3. Bitterroot Mountains Section

(v. 2015-12-29)

Section Description

The Bitterroot Mountains Section is part of the Canadian Rocky Mountain Ecoregion. The section includes habitats in Idaho and Montana. The Idaho portion of the Bitterroot Mountains, includes the Coeur d'Alene, St. Joe, North Clearwater, and North Bitterroot ranges and is bounded by the Clark Fork River in the north, Lake Pend Oreille and the Palouse Prairie in the west, the Idaho–Montana border in the east, and the ridge above the Lochsa River to the south (Fig. 3.1, Fig. 3.2). The Bitterroot Mountains span from 300 to 2,414 m (984 to 7,920 ft) in elevation with the highest peaks occurring along the Idaho–Montana border within the North Bitterroot Range. Like most of the sections in north Idaho, this section is cool and temperate with an annual precipitation of 54 to 208 cm (20 to 82 in; PRISM 30-year annual precipitation) and average annual temperature ranging from 2.6 to 9.7 °C (36.7 to 49.5 °F, PRISM 30-year annual temperature). Precipitation occurs mostly as snow from November to March, while summers are dry.

The mountain ranges that compose the Bitterroot Mountains Section vary from the lower rolling peaks of the Coeur d'Alene Range to the higher, steeply dissected peaks of the North Bitterroot and North Clearwater Mountain ranges. The topology of the different ranges reflect the different underlying mechanisms responsible in their formation with the lower Coeur d'Alene and St. Joe mountains remaining unglaciated and the higher North Bitterroot and North Clearwater carved by alpine glaciers. The section is influenced by a maritime climate that delivers moisture-laden air currents in the fall, winter, and spring in the form of heavy snowfall and warmer winter temperatures. On the other hand,

Coeur d'Alene Mountains © YYYY Photographer

summers are hot and dry, with some areas reaching temperatures of around 100 °F.

The section is predominantly forested with dense and diverse stands of subalpine fir (*Abies lasiocarpa* [Hook.] Nutt.), Douglas-fir (*Pseudotsuga menziesii* [Mirb.] Franco), grand-fir (*Abies grandis* [Douglas ex D. Don] Lindl.) and western redcedar (*Thuja plicata* Donn ex D. Don). Western white pine (*Pinus monticola* Douglas ex D. Don) was a prominent tree within these forests but the advent of the white pine blister rust (*Cronartium ribicola*), of which the pine has limited resistance, has nearly eliminated this species presence on the landscape. Whitebark pine (*Pinus albicaulis* Engelm.) was another key component of the subalpine habitats but mountain pine beetle (*Dendroctonus ponderosae*) and white pine blister rust have impacted this species as well. Wildlife characteristic of the Northern Rockies is found in this section include Clark's Nutcracker (*Nucifraga columbiana*), Wolverine (*Gulo gulo*), and Mountain Goat (*Oreamnos americanus*) in the subalpine habitats and Olive-sided Flycatcher (*Contopus cooperi*) and Fisher (*Pekania pennant*) in mesic montane habitats.

Although the higher elevations of the North Bitterroot and North Clearwater ranges were carved by mountain glaciers, the lower portions of the ranges were unaffected by glaciation resulting in steep V-shaped canyons at lower elevations. These lower canyons provide a refugium of coastal species that are endemic in north Idaho. These canyons are the first deep canyons south of the continental glaciation therefore were thought to provide a refuge for plants with relatively high heat requirements during the Little Ice Age. The maritime climate of the section continues to provide the mild temperatures and heavy precipitation necessary for the species occurrence. Nearly 40 species of disjunct coastal plants have been identified in the lower canyons of the North Fork Clearwater, Selway, and Lochsa rivers. In the North Fork Clearwater, which is found within the Bitterroot Mountains section, the presence of red alder (*Alnus rubra* Bong.) often defines the areas of the distinctive canyon habitat. Other species include deer fern (*Blechnum spicant* (L.) Sm.), Sierra marsh fern (*Thelypteris nevadensis* [Baker] Clute ex Morton), Constance's bittercress (*Cardamine constancei* Detling) which is endemic to Idaho and North Idaho monkeyflower (*Mimulus clivicola* Greenm.) which is a regional endemic. In addition, the canyon habitat contains several species of beetles and earthworms that are endemic to the state. However, the filling of the Dworshak Reservoir inundated much of this habitat and it has been further impacted by the construction of roads, campgrounds, and administrative sites.

The Coeur d'Alene, St. Joe, St. Maries, and North Fork Clearwater rivers compose the major waterways of the Bitterroot Mountains Section. Three of these (Coeur d'Alene, St. Joe, and St. Maries) are major tributaries of the Spokane River drainage and feed into Lake Coeur d'Alene, the largest natural lake in the section. Although nearly 66 mi of the upper St. Joe River is nationally designated as wild and scenic, most of the Spokane River drainage, including the St. Maries and Coeur d'Alene rivers, has been impacted by a long history of heavy metal pollution, sedimentation, and stream channelization. Numerous lowland lakes, waterfalls, wetlands, and mountain lakes in the drainage support a diversity of colonial waterbirds, waterfowl, Neotropical migrants and Black Terns (*Chlidonias niger*) providing both important nesting and migration stop-over habitats.

The proximity of Lake Coeur d'Alene to the city of Coeur d'Alene, the largest population center in the section, and Spokane, Washington, make it a popular tourist destination. Boating, angling, wildlife watching, and specifically winter eagle watching are common activities. The proximity of 2 major cities (Spokane, Washington and Missoula, Montana) plus the growing population of Coeur d'Alene, provide an economic boost to the region through fees paid on recreational activities such as hunting, fishing, boating, and snowmobiling and taxes paid on associated gear. Camping, hiking, wildlife watching, and biking are also popular outdoor activities in the region. Outside of Coeur d'Alene, most of the section's population is dispersed and rural. Towns are generally located along rivers, such as the St. Maries, and many have a historical relationship with mining such as Mullan, Wallace, and Kellogg. Gold and silver mining has a long and storied history in this section, particularly in the Coeur d'Alene range where metal extraction continues today. Forestry and localized grazing are also important land uses within the section.

Black Tern © YYYY Photographer

Spotlight Species of Greatest Conservation Need: Clearwater Roachfly (*Soliperla salish*)

Although this small mayfly has an unattractive name, it is found in a beautiful habitat—the splash zones of high elevation headwater stream waterfalls. It is believed to be endemic to the Clearwater basin and is only known from a few sites. Considering how difficult it is to access its unique habitat sites, this species is likely undersampled and likely occurs at more sites than we are currently aware of (D. Gustafson pers. comm). This species is representative of the high levels of endemism found in the Bitterroot Mountains Section and emblematic of the cold-adapted and understudied species which we strive to understand more completely in our rapidly changing world.

