Action(s)	Target SGCNs
Support the continued responsible use of federal lands for grazing to maintain open spaces and important habitat conditions (e.g., year-round water sources) that benefit wildlife (WGA Policy Resolution 2015-03).	Implement WGA policy for public lands grazing (for details, see WGA Policy Resolution 2015-03).	Use sound, science-based management decisions for federal lands and base these decisions upon flexible policies that take into account local ecological conditions and state planning decisions.	Snake River Physa Bliss Rapids Snail Deseret Mountainsnail Northern Leopard Frog Western Toad Black Tern Long-billed Curlew American Bittern White-faced Ibis Sandhill Crane California Floater A Caddisfly (*Glossosoma idaho*) Western Ridged Mussel Franklin's Gull Pondsnail (*Stagnicola*)

Objective	Strategy	Action(s)	Target SGCNs
			Species Group
Improve aquatic habitats impacted by grazing.	Control Livestock grazing in sensitive aquatic areas.	Create exclusion fencing along aquatic areas.	Snake River Physa Bliss Rapids Snail Deseret Mountainsnail Northern Leopard Frog Western Toad Black Tern Long-billed Curlew White-faced Ibis Sandhill Crane California Floater A Caddisfly (*Glossosoma idaho*) Western Ridged Mussel Franklin's Gull Pondsnail (*Stagnicola*) Species Group
	Encourage livestock managers to take proactive steps to reduce the amount of time livestock spend in Riparian areas.	Encourage salting at least ¼ mile away from riparian/wetland areas where possible. Employ riders to move livestock away from sensitive areas.	Snake River Physa Bliss Rapids Snail Deseret Mountainsnail Northern Leopard Frog Western Toad Black Tern Long-billed Curlew White-faced Ibis Sandhill Crane California Floater A Caddisfly (*Glossosoma idaho*) Western Ridged Mussel Franklin's Gull Pondsnail (*Stagnicola*) Species Group
Improve riparian vegetation.	Reduce livestock use of woody plants.	Encourage managers to restrict riparian use during the autumn months when livestock are more likely to browse on shrubs.	Snake River Physa Bliss Rapids Snail Deseret Mountainsnail Northern Leopard Frog Western Toad California Floater A Caddisfly (*Glossosoma idaho*) Western Ridged Mussel Pondsnail (*Stagnicola*) Species Group

Spring development & diversion

In recent decades, the increased need for unallocated water has led to the utilization of spring-fed water sources primarily along the Snake River. These cold and clean water sources are ideal for aquaculture in addition to being easily diverted for other agricultural purposes. Complete development and/or diversion of water from these spring sources causes a loss of habitat and in some cases loss of local endemic rare species.

Objective	Strategy	Action(s)	Target SGCNs
When spring water is allocated for use, allow for a percentage to pass diversions and maintain natural springs and the species that depend on them.	Work with land and water managers to identify opportunities for allocating water for the persistence of spring habitats and associated wildlife species.	Reduce use and increase regulation of ground water resources. Encourage a portion of water resources be allocated for wildlife, rather than overallocation to other uses.	Bliss Rapids Snail Deseret Mountainsnail Northern Leopard Frog Western Toad California Floater A Caddisfly (*Glossosoma idaho*) Western Ridged Mussel Pondsnail (*Stagnicola*) Species Group

Target: Lakes, Ponds & Reservoirs

Mud Lake and riparian fringe, Mud Lake WMA, Idaho © 2013 Terry Thomas

Lacustrine ecosystems (i.e., lakes, ponds, and reservoirs) include aquatic and wetland habitats in permanently- to seasonally-flooded lakes and reservoirs with extensive areas of deep water and often have wave-eroded beach or bedrock shorelines (Cowardin et al. 1979). They are situated in topographic depressions or a dammed river channel with the basin formed along the contour approximating the normal spillway elevation or normal pool elevation; generally lack trees, shrubs, or persistent emergent vegetation; are typically (but not always) >8 ha (20 acres) in area; and have water depths exceeding 2 m (6.6 ft) at low water (Cowardin et al. 1979). The limnetic zone includes all nonvegetated deep water aquatic habitats and the littoral zone includes all wetland habitats (e.g., floating or submerged aquatic vegetation, or sometimes emergent vegetation with low cover) extending from the shoreward boundary to a depth of 2 m (6.6 ft) below low water or to the maximum extent of nonpersistent emergent vegetation if these grow at depths greater than 2 m (e.g., submerged aquatic vegetation). For our purposes, the persistent emergent or aquatic vegetation bordering or forming islands within lakes, deep ponds, and reservoirs (called lacustrine fringe wetlands) are included in emergent marsh or aquatic bed groups.