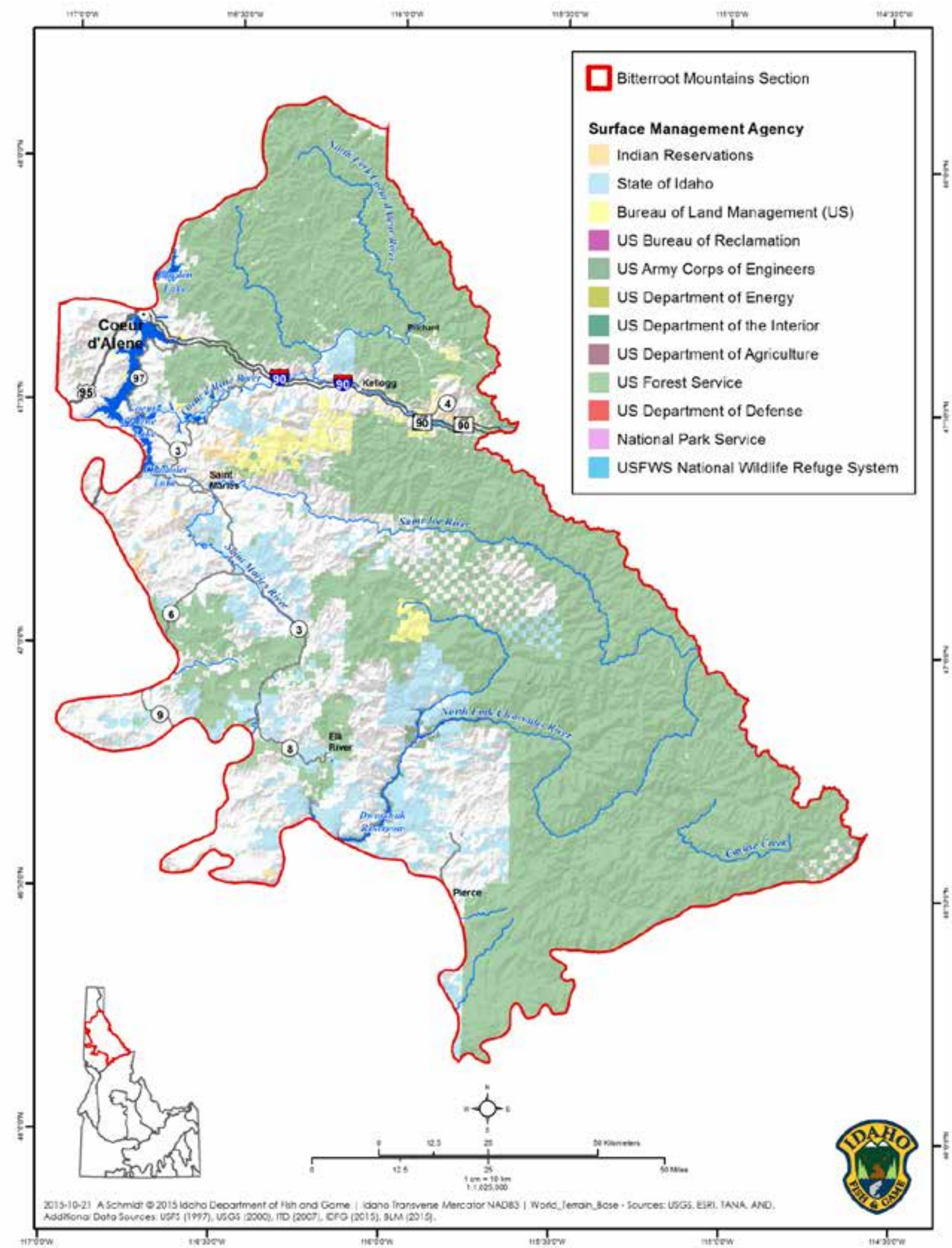

Fig. 3.1 Map of Bitterroot Mountains surface management

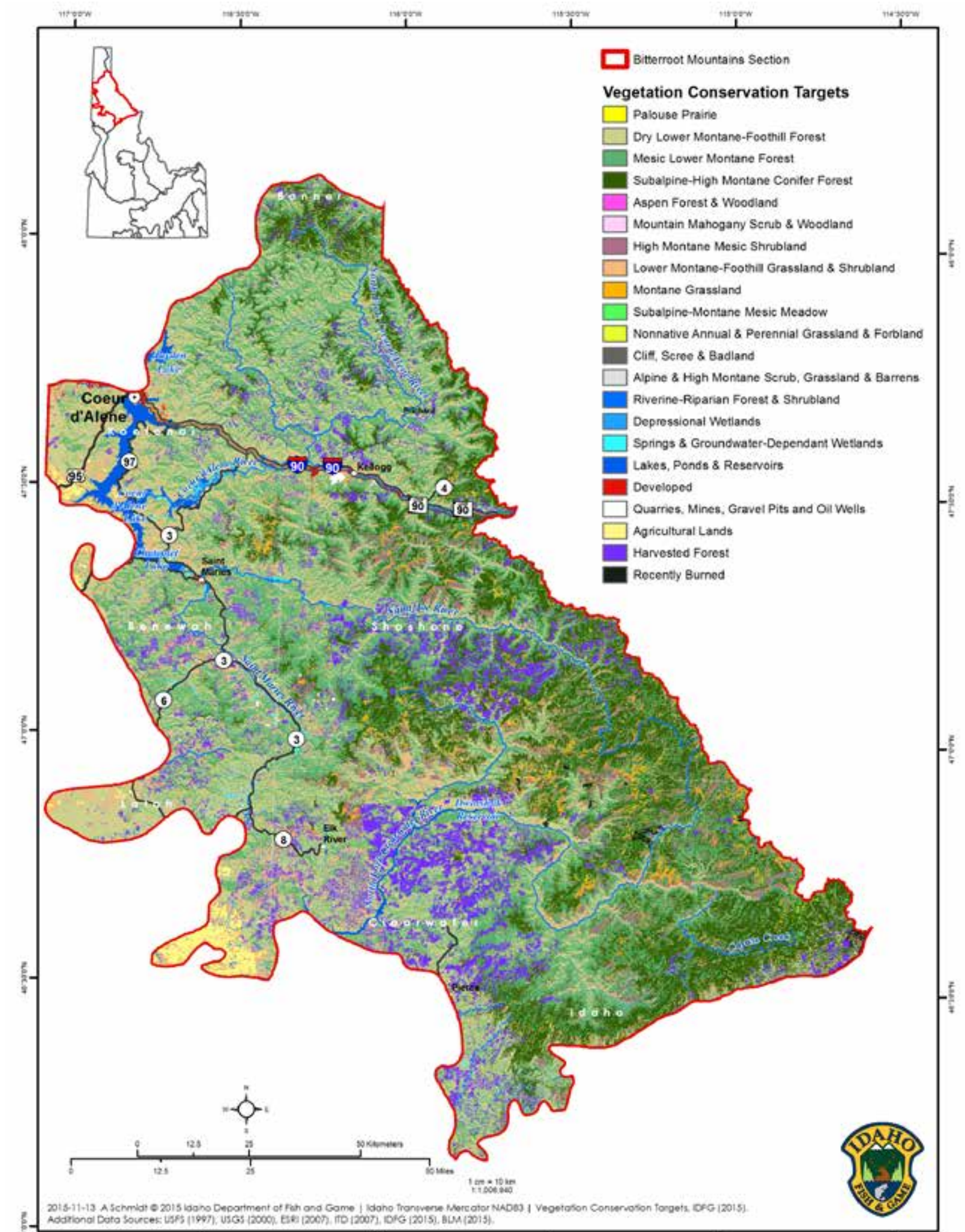

Fig. 3.2 Map of Bitterroot Mountains vegetation conservation targets

Conservation Targets in the Bitterroot Mountains

We selected 6 habitat targets (3 upland, 3 aquatic) that represent the major ecosystems in the Bitterroot Mountains as shown in Table 3.1. Each of these systems provides habitat for key Species of Greatest Conservation Need (SGCN), i.e., “nested targets” (Table 3.2) associated with each target. All SGCN management programs in the Bitterroot Mountains have a nexus with habitat management programs. Conservation of the habitat targets listed below should conserve most of the nested species within them. However, we determined that at least 6 taxonomic groups (Lake-nesting birds, Ground-dwelling Invertebrates, Pond-breeding Amphibians, Forest Carnivores, Pollinators, and Bat Assemblage) face special conservation needs and thus are presented as explicit species targets as shown in Table 3.1.

Table 3.1 At-a-glance table of conservation targets in the Bitterroot Mountains

Target	Target description	Target viability	Nested targets (SGCN)	
Dry Lower Montane–Foothill Forest	Northern Rocky Mts. Dry-Mesic Conifer and Ponderosa Pine Woodland and Savannah systems lower elevation forests of the Coeur d’Alene, St. Joe, North Bitterroot and North Clearwater Mountains.	*Fair.* Substantial encroachment by other habitat types due to lack of natural fire cycle	*Tier 2*	Lewis’s Woodpecker Olive-sided Flycatcher Silver-haired Bat Hoary Bat
			Tier 3	Townsend’s Big-eared Bat Little Brown Myotis
Mesic Lower Montane Conifer Forest	Commonly referred to as a “cedar-hemlock” but also includes Lodgepole Pine and Aspen-Mixed conifer forest at lower elevations of the Coeur d’Alene, St. Joe, North Bitterroot and North Clearwater Mountains.	*Fair.* Substantial encroachment by other habitat types due to lack of natural fires cycle and loss of western white pine.	*Tier 2*	Olive-sided Flycatcher Silver-haired Bat Hoary Bat
			Tier 3	Townsend’s Big-eared Bat Little Brown Myotis
Subalpine High Montane Conifer Forest	Dry-mesic spruce-fir forest and whitebark pine woodlands at higher elevations of the Coeur d’Alene, St. Joe, North Bitterroot and North Clearwater Mountains.	*Poor to Fair*. Subject to altered fire regimes, forest insects, disease, and climate change; reduction in whitebark pine woodlands.	*Tier 1*	Wolverine Grizzly Bear
			Tier 3	Clark’s Nutcracker Mountain Goat Hoary Marmot
Riverine–Riparian Forest and Shrubland	Rivers and streams, including aquatic habitats and their associated terrestrial riparian habitats. Includes Coeur d’Alene, St. Joe, St. Maries, and Clearwater rivers and their tributaries.	*Fair*. Riverine systems in the lower valleys impacted by hydroelectric operations, pollution from mining and invasive species. Higher elevation headwaters threatened by climate change.	*Tier 1*	Pacific Lamprey *Beckerus barri*
			Tier 2	Harlequin Duck Black Swift Western Pearlshell Rocky Mountain Duskysnail Nez Perce Pebblesnail *Bryelmis idahoensis* Lolo Mayfly *Ephemerella alleni*

Target	Target description	Target viability	Nested targets (SGCN)	
			Tier 3	California Floater Western Ridged Mussel Pondsnail Species Group Rotund Physa *Ameletus tolae* *Paraleptophlebia falcula* *Parameletus columbiae* Straight Snowfly Idaho Snowfly Palouse Snowfly Clearwater Roachfly Umatilla Willowfly *Manophylax annulatus* *Eocosmoecus schmidi* *Philocasca antennata* *Philocasca banksi* *Homophylax acutus* *Rhyacophila oreia* *Rhyacophila robusta* *Goereilla baumanni* *Sericostriata surdickae*
Depressional Wetlands	Rain-fed systems ranging from infrequent to semi-permanent or permanently flooded. Typically pond sized or smaller. Includes playas, vernal pools, shallow marshes and meadows, and deep water marshes.	*Fair*. Lower elevations experiencing altered hydrological regimes and invasive species/disease. Higher elevations threatened by climate change.	*Tier 2* *Tier 3*	Western Toad American Bittern Black Tern Silver-haired Bat Townsend's Big-eared Bat Little Brown Myotis
Springs and Groundwater-Dependent Wetlands	Includes a subset of groundwater-dependent ecosystems such as springs, seeps, and wet and mesic meadows.	*Fair*. Lower elevations experiencing altered hydrological regimes and invasive species/disease. Higher elevations threatened by climate change	*Tier 2* *Tier 3*	Western Toad Rocky Mountain Duskysnail Pristine Pryg Cascades Needlefly Idaho Forestfly Clearwater Roachfly
Lake-nesting Birds	Western Grebe is listed as an Intermountain West Waterbird Conservation Plan priority species due to habitat concerns and impacts from recreational boating.	*Good*. Colony has consistently number between 20-80 nests. Occasionally, contains nesting Clark's Grebes.	*Tier 2*	Western Grebe
Ground-dwelling Invertebrates	Assemblages of terrestrial invertebrates found on forest and other habitat floors.	*Good*. Habitat and threat data deficient. Many species taxonomically and distributionally data deficient.	*Tier 1*	Marbled Jumping-slug Magnum Mantleslug Blue-gray Taildropper Papillose Taildropper Rocky Mountain Axetail Selway Forestsnail Salmon Oregonian Mission Creek Oregonian

Target	Target description	Target viability	Nested targets (SGCN)	
				Kingston Oregonian
			Tier 2	*Hemphillia* sp.1 Costate Mountainsnail Striate Mountainsnail Giant Palouse Earthworm
			Tier 3	Pale Jumping-slug Nimapuna Disc Salmon Coil Coeur d'Alene Oregonian Shiny Tightcoil Harvestman Species Group Spur-throated Grasshopper Group
Pond-Breeding Amphibians	Amphibians and reptiles which primarily breed in lentic wetlands.	*Poor.* Many amphibians face invasive species/disease threats. Possible severe population decline.	*Tier 2*	Western Toad Northern Leopard Frog
Forest Carnivores	Wide ranging mammalian mesocarnivores.	*Poor-Fair*. Only a few wolverines known to occur in section. Bitterroot Mountains is core habitat for Fisher.	*Tier 1* *Tier 2*	Wolverine Fisher
Pollinators	Species delivering pollination ecosystem service.	*Fair.* Many pollinators declining range wide.	*Tier 1*	Hunt's Bumble Bee Morrison Bumble Bee Western Bumble Bee Suckley's Cuckoo Bumble Bee
			Tier 3	*Andrena aculeata* *Perdita salicis euxantha* *Hoplitis orthognathus* Monarch Gillette's Checkerspot
Bat Assemblages	Several species of bats occur across habitats within the section	*Fair*. Roost locations are impacted by human disturbance and closures. Threat of White-nose syndrome is imminent.	*Tier 2*	Silver-haired Bat Hoary bat
			Tier 3	Townsend's Big-eared Bat Little Brown Myotis

Table 3.2 Species of Greatest Conservation Need (SGCN) and associated conservation targets in the Bitterroot Mountains

	Conservation targets											
Taxon	Dry Lower Montane–Foothill Forest	Mesic Lower Montane Conifer Forest	Subalpine High Montane Conifer Forest	Riverine–Riparian Forest and Shrubland	Depressional Wetlands	Springs and Groundwater-Dependent Wetlands	Lake-nesting Birds	Ground-dwelling Invertebrates	Pond-Breeding Amphibians	Forest Carnivores	Pollinators	Bat Assemblages
FISH												
Pacific Lamprey				X								
AMPHIBIANS												
Western Toad					X	X			X			
Northern Leopard Frog									X			
BIRDS												
Harlequin Duck				X								
Western Grebe							X					
American Bittern					X							
Black Tern					X							
Common Nighthawk	X											
Black Swift				X								
Lewis's Woodpecker	X											
Olive-sided Flycatcher	X	X										
Clark's Nutcracker			X									
MAMMALS												
Townsend's Big-eared Bat	X	X			X							X
Silver-haired Bat	X	X			X							X
Hoary Bat	X	X										X
Little Brown Myotis	X	X			X							X
Wolverine			X							X		
Grizzly Bear <which target?>												
Fisher										X		
Mountain Goat			X									
Hoary Marmot			X									
BIVALVES												
Western Pearlshell				X								
California Floater				X								
Western Ridged Mussel				X								
AQUATIC GASTROPODS												
Pondsnail Species Group				X								

Taxon	Conservation targets											
	Dry Lower Montane–Foothill Forest	Mesic Lower Montane Conifer Forest	Subalpine High Montane Conifer Forest	Riverine–Riparian Forest and Shrubland	Depressional Wetlands	Springs and Groundwater-Dependent Wetlands	Lake-nesting Birds	Ground-dwelling Invertebrates	Pond-Breeding Amphibians	Forest Carnivores	Pollinators	Bat Assemblages
Rotund Physa				X								
Rocky Mountain Duskysnail				X		X						
Nez Perce Pebblesnail				X								
Pristine Pyrg						X						
TERRESTRIAL GASTROPODS												
Pale Jumping-slug								X				
Marbled Jumping-slug								X				
A roundback slug (*Hemphillia sp. 1*)								X				
Magnum Mantleslug								X				
Blue-gray Taildropper								X				
Papillose Taildropper								X				
Rocky Mountain Axetail								X				
Nimapuna Disc								X				
Salmon Coil								X				
Costate Mountainsnail								X				
Striate Mountainsnail								X				
Selway Forestsnail								X				
Salmon Oregonian								X				
Mission Creek Oregonian								X				
Coeur d'Alene Oregonian								X				
Kingston Oregonian								X				
Shiny Tightcoil								X				
ARACHNIDS												
A Harvestman Species Group								X				
INSECTS												
A Click Beetle (*Beckerus barri*)						X						
A Riffle Beetle (*Bryelmis idahoensis*)				X								
A Mayfly (*Ameletus tolae*)				X								
Lolo Mayfly				X								
A Mayfly (*Ephemerella alleni*)				X								
A Mayfly (*Paraleptophlebia falcula*)				X								
A Mayfly(*Parameletus columbiae*)				X								
A Miner Bee(*Andrena aculeata*)											X	

Taxon	Conservation targets											
	Dry Lower Montane–Foothill Forest	Mesic Lower Montane Conifer Forest	Subalpine High Montane Conifer Forest	Riverine–Riparian Forest and Shrubland	Depressional Wetlands	Springs and Groundwater-Dependent Wetlands	Lake-nesting Birds	Ground-dwelling Invertebrates	Pond-Breeding Amphibians	Forest Carnivores	Pollinators	Bat Assemblages
A Miner Bee (*Perdita salicis euxantha*)											X	
Hunt's Bumble Bee											X	
Morrison Bumble Bee											X	
Western Bumble Bee											X	
Suckley's Cuckoo Bumble Bee											X	
A Mason Bee (*Hoplitis orthognathus*)											X	
Monarch											X	
Gillette's Checkerspot											X	
Spur-throated Grasshoppers								X				
Straight Snowfly				X								
Idaho Snowfly				X								
Palouse Snowfly				X								
Cascades Needlefly						X						
Idaho Forestfly						X						
Clearwater Roachfly				X		X						
Umatilla Willowfly				X								
A Caddisfly (*Manophylax annulatus*)				X								
A Caddisfly (*Eocosmoecus schmidi*)				X								
A Caddisfly (*Philocasca antennata*)				X								
A Caddisfly (*Philocasca banksi*)				X								
A Caddisfly (*Homophylax acutus*)				X								
A Caddisfly (*Rhyacophila oreia*)				X								
A Caddisfly (*Rhyacophila robusta*)				X								
A Caddisfly (*Goereilla baumanni*)				X								
A Caddisfly (*Sericostriata surdickae*)				X								
WORMS												
Giant Palouse Earthworm								X				

Target: Dry Lower Montane–Foothill Forest

In the Bitterroot Mountains, nearly 27% of the land cover is classified as dry lower montane–foothill forest. Although this habitat group can be located at all aspects and slopes; it is predominantly found on the warm-dry, south-southwest, moderately steep slopes within the Coeur d'Alene, St. Joe, North Bitterroot and North Clearwater Mountains (Cooper et al. 1991). However, it also extends into the valleys and floodplains that surround the mountain ranges. Elevation ranges from 300 to 1920 m in the Bitterroot Mountains, but there are numerous occurrences above 1920 m. In the dry lower montane–foothill forest, Douglas-fir is a co-dominant climax species with ponderosa pine (*Pinus ponderosa* Lawson & C. Lawson) in mixed or single species stands (Rocchio 2011). Species such lodgepole pine (*Pinus contorta* Douglas ex Loudon), western larch (*Larix occidentalis* Nutt.) and grand fir (*Abies grandis* [Douglas ex D. Don] Lindl.) only occasionally occur and are found in the wetter microsites within the habitat group (Cooper et al. 1991). Ponderosa pine woodlands are dominant on the driest sites and where fires are frequent and of low severity (Cooper et al. 1991). Historically fires were thought to be frequent and moderate-low severity, which maintained open stands of fire-resistant species. Low fire frequency has resulted in a dominance of shrubs and tree species such as grand fir, lodgepole pine, Douglas-fir and western larch in the understory. Currently, the habitat group contains a variable understory physiognomy ranging from shrub-dominated and dense with mallow ninebark (*Physocarpus malvaceus* [Greene] Kuntze) and ocean spray (*Holodiscus discolor* [Pursh] Maxim.), to bunchgrass-dominated and open with Idaho fescue (*Festuca idahoensis* Elmer) and bluebunch wheatgrass (*Pseudoroegneria spicata* [Pursh] Á. Löve) to name a few species.

Dry lower montane–foothill forest © Amanda DeLima

Target Viability

Fair. There has been substantial encroachment in the habitat type by more shade-tolerant overstory species due to the lack of normal fire intervals.

Prioritized Threats and Strategies for Dry–Lower Montane Foothill Forest

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

Altered fire regimes (fire suppression and stand-replacing wildfires)

Uncharacteristic wildland fire is defined as "an increase in wildfire size, severity, and resistance to control compared to that which occurred historically in the native system." (see Idaho Forest Action Plan; Idaho Department of Lands 2010, rev. May 2012). Historically, moderate- to low-severity fires that burned on average every 10 to 30 years maintained the open understory and predominance of shade-intolerant species, such as ponderosa pine in the overstory (Smith and Fischer 1997). However, accumulations of fuels developed from decades of aggressive fire suppression, coupled with a lack of timber management, contribute to this problem. In addition, these conditions have been aided by a cool period in the Pacific decadal oscillation that proved effective in preventing most moderate fires in the ecosystem while also preventing stand-replacing fires that often enable shade-intolerant species to establish (USDA Forest Service 2013[EIS_IPNF]). This resulted in the encroachment of shade-tolerant species into the habitat group as well as a decrease in fire-tolerant species, increased vertical stand structure, increased canopy closure, increased vertical fuel ladders, greater biomass, greater fire intensities and severities, and increased insect and disease epidemics (Keane et al. 2002). Fire management activities over the past 15 years have attempted to simulate and reestablish the vegetative composition of regular fire patterns, but are hampered by the inability to allow natural fires to burn. Additionally, population increases in neighboring towns has increased the Wildland–Urban Interface (WUI) that often prevents the use of fire as a management tool.

Objective	Strategy	Action(s)	Target SGCNs
Restore a natural fire interval that promotes historical forest conditions (USDA Forest Service 2013 [monitoring and evaluation program]).	Use prescribed and natural fires to maintain desired conditions (USDA Forest Service et al. 2015). Encourage silviculturally-prescribed (nonnatural) fire on private, corporate, & state-endowed lands. Provide for continuous forest management across large landscape.	Lands within the WUI treated to reduce fuels through mechanical removal or controlled burns (USDA Forest Service 2015). Fire-killed trees are left standing, if pose no safety hazard, as wildlife habitat (USDA Forest Service 2015).	Lewis's Woodpecker Common Nighthawk, Olive-sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Little Brown Myotis
	Increase prescribed fire on federal lands.	Reduce procedural obstacles to prescribed burning.	
Simulate natural fire regimes.	Design and implement silvicultural prescriptions that simulate natural disturbance regimes.	Actively remove shade-tolerant species.	Lewis's Woodpecker Common Nighthawk, Olive-sided Flycatcher, Townsend's Big-eared Bat,

Objective	Strategy	Action(s)	Target SGCNs
			Silver-haired Bat, Hoary Bat, Little Brown Myotis
Encourage use of fire as management tool on private lands.	Design programs for small forest owners.	Provide agency resources to conduct prescribed burns on private property at low to no cost to landowner.	Lewis's Woodpecker Common Nighthawk, Olive-sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Little Brown Myotis
	Promote good land use regulations for development.		
Restore native tree species.	Plant more improved western white pine north of the Clearwater River in wetter habitat types; this is the tree species that grew there historically. This is one of the most important strategies and has the potential to address multiple threats (e.g., wildfire, insects, disease).		