In the Snake River Basalts, this ecosystem includes all natural lakes and deep ponds, dam-altered naturally formed lakes, and created waterbodies of all sizes that fit the lacustrine

definition. Natural deep water ponds and lakes are rare in the Snake River Basalts section. Several large reservoirs exist that were created primarily for hydroelectric and irrigation water storage (Milner Reservoir, Lake Walcott, American Falls Reservoir and Mud Lake). The shoreline and upper portion of Lake Walcott, American Falls Reservoir, Mud and Market Lakes, and their associated adjacent wetlands and ponds provide habitat for a variety of breeding waterbirds and shorebirds. In addition, numerous smaller reservoirs exist that were primarily created for irrigation water storage. Most of these reservoirs have areas of emergent vegetation and aquatic bed vegetation on their fringes, as well as riparian vegetation on their shores, which can be important for migratory, wintering, and breeding waterfowl and other waterbirds. Stormwater detention ponds, golf course ponds, or other landscaped ponds represent lacustrine habitat in urban areas of the section. In addition, hundreds of small livestock water reservoirs dot the landscape across rural and undeveloped areas of the Snake River Basalts.

Freshwater mudflats are found scattered throughout the temperate regions of the western interior of North America. They form when seasonally flooded, shallow lake and deep marshes dry during summer, when reservoirs are drawn down, or sometimes on river floodplains after spring flows subside. Mudflats may be absent in any one year because of year-to-year variation in water levels, but must be exposed before vegetation can develop from the seedbank. Mudflats range in physiognomy from sparsely-vegetated mud to extensive herbaceous vegetation comprised of low-statured annual plants (both native and nonnative). These are valuable habitats for shorebirds and waterbirds, such as White-faced Ibis, during spring and fall migration. American Falls Reservoir, in particular, provides critical stopover habitat for these species.

Target Viability

Good. Main issues for this system are wildlife-related, e.g., boat wake floods grebe nests, and fluctuations in water levels can result in grebe nests flooding or exposure of island nesting colonies.

Spotlight Species of Greatest Conservation Need: Caspian Tern

In the western interior, Caspian Terns (*Hydroprogne caspia*) generally nest on open, fairly flat islands or islets of lakes, reservoirs, and rivers. In Idaho, this species appears to always nest in mixed-species colonies, particularly colonies with California Gulls (*Larus californicus*). Nests are placed on either bare ground or in shallow scrapes, and lined with pebbles, grasses, mosses, and other vegetation. This species forages over lakes, reservoirs, rivers, and sloughs and preys almost exclusively on fish. Approximately 75 pairs currently breed at Island Park Reservoir in Idaho—this is now the only nesting location in the state. As recently as 2007, this species also nested at Blackfoot, Magic, and Mormon reservoirs, and Bear Lake and Minidoka National Wildlife refuges—in 2015, however, none of these locations were known to support nesting populations of Caspian Terns. Colony surveys conducted in Idaho indicate that the population of breeding adults has declined by 30% in the past 10 years, and the breeding distribution has contracted to a single colony at Island Park Reservoir. Low water levels, particularly in the IDFG Magic Valley Region, are the most significant threat to Caspian Terns in Idaho. Low water levels in nesting reservoirs has resulted in land-bridging at two historic nesting locations. This species appears to have low tolerance to land-bridging and has abandoned these two nesting islands. Caspian Terns are typically at a competitive disadvantage when nesting with other colonial

species, such as California Gulls and American White Pelicans (*Pelecanus erythrorhynchos*). They initiate nesting later than these other colonial species, and may be unable to initiate nesting because of lack of space, or they are subject to high predation pressure from the gulls who are often already feeding chicks. Potentially beneficial management actions include working with water managers to develop and implement water level management guidelines during the breeding season that balance irrigation and wildlife needs, working with land managers to restore or create new nesting locations that will not be subject to low water level concerns in the foreseeable future, minimizing human disturbance of nesting colonies to the extent possible, and creating areas on nesting islands for late breeding initiation.