OHV use in undesignated areas

Considered a critical issue on state, industrial, and private lands as well as one of the USFS's "four threats," pressure from OHV use can lead to the degradation of forested areas. Such use can increase erosion, user conflicts, spread of invasive species, damage to cultural sites, disturbance to wildlife, destruction of wildlife habitat, and risks to public safety. In the Idaho Panhandle National Forest (IPNF), there are over 4,300 miles of road and trail available for Off Highway Vehicle (OHV) use. Visitors to the IPNF often cite the ability to use OHV on forest roads and trails as the primary reason for their visit (Cook and O'Laughlin 2008). It is a desired condition within the 2015 Forest Management Plan that motorized recreational opportunities at the levels designated in the plan continues within the forest (USDA Forest Service 2015). However, in the IPNF and the adjacent Clearwater National Forest, there is evidence of unauthorized motorized used through the damage done to natural resources. Additionally, violations associated with OHV use are continuously in the triple digits (USDA Forest Service [IPNF Monitoring and evaluation report] et al. 2013). Unauthorized motorized use impacts soil and vegetation resources through the disruption or compaction of soil and the damage or removal of vegetation (Cook and O'Laughlin 2008). Wildlife may also be impacted through noise and disturbance. The severity of the impacts is dependent on the habitat and the wildlife associated (Cook and O'Laughlin 2008). Whether damage is intentional and unintentional restoration efforts in areas damaged by OHV use often costs in the millions of dollars statewide (Cook and O'Laughlin 2008). However, during a survey of OHV users in Idaho, more than half of OHV users saw little to no impact on natural resources via off-trail/off-road vehicle use (Cook and O'Laughlin 2008).

Objective	Strategy	Action(s)	Target SGCNs
Minimize wildlife, soil, vegetation, hydrologic disturbances from unauthorized off-trail/off-road motorized use.	Create and maintain OHV use areas. Increase enforcement. Update Travel Management Plans. Provide education on OHV impacts.	Create and maintain designated OHV use areas & provide education to OHV users. Increase signage at closed roads/trails to prevent unintentional travel. Resource-hardening: making sensitive sites harder to access while providing facilities and trails in other areas (Cook and O'Laughlin 2008). More severe penalties for OHV violations. Incentivize reporting violations (e.g., Backcountry Hunters and Anglers provide reward to someone reporting ATVs behind closed gates). Increase signage at vulnerable locations on OHV impacts.	Lewis's Woodpecker Common Nighthawk, Olive-sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Little Brown Myotis

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

Noxious weeds

In the drier habitat types, such as the Dry Lower Montane Foothill Forests, invasive and noxious weeds have migrated from disturbed areas such as roads, railroads and utility right-of-ways to undisturbed habitats. Across the Idaho Panhandle National Forest (IPNF), nearly 82% of the warm/dry habitat type is at high risk for invasion by nonnative weeds (USDA Forest Service et al. 2013). Additionally, surveys done in the Bitterroot Mountains, found 5% of sites in the Dry Lower Montane Foothill Forest type (n=123) had spotted knapweed or tansy present (Lucid et al. 2015). Species such as spotted knapweed, diffuse knapweed, yellow star thistle, leafy spurge, dyer's wood are particularly invasive within the IPNF and have dispersed into undisturbed areas and displaced native species over large areas (USDA Forest Service et al. 2013).

Objective	Strategy	Action(s)	Target SGCNs
Identify and eradicate any potential invasive species prior to establishment (USDA Forest Service 2013).	Increased monitoring for invasive and noxious weeds. Coordinate invasive and noxious weed treatment across agencies.	Train agency staff to document presence/absence of noxious weeds during field/site visits. Develop a noxious weed database for all lands across Idaho. Utilize existing technology such as Global	Lewis's Woodpecker Common Nighthawk, Olive-sided Flycatcher, Townsend's Big-eared Bat, Silver-haired

Objective	Strategy	Action(s)	Target SGCNs
		Positioning Systems (GPS), remote sensing and Geographic Information Systems (GIS) to efficiently collect, store, retrieve, and analyze and display noxious weed information (ISDA 1999). Implement actions described in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012)	Bat, Hoary Bat, Little Brown Myotis
Contain and reduce widespread weeds in areas that are already infested (USDA Forest Service 2013).	Coordinate invasive and noxious weed treatment across agencies. Prevent spread of widespread weeds through the identification and treatment of dispersal vectors. Restoration of treated areas with native species.	Weed treatment of high impact areas/roads. (USDA Forest Service 2013) Treat equipment used during timber harvest or fire suppression activities to be "weed-free" (USDA Forest Service 2013, IDL 2015) Revegetate and monitor restoration areas with native species (KTOI 2009) Implement actions described in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012)	Lewis's Woodpecker Common Nighthawk, Olive-sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Little Brown Myotis
	Intensify existing weed management practices.	IDL has requirement in timber sale contract to wash equipment to keep it weed free; spraying and planting close mat of grass so that the weeds don't survive.	

Medium rated threats to Dry–Lower Montane Foothill Forest in the Bitterroot Mountains

Forest insect pests & diseases

The Idaho Forest Action Plan (Idaho Department of Lands 2010, rev. May 2012) scores this threat as "High" and considers mountain pine beetle the most serious pest problem in Idaho, considered equal in importance to the combination of all other forest health sub-issues. However, beetle infestations are a natural part of the system so in this plan, we focus on epidemic outbreaks as the problem. In addition, forest diseases such as root rot (e.g., *Armillaria*), mistletoe, and stem rot result in tree mortality.

Objective	Strategy	Action(s)	Target SGCNs
Reduce forest pest epidemics.	Use integrated pest management (IPM)	IPM includes 3-prong approach, e.g., example of mechanical approach would be to plant ponderosa pine instead of Douglas-fir on dry forest site; chemical approach would be to	Lewis's Woodpecker Common Nighthawk,

Objective	Strategy	Action(s)	Target SGCNs
		spray, and biological controls (e.g., insect pheromones, which can work to either deter or attract) such as natural in the environment, but can also cross over into weeds management, new introductions or inundative releases of native or introduced herbivores. Approach: (1) scout; (2) determine if 1 or all 3 approaches should be applied.	Olive-sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Little Brown Myotis
	Thin overstocked forest stands.	Thin stands to <=60 Basal Area.	
Reduce the incidence of forest disease.	Girdling kills the mistletoe but leaves the structure, i.e., platform, which is valuable for wildlife; also creates snags.	Cut out or girdle mistletoe-infected trees.	
Restore native tree species.	Plant more improved western white pine north of the Clearwater River in wetter habitat types; this is the tree species that grew there historically. This is one of the most important strategies and has the potential to address multiple threats (e.g., wildfire, insects, disease).		

Species designation, planning & monitoring

Multiple species identified as SGCN are declning as as result of unknown causes. The priority for many of these species in the coming years is to identify what is/are the root cause(s) of their apparent decline, and develop a strategy for addressing it.

Objective	Strategy	Action(s)	Target SGCNs
Determine causes of decline in Olive-sided Flycatcher.	Determine relative importance of known and suspected threats to Olive-sided Flycatcher, its prey, and their habitats (see Canada's recovery plan, Appendix B;	Promote cooperation and collaboration with Western Working Group Partners in Flight to fill knowledge gaps and to mitigate threats. Develop monitoring program to assess changes in species distribution and population size for SGCN and associated species.	Olive-sided Flycatcher

Objective	Strategy	Action(s)	Target SGCNs
	Environment Canada 2015b) Investigate factors affecting reproductive output, survival, and fidelity to breeding sites.		
Determine cause(s) of decline for nightjar species in Idaho.	Work with Western Working Group Partners in Flight (WWG PIF) and the Pacific Flyway Nongame Technical Committee (NTC) to assess causes(s) of decline.	Assist WWG PIF with adjusting current Nightjar Survey Network protocols to collect data that will inform potential cause(s) of decline, including assessments of insect prey populations and their habitats. Work with WWG PIF and NTC to identify opportunities for research on contaminant impacts. Develop monitoring program which assess changes in species distribution and population size for SGCN and associated species.	Common Nighthawk

Target: Mesic Lower Montane Conifer Forest

In the Bitterroot Mountains, 32% of the land cover is classified as Mesic Lower Montane Forest. Within the Coeur d'Alene, St. Joe, North Bitterroot and North Clearwater Mountains, this habitat group is located on the slopes, valley bottoms, ravines, canyons and benches with high soil moisture and cool summer temperatures. Elevation ranges from 487 to 805 m. Commonly referred to as a cedar/hemlock forest, western hemlock (*Tsuga heterophylla* [Raf.] Sarg.) and western redcedar (*Thuja plicata* Donn ex D. Don) are common in the overstory with grand fir (*Abies grandis* [Douglas ex D. Don] Lindl.), Douglas-fir (*Pseudotsuga menziesii* [Mirb.] Franco), Engelmann spruce (*Picea engelmannii* Parry ex Engelm.), western white pine (*Pinus monticola* Douglas ex D. Don) and western larch (*Larix occidentalis* Nutt.) as frequent associates within the canopy (Cooper et al. 1991). However, western hemlock presence in the forest type abruptly ends just north of the North Fork Clearwater River (Cooper et al. 1991). The understory is composed of short and tall shrubs, perennial graminoids, forbs, ferns, and mosses, often at levels of in-stand diversity approaching or equal to the diversity found in some eastern deciduous forests (Reid 2013). In depressional areas with a high water table, Devil's club (*Oplopanax horridus* (Sm.) Miq.) is regularly encountered. Forests within this habitat group are often centuries old with fire only passing through every 500 years. The fire interval is long with stand-replacing fires occurring every 150 to 500 years and moderate fires every 50 to100 years (Crawford 2011). Fire suppression has created mixed aged stands that form fuel ladders that make the forest more susceptible to high-intensity and stand-replacing fires. Disturbance in the form of insect, disease, windfall and ice generally produce canopy openings for the regeneration of forest types. Western white pine was once a predominant canopy species within this habitat group; however logging, fire and the introduction of the white pine blister rust (*Cronartium ribicola*) has decimated this species to below 90% of its historical prevalence (Cooper et al. 1991).

Target Viability

Fair. Substantial encroachment by other habitat types due to lack of natural fires cycle and loss of western white pine.