Prioritized Threats and Strategies for Lakes, Ponds & Reservoirs

High rated threats to Lakes, Ponds & Reservoirs in the Snake River Basalts

Real-time dam operations & water level fluctuations in reservoirs

Wildlife managers typically do not have control over water levels in irrigation reservoirs and canals. Water managers typically do not notify wildlife managers when water releases or holdbacks will occur. Consequently, fluctuating water levels are a significant issue for several waterbird species, including Western Grebe (*Aechmophorus occidentalis*), Clark's Grebe (*Aechmophorus clarkii*), White-faced Ibis, and Franklin's Gull (*Leucophaeus pipixcan*). Most Western and Clark's Grebe colonies are located on reservoirs, or along rivers susceptible to water fluctuations resulting from dam operations. Rapid increase in water levels results in nest flooding, while rapid releases of water results in nests that are no longer accessible to grebes. In addition, the raising of dams to allow for greater reservoir capacity can also have significant short-term and lasting long-term effects on habitat use and productivity of a variety of associated species.

Objective	Strategy	Action(s)	Target SGCNs
Reduce grebe nest failure.	Work with FWS, BOR, and irrigation districts to reduce water level fluctuations during grebe nesting period.	Develop Best Management Practices with BOR for water level management around grebe colonies. Work with FWS to determine opportunities for reducing water level fluctuation issues on Minidoka NWR.	Western Grebe Clark's Grebe
Reduce occurrence of colony failure at Mud Lake WMA.	Maintain water levels during nesting season to minimize nest flooding.	Work with water managers to develop and implement water level management recommendations that reduce nest loss while also meeting irrigation needs.	White-faced Ibis Franklin's Gull
Determine causes of low nesting success and recruitment of Western and Clark's Grebes in Idaho.	Conduct research on existing colonies in Idaho.	Collaborate with FWS on proposed research project.	Western Grebe Clark's Grebe

Drought & water management impacts

Until as recently as 2006, there were eight nesting colonies of Ring-billed Gull (*Larus delawarensis*) and California Gull in Idaho. Six of these were also nesting locations for Caspian Tern (IDFG 2007). Low water levels in nesting reservoirs has resulted in land-bridging at several nesting islands. If gulls attempt to nest at all, land-bridging results in high predation rates on young and adults. Because of land-briding, two nesting colonies are no longer active, and the largest in Idaho (American Falls Reservoir), which is within Snake River Basalts, is declining rapidly from high mortality (IDFG unpublished data). By 2014, only five of these historic colonies were still active, and contained 41% of the 2006 population. To our knowledge, only one new colony has become established, and it is in an unsuitable location (see Owyhee Uplands for more details).

Caspian Terns have mostly disappeared from Idaho, and currently nest reliably in just one location: Island Park Reservoir. This species is highly sensitive to the land-bridging issue, but they are also typically at a competitive disadvantage when nesting with other colonial species, such as gulls and pelicans. They initiate nesting later than these other colonial species, and are therefore either pushed out because of lack of space, or they are subject to high predation pressure from the gulls who are often already feeding chicks. This is of particular concern at Minidoka NWR where Caspian Terns have nested historically, but are no longer present.

Objective	Strategy	Action(s)	Target SGCNs
Increase nesting habitat availability.	Work with land and water managers to identify opportunities at historic and/or new locations.	Work with water managers to develop and implement water level management guidelines during the breeding season that balance irrigation and wildlife needs. Work with land managers, such as FWS, to restore or create new nesting locations that will not be subject to low water level concerns in the foreseeable future.	California Gull Ring-billed Gull Caspian Tern Trumpeter Swan
Reduce impacts of competition with other nesting species on Caspian Terns.	Create areas on nesting islands for late breeding initiation.	Work with FWS, Pacific Region Migratory Birds and Habitat Program, to develop protocol for creating late breeding initiation areas. Work with land managers, such as FWS, to test protocol on a historic Caspian Tern nesting island that has seen recent nesting attempts (e.g., Minidoka NWR).	Caspian Tern

Species designation, planning & monitoring

We have an inadequate understanding of the current population status of *Stagnicola* species associated with this target. To better understand these species and their habitat needs, surveys of historic sites are needed.

Objective	Strategy	Action(s)	Target SGCNs
Monitor the status of cave-associated fauna.	Conduct regular monitoring of occupied, historic, and potential caves and tubes for SGCN species.	Conduct a population survey of all historic, current, and potential sites every 2–3 years to determine status and possible population trends. Survey caves that have not been previously sampled for the presence of cave invertebrates and bat species.	Pondsnail (*Stagnicola*) Species Group

Target: Lava Flows, Kipukas, Caves & Tubes

Vegetation within the Craters of the Moon National Monument and Preserve is diverse. The area encompasses sparse, vegetated lava and cinder cones; sagebrush steppe; grasslands; wetlands; and montane shrublands, woodlands, and forest. The study area encompasses several hundred kipukas (isolated areas of vegetation surrounded by more recent lava flows) and numerous parks. Many of these areas of relatively pristine native vegetation are protected from disturbances of nonnative species invasion, livestock grazing, and recreational use (Rust and Wolken 2008).

Lava flows at Craters of the Moon National Monument and Preserve with surface cracks and fissures. Craters of the Moon National Monument and Preserve, Idaho © 2015 Terry Thomas

Although some of the younger lava flows are devoid of vegetation, there is surprising diversity among plants and plant communities in the Monument. Lava flows and kipukas show a full range of ecological succession—from pioneer plants, such as lichens and mosses on basalt surfaces, to complex plant communities in kipukas and rangelands bordering lava flows. Rough topography of the lava flows creates numerous microsites where soil and water accumulate to support plants that would normally occur in higher precipitation zones. Limber Pine (*Pinus flexilis*) stands occur on cinder cones and lava flows in the northern part of the Monument. The transition between limber pine and juniper vegetation types occurs between Blacktail Butte and the Craters of the Moon National Wilderness Area. This ecotone normally occurs in montane regions and is an unusual feature for the lava flows (USDI BLM 1980*b*). Quaking Aspen (*Populus tremuloides*) and Douglas-fir (*Pseudotsuga menziesii*) stands are found on some north-facing slopes in the northern portion of the Monument. Riparian and wetland habitats are limited to the northern periphery due to geology, topography, and climate of the area. Early successional plant communities on the cinder cones produce diverse spring wildflower displays (DOI 2014).

Lava flows in the Snake River Basalts are comprised of three geologically young (Late Pleistocene-Holocene) lava fields that lie along the Great Rift: The Wapi Lava Field, The Kings Bowl Lava Field, and the Craters of the Moon Lava Field (DOI 2007). The Great Rift extends southeasterly from the Lava Creek vents for more than 50 miles to somewhere beneath the Wapi Lava Field (Kuntz et al. 1982). The Craters of the Moon Lava Field is the northernmost and largest

of the three young lava fields. Kings Bowl Lava Field is the smallest and lies between Craters of the Moon Lava Field and the Wapi Lava Field. These young flows are composed of Pleistocene-age pahoehoe and a'a flows, near-vent tephra deposits, cinder cones, lava cones, and shield volcanoes (Kuntz et al. 1988). These older areas are mantled with loess deposits (windblown silt) and in some places by windblown sand. During the Holocene (last 10,000 years), the most volcanic activity of any of the Eastern Snake River Plain basaltic rift systems was exhibited by these three lava fields associated with the Great Rift (Hughes et al. 1999, DOI 2007).

There are many different kinds of caves associated with the lava flows of the Great Rift. Shelly pahoehoe areas contain many small open tubes and blisters. There are thousands of these small open tubes and blisters in the Monument. Pahoehoe flows can travel more than 20 miles because the ceilings of lava tubes insulate them from heat loss and some of the tubes are greater than 30 ft in height. Some fissure caves associated with the Great Rift can be passable to hundreds of feet below the surface (DOI 2007).

Target Viability

Fair. In theory, kipukas should be reference areas for intact and healthy sagebrush steppe. However, invasive plant species and human uses have found their way into most kipukas. The location of many caves and lava tubes is not public knowledge and thus they may be reasonably safe from disturbance.