Prioritized Threats and Strategies for Mesic Lower Montane Conifer Forest

Very High rated threats to Mesic Lower Montane Conifer Forest in the Bitterroot Mountains

Altered fire regimes (fire suppression and stand-replacing wildfires)

Historically, fires were as variable as the tree species in the forest stand, with an average mean interval of 200 to 250 years but some stands burning with a mean of 18 years (Smith and Fischer 1997). Stands with fire intervals shorter than 140 years were often dominated by western white pine, western larch, Douglas-fir and grand fir (Smith and Fischer 1997). However, decades of fire suppression activities aided by a cool period in the Pacific decadal oscillation were effective in preventing most moderate fires in the ecosystem while also preventing stand-replacing fires that often enable shade and fire-intolerant species to establish and heavy fuel loads to build (USDA Forest Service 2013[EIS_IPNF]). This resulted in the encroachment of shade-tolerant species into the habitat group as well as a decrease in fire-tolerant species, increased vertical stand structure, increased canopy closure, increased vertical fuel ladders, greater biomass, greater fire intensities and severities, and increased insect and disease epidemics (Keane et al. 2002). Fire management activities over the past 15 years have attempted to simulate and reestablish the vegetative composition of regular fire patterns, but are hampered by the inability to allow natural fires to burn. Additionally, population increases in neighboring towns has increased the Wildland–Urban Interface (WUI) that often prevents the use of fire as a management tool.

Objective	Strategy	Action(s)	Target SGCNs
Restore a natural fire interval that promotes historical forest conditions (USDA Forest Service 2013 [monitoring and evaluation program])	Use prescribed and natural fires to maintain desired conditions (USDA Forest Service et al. 2015) Encourage silviculturally-prescribed (nonnatural) fire on private, corporate, & state-endowed lands.	Lands within the WUI treated to reduce fuels through mechanical removal or controlled burns (USDA Forest Service 2015) Fire-killed trees are left standing, if pose no safety hazard, as wildlife habitat (USDA Forest Service 2015)	Olive-sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Little Brown Myotis
Simulate natural fire regimes.	Design and implement silvicultural prescriptions that simulate natural disturbance regimes.	Actively remove shade-tolerant species.	Olive-sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Little Brown Myotis
Encourage use of fire as management tool on private lands.	Design programs for small forest owners.	Provide agency resources to conduct prescribed burns on private property at low to no cost to landowner.	Olive-sided Flycatcher, Townsend's Big-eared Bat,

Objective	Strategy	Action(s)	Target SGCNs
			Silver-haired Bat, Hoary Bat, Little Brown Myotis

High rated threats to Mesic Lower Montane Conifer Forest in the Bitterroot Mountains

Forest insect pests & diseases

When at endemic population levels, native forest insects and disease play a critical role in maintaining the health of the forest ecosystem by removing individuals or small groups weakened by drought, injury, or fire (USDA Forest Service 2010). However, when large stands of trees are stressed by prolonged drought and/or dense stocking, outbreaks of forest insects and disease can impact tree growth, forest composition and cause extensive tree mortality (USDA Forest Service 2010). Severe outbreaks of forest insects and pathogens can even cause the conversion of forest to shrublands or grasslands. The impact on forest composition from large scale outbreaks is predicted to increase as climate change decreases precipitation and increases temperatures (USDA Forest Service 2010). Currently, 15–20% of lodgepole pine stands in the IPNF are at high risk for attack by the mountain pine beetle, whereas 25–30% of Douglas-fir stands are at high risk for attack by the Douglas-fir pine beetle, with each beetle predicted to kill 80% and 60%, respectively of the basal area in high risk stands (USDA Forest Service 2010). The introduction of the exotic white pine blister rust (*Cronartium ribicola*) has reduced western white pine to 5% of its original distribution across the interior Pacific Northwest. This caused changes in forest composition from a relatively stable, fire- and disease- tolerant western white pine forests to early seral forests dominated by the fire and disease–intolerant species such as Douglas-fir, grand fir and subalpine fir (USDA Forest Service 2013).

Objective	Strategy	Action(s)	Target SGCNs
Reduce risk of stand-replacing pine beetle or root fungus infestations.	Use integrative pest management strategies. Increase diversity of stand ages, size classes and tree species (KPNZ Climate et al. 2010) Promote responsible firewood harvest/transport.	Use pheromones to protect stands (beetle whispering) (Kegley and Gibson 2004). Thin stands to <= 60 basal area. Remove debris that attracts pine beetles. Cut out infected trees (mistletoe) (IDL 2015).	Olive-sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Little Brown Myotis

Objective	Strategy	Action(s)	Target SGCNs
Increase number of rust-resistant western white pine in the ecosystem (USDA Forest Service 2013).	Continue developing genetics of disease resistant trees. Planting rust–resistant western white pine during restoration efforts.	Conserve and protect any old-growth western white pine on the landscape. Determine if rust-resistant. (Neuenschwander et al. 1999). Planting rust-resistant trees in openings that are also *Ribes*-free (Neuenschwander et al. 1999). Monitor and remove any signs of the rust on planted trees (USDA Forest Service 2013).	Olive-sided Flycatcher, Townsend's Big-eared Bat, Silver-haired Bat, Hoary Bat, Little Brown Myotis

Species designation, planning & monitoring

Multiple species identified as SGCN are declning as as result of unknown causes. The priority for many of these species in the coming years is to identify what is/are the root cause(s) of their apparent decline, and develop a strategy for addressing it.

Objective	Strategy	Action(s)	Target SGCNs
Determine causes of decline in Olive-sided Flycatcher.	Determine relative importance of known and suspected threats to Olive-sided Flycatcher, its prey, and their habitats (see Canada's recovery plan, Appendix B; Environment Canada 2015b). Investigate factors affecting reproductive output, survival, and fidelity to breeding sites.	Promote cooperation and collaboration with Western Working Group Partners in Flight to fill knowledge gaps and to mitigate threats. Develop monitoring program that assess changes in species distribution and population size for SGCN and associated species.	Olive-sided Flycatcher

Target: Subalpine–High Montane Conifer Forest

At the higher elevations within the Coeur d'Alene, St. Joe, North Bitterroot and North Clearwater Mountains, the Subalpine–High Montane Conifer Forest is the prevalent habitat group. The Subalpine–High Montane Conifer Forest is predominantly found at elevations between 900 and 2373 m in the mountain ranges. At the lower elevations within the habitat group where it is still warm enough to sustain, Douglas-fir (*Pseudotsuga menziesii* [Mirb.] Franco), western larch (*Larix occidentalis* Nutt.), and western white pine (*Pinus monticola* Douglas ex D. Don) are found with Engelmann spruce (*Picea engelmannii* Parry ex Engelm.), lodgepole pine (*Pinus contorta* Douglas ex Loudon) and subalpine fir (*Abies lasiocarpa* [Hook.] Nutt.) in the overstory. Thinleaf huckleberry (*Vaccinium membranaceum* Douglas ex Torr.) and grouse whortleberry (*Vaccinium scoparium* Leiberg ex Coville) are common species in the understory and provide important wildlife forage (Smith and Fischer 1997). Mountain hemlock (*Tsuga mertensiana* [Bong.] Carrière) is often a co-climax species in this habitat group; however like Subalpine larch, (*Larix lyallii* Parl.) it has a limited distribution in the St. Joe, North Bitterroot and North Clearwater Mountains (Smith and Fischer 1997). Whitebark pine (*Pinus albicaulis* Engelm.) replaces lodgepole pine in higher elevations and becomes dominant as the elevation and climate severity increases. At the timberline, the transition zone between continuous forest and the limited alpine, only Engelmann spruce, subalpine fir, subalpine larch and whitebark pine persist. The timberline zone is impacted by drying winds, heavy snow accumulation and subsurface rockiness that lead to stunted growth and a clustered distribution (Cooper et al. 1991, Smith and Fischer 1997). At the timberline, whitebark pine is commonly the species that colonizes sites and provides habitat for less hardy species. Whitebark pine also provides food resources for numerous wildlife *species*, such as Clark's Nutcracker (*Nucifraga columbiana*) and other small mammals and birds, in the form of large high caloric-value seeds (Fryer 2002). It is a long-lived and slow-growing species that is often overtopped by faster-growing, shade-tolerant species, such as subalpine fir and Engelmann spruce. Fire and other disturbances such as ice, windthrow, rockslides and landside help to maintain whitebark pine as the climax species within the upper elevations of the subalpine. However fire suppression, invasion of the white pine blister rust (*Cronartium ribicola*) and mountain pine beetle have all contributed to the recent precipitous declines of whitebark pine across its range (Smith and Fischer 1997, Fryer 2002).

Target Viability

Poor to Fair. Subject to altered fire regimes, forest insects, disease, and climate change; reduction in whitebark pine woodlands.

Prioritized Threats and Strategies for Subalpine High Montane Conifer Forest

Very High rated threats to Subalpine High Montane Conifer Forest in the Bitterroot Mountains

Altered fire regimes (fire suppression and stand replacing wildfires)

Historically, mixed severity fires burned between 60 and 300 years with nonlethal burns in the understory of whitebark pine stands at an average interval of 56 years (Smith and Fischer 1997). However tree regeneration in the upper elevation is dependent on soil moisture, temperature and whitebark pine seed cache and maybe very slow in some areas. The lack of whitebark pine regeneration after the Sundance Fire is thought to be due to a lack of seed cache after mature trees were killed by mountain pine beetle or infected with blister rust (Smith and Fischer 1997). As with the other habitat types, decades of fire suppression activities aided by a cool period in the Pacific decadal oscillation were effective in preventing most moderate fires in the ecosystem while also preventing stand-replacing fires that often enable shade-intolerant species to establish (USDA Forest Service 2013[EIS_IPNF]). This resulted in the encroachment of shade-tolerant species into the habitat group as well as a decrease in fire-tolerant species, increased vertical stand structure, increased canopy closure, increased vertical fuel ladders, greater biomass, greater fire intensities and severities, and increased insect and disease epidemics (Keane et al. 2002). Fire management activities over the past 15 years has attempted to simulate and re-establish the vegetative composition of regular fire patterns but is hampered by the inability to allow natural fires to burn.