Spotlight Species of Greatest Conservation Need: Blind Cave Leiodid Beetle

This beetle is an obligate inhabitant of cave habitat. It is found in 4 widely separated lava-tube caves on the eastern Snake River Plain (Westcott 1968) in Fremont, Butte, Lincoln, and Power counties. The beetle has also been documented in a limestone cave in Wyoming on the west side of the Teton Mountains. Most lava-tube caves have not been surveyed for invertebrates (IDFG 2005). Several of the occupied caves contain perennial ice formations, though, based on the description in Briggs (1974), the Lincoln County cave may not contain ice. Westcott (1968) found beetles on ice and floating in melt-water above the ice floor. Beetles appeared to be particularly partial to ice mounds or large ice stalagmites, the former frequently harboring a variety of live and dead arthropods. Beetles also occur on rock formations. Peck (1970) attracted beetles to bait more commonly among rocks than at the edge of ice or on ice. Naseath (1974) found the beetle on and in holes of highly vesicular basalt. Naseath (1974) believed that the beetle subsists on a bacterium found on fractured lava rock. The beetle may also scavenge dead invertebrates or consume fungus (Westcott 1968).

Prioritized Threats and Strategies for Lava Flows, Kipukas, Caves & Tubes

High rated threats to Lava Flows, Kipukas, Caves & Tubes in the Snake River Basalts

Altered fire regimes

Kipukas are highly sensitive habitats that in recent years have seen an invasion of weed species. Of these weed species, the most impactful is cheatgrass as it alters the fire regimes in this system that is not well adapted to fire. Limber Pine habitats found within the lava flows are also susceptible to fire when invasive weeds such as cheatgrass appear as the dominant understory species.

Objective	Strategy	Action(s)	Target SGCNs
Identify and maintain intact kipukas and Limber Pine stands to minimize direct habitat loss.	Protect kipukas from destruction by wildfire.	Combat cheatgrass to reduce fire frequency using Plateau and other new emerging techniques.	A Metallic Wood-boring Beetle (*Chrysobothris horning*) A Metallic Wood-boring Beetle (*Chrysobothris idahoensis*) Western Small-footed Myotis Townsend's Big-eared Bat Little Brown Myotis A Yellow-masked Bee (*Hylaeus lunicraterius*)

Recreational overuse & misuse

Caves and tubes are highly sensitive environments. Due to the variance in size and shape of these subterranean features, each locality possesses unique temperatures, humidity, and flora and fauna. Species found to occur in 1 cave or tube will not necessarily be found in a nearby tube. For this reason, care must be taken when allowing access to caves and tubes. It is the policy of the National Park Service and BLM to withhold known cave locations from all but administrative agency partners. Local caving grottos are also familiar with the locations of many cave and tube features and are typically responsible in their recreational use of these sites. However, priorities should be made to preserve specific caves that possess unique biological, cultural, and anthropological resources.

Objective	Strategy	Action(s)	Target SGCNs
Identify and prioritize caves and tubes with high wildlife value (e.g. hibernacula, known locality of endemic cavernicolous fauna, etc).	Work with agencies to come up with a list and implement best practices for protecting these resources.	Develop a cave faunal working group to identify and prioritize caves and tubes that make good candidates for increased protection and conservation. Collaborate with agencies to develop survey and monitoring protocols for cave and tube systems and their associated fauna.	Blind Cave Leiodid Beetle A Cave Obligate Mite (*Flabellorhagidia pecki*) A Cave Obligate Millipede (*Idagona westcotti*) Western Small-footed Myotis Townsend's Big-eared Bat Little Brown Myotis A Cave Obligate Harvestman (*Speleomaster lexi*) A Cave Obligate Harvestman (*Speleomaster pecki*)

Objective	Strategy	Action(s)	Target SGCNs
	Monitor identified caves and determine use. Based on use, develop strategies to minimize impacts to the natural state of the caves and tubes.	Collaborate with local grottos to identify caves being regularly visited and determine appropriate management actions if needed. Determine where use occurs as a baseline of potential closures should white-nose syndrome reach Idaho and the fungus be spread by recreational activities.	Blind Cave Leiodid Beetle A Cave Obligate Mite (*Flabellorhagidia pecki*) A Cave Obligate Millipede (*Idagona westcotti*) Western Small-footed Myotis Townsend's Big-eared Bat Little Brown Myotis A Cave Obligate Harvestman (*Speleomaster lexi*) A Cave Obligate Harvestman (*Speleomaster pecki*)