Objective	Strategy	Action(s)	Target SGCNs
Restore a natural fire interval that promotes historical forest conditions (USDA Forest Service 2013 [monitoring and evaluation program]).	Use prescribed and natural fires to maintain desired conditions (USDA Forest Service et al. 2015). Encourage silviculturally-prescribed (nonnatural) fire on private, corporate, & state-endowed lands.	Fire-killed trees are left standing, if pose no safety hazard, as wildlife habitat (USDA Forest Service 2015).	Wolverine Clark's Nutcracker Mountain Goat Hoary Marmot
Simulate natural fire regimes.	Design and implement silvicultural prescriptions that simulate natural disturbance regimes.	Actively remove shade-tolerant species.	Wolverine Clark's Nutcracker Mountain Goat Hoary Marmot

High rated threats to Subalpine High Montane Conifer Forest in the Bitterroot Mountains

Climate planning and monitoring

Delineating temperature refugia for cool water or air temperature dependent species is a relatively new idea (Isaak et al. 2015). Recent microclimate monitoring work in the Idaho Panhandle identified a portion of the St. Joe Mountains to have a cooler than average mean annual air temperature in the Panhandle. Additionally, the Coeur d'Alene Mountains tend to have warmer mean annual air temperatures than other mountain ranges in the Panhandle. Monitoring both the organisms that inhabit these mountains along with abiotic climate measurements will be an important component of adaptively managing wildlife in a changing climate (Lucid et al. 2015).

Objective	Strategy	Action(s)	Target SGCNs
Climate monitoring.	Monitor climate variables and species co-occurrence over time.	Develop climate monitoring program using a variety of microclimate variables along with co-occurrence of associated SGCN.	Wolverine Clark's Nutcracker Mountain Goat Hoary Marmot Pale Jumping Slug Hemphillia spp. 1 Western Toad Magnum Mantleslug
Implement other state management plans.	Implement *Management Plan for the Conservation of Wolverines in Idaho 2014–2019* (IDFG 2014).	Implement specific actions outlined in climate section of *Management Plan for the Conservation of Wolverines in Idaho 2014–2019* (IDFG 2014).	Wolverine Clark's Nutcracker Mountain Goat Hoary Marmot Pale Jumping Slug Hemphillia spp. 1 Western Toad Magnum Mantleslug

Forest insects and disease

When at endemic population levels, native forest insects and disease play a critical role in maintaining the health of the forest ecosystem by removing individuals or small groups weakened by drought, injury or fire (USDA Forest Service 2010). However, when large stands of trees are stressed by prolonged drought and/or dense stocking, outbreaks of forest insects and disease can impact tree growth, forest composition and cause extensive tree mortality (USDA Forest Service 2010). Severe outbreaks of forest insects and pathogens can even cause the conversion of forest to shrublands or grasslands. The impact on forest composition from large scale outbreaks is predicted to increase as climate change decreases precipitation and increases temperatures (USDA Forest Service 2010). The introduction of the exotic white pine blister rust (*Cronartium ribicola*) has reduced whitebark pine by nearly a quarter to a half in subalpine ecosystems in Northern Idaho and Montana (USDA Forest Service 2010) by reducing the ability of the species to produce cones. In the Selkirk Mountains, an average of 70% of live whitebark pine is already infected by blister rust (Kegley and Gibson 2004). Additionally, mountain pine beetle often kills whitebark pine that are rust resistant (Schwandt 2006). As a keystone species within subalpine ecosystems, the loss of whitebark pine is predicted to negatively impact forest composition, wildlife communities, soil structure and alpine hydrology (Schwandt 2006).

Objective	Strategy	Action(s)	Target SGCNs
Reduce risk of stand-replacing pine beetle infestations.	Use integrative pest management strategies. Increase diversity of stand ages, size classes and tree species (KPNZ Climate et al. 2010). Promote responsible firewood harvest/transport.	Use pheromones to protect stands (beetle whispering)(Kegley and Gibson 2004). Thin stands to <= 60 basal area. Remove debris that attracts pine beetles. Cut out infected trees (mistletoe) (IDL 2015).	Clark's Nutcracker Grizzly Bear
Increase number of rust-resistant whitebark pine in the ecosystem (USDA Forest Service 2013).	Continue developing genetics of disease resistant trees. Planting rust–resistant whitebark pine during restoration efforts.	Monitor rust and beetle levels in live whitebark pine. Collect rust-resistant seed for testing and restoration (Schwandt 2006). Planting rust-resistant trees in openings that are also *Ribes*-free (Neuenschwander et al. 1999). Monitor and remove any signs of the rust on planted trees (USDA Forest Service 2013).	Clark's Nutcracker Grizzly Bear

Target: Riverine–Riparian Forest & Shrubland

In the Bitterroot Mountains, the riverine ecosystem includes all rivers, streams, and smaller order waterways (1st through 3rd-order; Strahler stream order) and their associated floodplain and riparian vegetation. Major rivers (those designated as 4th+ order in Strahler stream order) in the Bitterroot Mountains includes the Coeur d'Alene, Spokane, St. Joe, St. Maries, and North Fork Clearwater rivers. Other rivers and streams in the region support numerous fisheries and provide host habitat for several mussel species. High velocity mountain streams provide important nesting habitat for Harlequin Duck and a diversity of aquatic invertebrates. The cold to very cold waters found in subalpine headwater systems support a diversity of stenographic invertebrates, particularly within the North Rocky Mountain Refugium. In the Bitterroot Mountains there are numerous waterfalls documented for the region. Waterfalls support aquatic organisms uniquely adapted to extremely high water velocities and plants and animals that require cool, constantly moist rocky habitats. Waterfalls also provide important nesting habitat for Black Swift. There are at least 2 nesting colonies in the Coeur d'Alene Mountains (Miller et al. 2013).

St. Joe River © John Neider

Target Viability

Fair. Long history of mining, timber, and grazing has impacted most parts of the major rivers. Higher elevation streams will be impacted by climate change.

Prioritized Threats and Strategies for Riverine–Riparian Forest & Shrubland

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

Pollution from mining

Heavy metal pollution, stream channelization and sedimentation, and migration blocks related to the extensive mining history have had severe impacts on fish, waterfowl, landbirds, amphibians, and aquatic invertebrates (Blus et al. 1994, Lybarger 2014, Maret et al. 2002, 2003). In 1986, the US EPA listed the Bunker Hill Mining and Metallurgical Site in the Coeur d'Alene Basin on the National Priorities List. Remediation work began in 1989 to clean up contaminated sites particularly within inhabited locations. In 2002 a Record of Decision expanded remediation activities to areas outside of the Bunker Hill site. As sites are cleaned of contamination, restoration efforts have began to restore the natural functioning ecosystem. Although restoration work has been completed in several areas since 2007, the final planning framework for the restoration of the Coeur d'Alene Basin is still in the approval process.

Objective	Strategy	Action(s)	Target SGCNs
Maintain (or provide) soil, sediment, and water quality capable of supporting a functional ecosystem for the aquatic and terrestrial plant and animal populations in the Coeur d'Alene Basin.	<insert strategies>	Implement the objectives, strategies, and actions outlined in the EPA's Bunker Hill and Metallurgical Site Record of Decision.	Western Pearlshell California Floater
Return injured natural resources to a healthy condition.		Implement the objectives, strategies, and actions outlined in the Final Restoration Plan when approved.	Western Pearlshell California Floater

Aquatic invasive invertebrate and plant species

Aquatic invasive species are often the most difficult to detect and eradicate. Across the nation, Zebra and Quagga Mussel have disrupted food chains, competed with native species, and cost millions of dollars of damage to municipalities by choking water intake pipes and other facilities (Pimental et al. 2004). Although zebra and quagga mussel has not yet been detected in the waterbodies of the Bitterroot Mountains, several boat check stations in the region have found the mussel on boats traveling through the area (State of Idaho Agriculture, accessed on Nov 2, 2015). It is a goal of the state that neither mussel is ever established in any of the Idaho water ways. Other aquatic invasive species specifically Eurasian watermilfoil (*Myriophyllum spicatum* L.) have been detected and established in the Coeur d'Alene and St. Joe rivers (T. Woolf, pers. comm.). This species easily spreads through the movement of boats between the recreational lakes, rivers, and streams in the region. For most of the aquatic plant species, only a fragment of the vegetated matter is necessary to establish the species in a new area. Aquatic invasive plant species, particularly Eurasian watermilfoil, often form dense mats that prevent the establishment of native aquatic plant species and degrade wildlife and fish habitat (ID Invasive Species Counsel and ID State Dept. of Agriculture 2007).

Objective	Strategy	Action(s)	Target SGCNs
Prevent the establishment of aquatic invasive species in noninvaded riverine systems.	Increase monitoring of riverine systems. Increase monitoring and treatment of dispersal vectors for invasive species.	Determine which riverine systems are not impacted by aquatic invasive species. Establish a monitoring schedule to visit un-invaded but high-risk riverine systems. Educate the public about the dangers of associated with spreading an aquatic invasive species. (ID Invasive Species Counsel and ISDA 2007). Maintain boat-check stations for the regular inspection for aquatic invasive species.	Western Pearlshell California Floater
Contain and	Implement	Survey invaded waters to determine extent of	Western

Objective	Strategy	Action(s)	Target SGCNs
eradicate populations of Eurasian watermilfoil .	actions indicated in the ISDA's 2008 Statewide Strategic Plan For Eurasian Watermilfoil In Idaho.	nonnative aquatic species distribution. Develop treatment priorities based on water body use. Develop strategies for eradication based on water body hydrology and use. Regularly monitor and retreat areas after initial treatment. (ID Invasive Species Counsel and ISDA 2007).	Pearlshell California Floater
Monitor threat.	Monitor changes in range and distribution of noxious weeds.	Incorporate noxious weeds into a multitaxa monitoring program.	Olive-sided Flycatcher, Common Nighthawk, Townsend's Big-eared Bat, Little Brown Myotis

Declines in beaver populations

Beaver populations currently exist at lower than historic levels across the western United States. This results in a host of ecological consequences. Beaver restoration efforts have been shown to be an effective tool to restoring habitat and ecological function to riverine systems.

Objective	Strategy	Recommended Action(s)	Target SGCNs
Determine current status of beaver populations.	Determine past and current status of beaver populations.	Conduct analysis to determine feasibility and potential mechanisms of beaver restoration. Implement actions delineated by above analysis.	Western Pearlshell, California Floater, Western Ridged Mussel, *Ephemerella alleni* Olive-sided Flycatcher, Common Nighthawk, Townsend's Big-eared Bat, Little Brown Myotis

Population declines of Harlequin Duck

In Idaho, Harlequin Ducks are uncommon and occupy high quality streams from the Canadian border south to the Selway River and in the Greater Yellowstone Ecosystem. Breeding streams are relatively undisturbed with high elevation gradients, cold, clear, and swift water, rocky substrates, and forested bank vegetation. Harlequin Ducks use different stream reaches over the course of the breeding season depending on environmental conditions (e.g., timing and magnitude of stream runoff, food abundance) and reproductive chronology (i.e., prenesting, nesting, early and late brood-rearing), but remain closely tied to rivers and streams for food, security, and escape cover from predators. There are an estimated 50 pairs of Harlequin Duck that breed in Idaho (IDFG unpublished data). From 1996 to 2007 there was no statistically significant change in the statewide population. However, there were possible declines on several rivers including the Moyie River, Granite Creek (Lake Pend Oreille drainage) and the St. Joe River. However, distribution and abundance of Harlequin Duck has not been assessed since 2007.

Objective	**Strategy**	**Action(s)**	**Target SGCNs**
Develop priority land management and recreation actions to benefit Harlequin Duck.	Design research projects that improve understanding of the factors that influence occupancy, survival, and reproduction.	Mark and track individuals on the breeding grounds using telemetry (e.g., platform transmitter terminals (PTTs) or geolocators) to better understand habitat use, survival rates, causes and timing of mortality, patterns and timing of movements, linkages between breeding, molting, and wintering areas, and return rates. Seek partnerships with coastal states and provinces to study wintering ecology and habitat use. Investigate how stream flow characteristics (severity, timing, and frequency of peak and low stream flows) affect Harlequin Duck productivity and survival. Assess population implications under forecasted climate models. Investigate how human disturbance and changes in forest management affect behavior, occupancy, reproductive success, and survival.	Harlequin Duck
Implement a Harlequin Duck population monitoring program.	Develop partnerships, funding and capacity to conduct breeding surveys statewide on a regular basis.	Conduct spring pair surveys and summer brood surveys following the protocol established in the Harlequin Duck Conservation Assessment and Strategy for the US Rocky Mountains (Cassirer et al. 1996). Where local declines are apparent, expand surveys upstream of historically occupied stream reaches. Coordinate surveys with MT, WY, WA, OR, BC, AB to facilitate a northwest regional population assessment. Incorporate Harlequin Duck surveys into riverine multitaxa monitoring programs.	Harlequin Duck
Provide and protect high quality breeding habitat (nesting habitat, security cover, food) for Harlequin Duck on breeding streams.	Maintain and protect water quality, quantity, and natural flow regimes and riparian vegetation.	Introduce buffer zones along montane riparian habitats to maintain riparian structure and function, including snags and woody debris. Avoid siting projects (e.g., water diversions, dams, and hydropower developments, mining, road construction, clearcut silvicultural prescriptions) on breeding streams and in the adjacent uplands that	Harlequin Duck

Objective	Strategy	Action(s)	Target SGCNs
		might alter runoff and water quality to sustain food supply, suitable foraging conditions, and continuous habitat during the breeding season. Manage grazing (length and timing of season, stock levels, location, development of water sources) to maintain streambank stability and riparian vegetation (especially shrubs).	

Unknown status of Black Swift

Little is known about breeding Black Swift in Idaho. Black Swifts are not generally detected during breeding bird surveys. Additionally, their cryptic nesting sites and small colony sizes are obstacles when determining distribution or abundance in the state. In 2013, a survey of breeding locations for Black Swift found evidence of nesting at 5 of the 16 waterfalls visited and roosting swifts at 2 of the waterfalls (Miller 2013).

Objective	Strategy	Action(s)	Target SGCNs
Determine current breeding locations of Black Swift.	Conduct a comprehensive survey of potential nesting locations.	Work with partners, including Intermountain Bird Observatory, to develop and implement a systematic survey. Incorporate surveys into multitaxa monitoring programs.	Black Swift

Species designation, planning and monitoring

Basic knowledge of ecological requirements, habitat needs, systematics, and distribution is lacking for the majority of aquatic invertebrates. Understanding distribution and habitat requirements is critical for management and conservation since most aquatic invertebrates have specific habitat requirement that generally do not overlap with aquatic vertebrates (Stagliano and Maxell 2010). Surveys in the Bitterroot Mountains, specifically within North Rocky Mountain Refugium, identified a hot spot of invertebrate endemism particularly within the cold headwaters (Stagliano and Maxell 2010). However regardless of location, very little is known about most aquatic invertebrates within the section.

Objective	Strategy	Action(s)	Target SGCNs
Determine distribution and habitat requirements.	Conduct surveys to determine distribution and trends.	Conduct surveys to determine distribution and trends. Collect voucher specimens to confirm identification and taxonomic status. Develop monitoring program to determine future changes in population size and species distribution.	Western Pearlshell Western Ridged Mussel Rocky Mountain Duskysnail Rotund Physa Nez Perce Pebblesnail *Bryelmis idahoensis* Lolo Mayfly *Ephemerella alleni* *Ameletus tolae* *Paraleptophlebia falcula* *Parameletus columbiae* Straight Snowfly Idaho Snowfly

Objective	Strategy	Action(s)	Target SGCNs
			Palouse Snowfly Clearwater Roachfly Umatilla Willowfly *Manophylax annulatus* *Eocosmoecus schmidi* *Philocasca antennata* *Philocasca banksi* *Homophylax acutus* *Rhyacophila oreia* *Rhyacophila robusta* *Goereilla baumanni* *Sericostriata surdickae*
Determine appropriate taxonomic status of California Floater and Pondsnail Species Group.	Investigate and validate taxonomic status.	Conduct field surveys to collect specimens. Conduct morphological and genetics work to determine species status.	California Floater Pondsnail Species Group
Determine microclimatic requirements for cold water associated species.	Investigate associations between species and abiotic factors.	Design studies to determine microclimate requirements. Implement programs to comonitor stream temperatures and species occurrence.	Western Pearlshell Western Ridged Mussel Rocky Mountain Duskysnail Rotund Physa Nez Perce Pebblesnail *Bryelmis idahoensis* Lolo Mayfly *Ephemerella alleni* *Ameletus tolae* *Paraleptophlebia falcula* *Parameletus columbiae* Straight Snowfly Idaho Snowfly Palouse Snowfly Clearwater Roachfly Umatilla Willowfly *Manophylax annulatus* *Eocosmoecus schmidi* *Philocasca antennata* *Philocasca banksi* *Homophylax acutus* *Rhyacophila oreia* *Rhyacophila robusta* *Goereilla baumanni* *Sericostriata surdickae*
Determine SGCN species status.	Conduct surveys and implement long-term aquatic species monitoring program.	Develop program to monitor trends in species distribution and population size.	Western Pearlshell California Floater

Target: Depressional Wetlands

Depressional wetlands are any wetlands found in a topographic depression. Depressional wetlands include vernal pools, old oxbows, disconnected river meanders and constructed wetlands. In the Bitterroot Mountains, this includes many of the wetlands found within the Coeur d'Alene Wildlife Management Area (WMA), and within the floodplains of the Coeur d'Alene, St. Joe, St. Maries, and North Fork Clearwater rivers. Other depressional wetlands are found within the mountain ranges wherever the elevational line lines close and surface waters accumulate.

Depressional wetland © YYYY Photographer

Small depressional ponds (<2 m deep) commonly occur within the mountain ranges and provide breeding habitat for Western Toad. Depressional wetlands often support emergent marsh or shrub swamps that are composed of broad-leaf cattail (*Typha latifolia* L.), panicled bulrush (*Scirpus microcarpus* J. Presl & C. Presl), creeping bentgrass (*Agrostis stolonifera* L.), rose spirea (*Spiraea douglasii* Hook.) and gray alder (*Alnus incana* [L.] Moench). In the valley bottoms, reed canarygrass (*Phalaris arundinacea* L) often forms impenetrable monocultures that limit species diversity within the wetlands (Cousins, pers. comm.). Amphibians, waterbirds, marshbirds, and waterfowl all use depressional wetlands for breeding and foraging habitats.

Target Viability

Fair. Lower elevations experiencing altered hydrological regimes and invasive species/disease. Higher elevations threatened by climate change.

Prioritized Threats and Strategies for Depressional Wetlands

Very High rated threats to Depressional Wetlands in the Bitterroot Mountains

Invasive and noxious weeds

Invasive species often prevent the establishment of native species by forming dense monocultures and in some instances even change the soil chemistry or hydrology of the invaded area (Ricciardi et al. 2013). Reed canarygrass is a native species in the lower 48 but is considered a noxious weed in Washington and is thought to have hybridized with a nonnative invasive reed canarygrass (Lavergne and Molofsky 2007). Reed canarygrass forms dense monocultures that decreases plant diversity and degrades wildlife habitat. Surveys done in the Bitterroot Mountains, found 25 of the ponds, small lakes and emergent wetlands (n = 183) surveyed had spotted knapweed or tansy present (Lucid et al. 2015).

Objective	**Strategy**	**Action(s)**	**Target SGCNs**
Identify and eradicate any potential invasive species prior to establishment (USDA Forest Service 2013).	Increased monitoring for invasive and noxious weeds. Coordinate invasive and noxious weed treatment across agencies.	Train agency staff to document presence/absence of noxious weeds during field/site visits. Develop a noxious weed database for all lands across Idaho. Use existing technology such as Global Positioning Systems (GPS), remote sensing and Geographic Information Systems (GIS) to efficiently collect, store, retrieve, and analyze and display noxious weed information (ISDA 1999). Implement actions described in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012) .	Western Toad, Black Tern, American Bittern, Silver-haired Bat, Townsend's Big-eared Bat, Little Brown Myotis
Contain and reduce widespread weeds in areas that are already infested (USDA Forest Service 2013).	Coordinate invasive and noxious weed treatment across agencies. Prevent spread of widespread weeds through the identification and treatment of dispersal vectors. Restoration of treated areas with native species.	Continue annual noxious weed control program and coordinate weed management activities with Kootenai County and the Inland Empire Cooperative Weed Management Area. Weed treatment of high impact areas/roads. (USDA Forest Service 2013). Treat equipment used during timber harvest or fire suppression activities to be "weed-free" (USDA Forest Service 2013, IDL 2015). Revegetate and monitor restoration areas with native species (KTOI 2009). Implement actions described in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012).	Western Toad, Black Tern, American Bittern, Silver-haired Bat, Townsend's Big-eared Bat, Little Brown Myotis

High rated threats to Depressional Wetlands in the Bitterroot Mountains

Climate planning and monitoring

Delineating temperature refugia for cool water or air temperature dependent species is a relatively new idea (Isaak et al. 2015). Recent microclimate monitoring work in the Idaho Panhandle identified a portion of the St. Joe Mountains to have a cooler than average mean annual air temperature in the Panhandle. Additionally, the Coeur d'Alene Mountains tend to have warmer mean annual air temperatures than other mountain ranges in the Panhandle. Monitoring both the organisms which inhabit these mountains along with abiotic climate measurements will be an important component of adaptively managing wildlife in a changing climate (Lucid et al. 2015).