Species designation, planning & monitoring

We have an inadequate understanding of the current population status of Idaho Dunes Tiger Beetle. Regular status assessments of occupied and recently-colonized habitats are important as the effectiveness of management actions continues to be evaluated. Likewise, the status of the populations of Wiest's Primrose Sphinx Moth, *Amblyderus owyhee*, *Calliopsis barri*, and *Ashmeadiella sculleni* and their life histories have not been fully documented or updated. To better understand these species and their habitat needs, surveys of historic sites are needed.

Objective	Strategy	Action(s)	Target SGCNs
Monitor the status of cave-associated fauna.	Conduct regular monitoring of occupied, historic, and potential caves and tubes for SGCN species.	Conduct a population survey of all historic, current, and potential sites every 2–3 years to determine status and possible population trends. Survey caves that have not been previously sampled for the presence of cave invertebrates and bat species.	Blind Cave Leiodid Beetle A Cave Obligate Mite (*Flabellorhagidia pecki*) A Cave Obligate Millipede (*Idagona westcotti*) Western Small-footed Myotis Townsend's Big-eared Bat Little Brown Myotis A Cave Obligate Harvestman (*Speleomaster lexi*) A Cave Obligate Harvestman (*Speleomaster pecki*)
Monitor known bat hibernacula, maternity roosts, and day roosts for presence of white-nose syndrome (WNS).	Collect bat swab/and or cave sediment samples at priority hibernacula and other bat roost locations.	Collect swab samples as part of the WNS surveillance project for baseline data on fungal communities in Snake River Basalts caves and tubes. Continue to take swabs at least every other year to determine if *Pd*/WNS is present.	Western Small-footed Myotis Townsend's Big-eared Bat Little Brown Myotis
Determine the status of the historic populations of several lava-associated SGCN species.	Conduct surveys at Craters of the Moon National Monument and Preserve and adjacent suitable habitat.	Conduct yellow pan trap and sweep surveys for *Chrysobothris horningi*, *Chrysobothris idahoensis*, *Hylaeus lunicraterius.* Assess collection records for these species in nondigitized regional collections.	A Metallic Wood-boring Beetle (*Chrysobothris horning*) A Metallic Wood-boring Beetle (*Chrysobothris idahoensis*) A Yellow-masked Bee (*Hylaeus lunicraterius*)

Snake River Basalts Section Team

An initial version of the Snake River Basalts 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 during a 2-day meeting in December 2014. Since then, we have continued to work with key internal and external stakeholders to improve upon the plan. Materials in this document are based on Miradi v. 0.35. Individuals, agencies, and organizations involved in this plan are listed in Table 13.3.

Table 13.3 Individuals, agencies, and organizations involved in developing this section [a]

First name	Last name	Affiliation
Ross	Winton*	Idaho Department of Fish and Game, Magic Valley Region
Terry	Thomas*	Idaho Department of Fish and Game, Upper Snake Region
Paul	Makela	Bureau of Land Management (US)
Devin	Engelstead	Bureau of Land Management (US), Idaho Falls District, Upper Snake Field Office
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Mark	Arana	Bureau of Reclamation (US) Snake River Area Office
Ryan	Newman	Bureau of Reclamation (US)
Quinn	Shurtliff	Gonzales–Stoller Surveillance, LLC
Jericho	Whiting	Gonzales–Stoller Surveillance, LLC
Colleen	Moulton	Idaho Department of Fish and Game, Headquarters
Todd	Stefanic	National Park Service, Craters of the Moon National Monument and Preserve
Dan	Christopherson	Shoshone-Bannock Tribe
Jack	Depperschmidt	US Department of Energy
Ty	Matthews	US Fish and Wildlife Service
David	Kampwerth	US Fish and Wildlife Service, Eastern Idaho Field Office
Evan	Ohr	US Fish and Wildlife Service, Eastern Idaho Field Office
David	Hopper	US Fish and Wildlife Service, Idaho State Office

[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.