Objective	Strategy	Action(s)	Target SGCNs
Climate monitoring.	Monitor climate variables and species co-occurrence over time.	Develop climate monitoring program using a variety of microclimate variables along with co-occurrence of associated SGCN.	Black Tern, American Bittern, Western Toad, Silver-haired Bat, Townsend's Big-eared Bat, Little Brown Myotis

Unknown status or causes of decline

Multiple species identified as SGCN are declning as as result of unknown causes. The priority for many of these species in the coming years is to identify what is/are the root cause(s) of their apparent decline, and develop a strategy for addressing it. For Black Tern (*Chlidonias niger*), there may be many additional nesting sites in Idaho yet to be discovered. This should be a high priority in the next 10 years so that we have a better sense of our baseline breeding population.

Objective	Strategy	Action(s)	Target SGCNs
Determine current distribution and abundance of American Bittern.	Participate in coordinated monitoring. Identify hot spots for conservation .	Conduct repeat surveys of effort initiated in early 2000s to determine where species distribution and density has changed.	American Bittern
Determine statewide breeding populations of Black Tern.	Identify habitat requirements of breeding Black Tern.	Conduct repeat surveys of targeted habitat for Black Tern nesting.	Black Tern
Determine reasons for decline in Western Toad population	Conduct studies.	Conduct literature and discuss issue with experts. Implement measures to restore viable toad populations.	Western Toad

Target: Springs & Groundwater-Dependent Wetlands

In the Bitterroot Mountains, springs and groundwater-dependent wetlands are numerous and often occur on sloping land with gradients ranging from steep hillsides to nearly imperceptible. Slope wetlands differ from depressional wetlands by the lack of closed contours. The mountainous region contains numerous wet–mesic meadows, fens, and seep-fed shrub or tree dominated wetlands. However, the abundance of both groundwater-dependent and depressional wetlands does not equal regions north due to slight differences in climate and geography. Cold-water springs are prevalent in the Bitterroot Mountains section, particularly in the subalpine headwaters of the North Fork Clearwater River basin, the St. Joe River basin and the Coeur d'Alene River basin. They often provide a cold-water refugium for invertebrate and vertebrate species (Issak et al. 2015).

Target Viability

Fair. Lower elevations experiencing altered hydrologic regimes and invasive species/disease. Higher elevations threatened by climate change.

Prioritized Threats and Strategies for Springs & Groundwater-Dependent Wetlands

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

Invasive and noxious weeds

Invasive species often prevent the establishment of native species by forming dense monocultures and in some instances even change the soil chemistry or hydrology of the invaded area (Ricciardi et al. 2013). Reed canarygrass is a native species in the lower 48 but is considered a noxious weed in Washington and is thought to have hybridized with a non-native invasive reed canarygrass (Lavergne and Molofsky 2007). Reed canarygrass forms dense monocultures that decreases plant diversity and degrades wildlife habitat.

Objective	Strategy	Action(s)	Target SGCNs
Identify and eradicate any potential invasive species prior to establishment (USDA Forest Service 2013).	Increased monitoring for invasive and noxious weeds. Coordinate invasive and noxious weed treatment across agencies.	Train agency staff to document presence/absence of noxious weeds during field/site visits. Develop a noxious weed database for all lands across Idaho. Utilize existing technology such as Global Positioning Systems (GPS), remote sensing and Geographic Information Systems (GIS) to efficiently collect, store, retrieve, and analyze and display noxious weed information (ISDA 1999). Implement actions described	Western Toad

Objective	Strategy	Action(s)	Target SGCNs
		in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012).	
Contain and reduce widespread weeds in areas that are already infested (USDA Forest Service 2013).	Coordinate invasive and noxious weed treatment across agencies. Prevent spread of widespread weeds through the identification and treatment of dispersal vectors. Restoration of treated areas with native species.	Continue annual noxious weed control program and coordinate weed management activities with Kootenai County and the Inland Empire Cooperative Weed Management Area. Weed treatment of high impact areas/roads. (USDA Forest Service 2013). Treat equipment used during timber harvest or fire suppression activities to be "weed-free" (USDA Forest Service 2013, IDL 2015). Revegetate and monitor restoration areas with native species (KTOI 2009) . Implement actions described in the 2012–2016 Idaho Invasive Species Strategic Plan (ISDA 2012).	Western Toad
Monitor threat.	Monitor changes in range and distribution of noxious weeds.	Incorporate noxious weeds into a multitaxa monitoring program.	Western Toad

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

Climate planning and monitoring

Delineating temperature refugia for cool water or air temperature dependent species is a relatively new idea (Isaak et al. 2015). Recent microclimate monitoring work in the Idaho Panhandle identified a portion of the St. Joe Mountains to have a cooler than average mean annual air temperature in the Panhandle. Additionally, the Coeur d'Alene Mountains tend to have warmer mean annual air temperatures than other mountain ranges in the Panhandle. Monitoring both the organisms which inhabit these mountains along with abiotic climate measurements will be an important component of adaptively managing wildlife in a changing climate (Lucid et al. 2015).

Objective	Strategy	Action(s)	Target SGCNs
Climate monitoring	Monitor climate variables and species co-occurrence over time	Develop climate monitoring program using a variety of micro-climate variables along with co-occurrence of associated SGCN.	Western Toad,

Species designation, planning and monitoring

Basic knowledge of ecological requirements, habitat needs, systematics, and distribution is lacking for most aquatic and semiaquatic invertebrates. Within the springs and groundwater-dependent wetlands target, A Click Beetle (*Beckerus barri*) is in need of additional information on its distribution and habitat requirements. Known from only 2 locations, this semiaquatic endemic species is thought to be associated with groundwater-associated marshes. Understanding distribution and habitat requirements is critical for management and conservation since most aquatic invertebrates have specific habitat requirements that generally do not overlap with aquatic vertebrates (Stagliano and Maxell 2010).

Objective	Strategy	Action(s)	Target SGCNs
Determine distribution and habitat requirements.	Conduct surveys to determine distribution and trends.	Conduct surveys to determine distribution and trends. Collect voucher specimens to confirm identification and taxonomic status. Develop monitoring program to determine future changes in population size and species distribution.	A Click Beetle (*Beckerus barri*)

Target: Lake-nesting Birds

Western Grebe is a lake-nesting species that is found primarily on the lakes in the Coeur d'Alene WMA. Western Grebes build floating nests that are often hidden among emergent vegetation but are sometimes in the open. They are often found in colonies that can number into the hundreds or thousands. In the Coeur d'Alene WMA, a nesting colony of Western Grebe has been regularly documented on Cave Lake with nest numbers ranging from 20 to 80 nests per year. Lake-nesting birds are often impacted by recreational boat traffic and invasive and noxious weeds.

Target Viability

Good. Colony has consistently number between 20 and 80 nests. Occasionally, contains nesting Clark's Grebe.

High rated threats to Lake-nesting Birds in the Bitterroot Mountains

Water level fluctuations in lakes

Fluctuating water levels are a significant issue for several waterbird species, including Western Grebe, Clark's grebe, White-faced Ibis, and Franklin's Gull. Most Western and Clark's Grebe colonies are located on lakes, 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. Additionally, recreational boat traffic near nests can inadvertently flood nests and cause a disruption of incubation behavior.

Objective	Strategy	Action(s)	Target SGCNs
Reduce grebe	Work with US	Create boating no-wake zones around nesting	Western Grebe

Objective	Strategy	Action(s)	Target SGCNs
nest failure.	Army Corps of Engineers (USACE) and dam operators to reduce water level fluctuations and boat wake during grebe nesting period. Educate public regarding presence and sensitivity of colonial nesting birds.	colonies, and monitor their effectiveness. Develop Best Management Practices with USACE for water level management around grebe colonies. Create signage at boat launches informing the public of colony presence and recommendations for reducing recreational impacts.	

Unknown status or causes of decline

Western Grebe is declning as as result of unknown causes. The priority for many of these species in the coming years is to identify what is/are the root cause(s) of their apparent decline, and develop a strategy for addressing it.

Objective	Strategy	Action(s)	Target SGCNs
Determine causes of low nesting success and recruitment of Western Grebe in Idaho.	Conduct research on existing colonies in Idaho.	Collaborate with USFWS on proposed research project.	Western Grebe

Target: Ground-dwelling Invertebrates

Ground-dwelling invertebrates provide essential ecosystem services including decomposition, nutrient cycling, food for vertebrates, plant pollination, seed dispersal, and disease vectoring. They can also serve as effective indicators of environmental health (Jordan and Black 2012). This group encompasses a wide array of taxa. However, Bitterroot Mountains SGCN in this group are limited to terrestrial gastropods, spur-throated grasshoppers, and harvestman species (commonly known as Daddy longlegs).

Cryptomastix sp. © Michael Lucid

Target Viability

Good. Habitat and threat data deficient. Many species taxonomically and distributionally data deficient.

Species designation, planning and monitoring

Basic knowledge of ecological requirements, habitat needs, systematics, and distribution is lacking for the majority of ground invertebrates. Spur-throated grasshoppers and harvestman species are in need of basic taxonomic work. Although substantial knowledge of terrestrial gastropod distribution and microclimate requirements was obtained during work conducted from 2010 to 2014 (Lucid et al. 2015), much work remains to be done to gain an adequate understanding of basic conservation needs for these species. Four terrestrial gastropods are known to be associated with cooler than average mean annual air temperatures (Lucid et al. 2015). Managing microsites for these species for cool air temperatures and minimal disturbance is recommended until a better ecological understanding is developed through research and monitoring.

Objective	Strategy	Action(s)	Target SGCNs
Determine appropriate taxonomic status of species within the spur-throated	Investigate and validate taxonomic status.	Conduct field surveys to collect specimens. Conduct morphological and genetics work to determine species status.	Spur-throated Grasshopper Group.

Objective	Strategy	Action(s)	Target SGCNs
grasshopper group.			
Determine appropriate taxonomic status of species within the harvestman group.	Investigate and validate taxonomic status.	Conduct field surveys to collect specimens. Conduct morphological and genetics work to determine species status.	Harvestman Group.
Determine appropriate taxonomic status of subspecies within the Coeur d'Alene Oregonian species complex and other species in this genus.	Investigate and validate taxonomic status.	Conduct field surveys to collect specimens or use specimens from existing collections. Conduct morphological and genetics work to determine species status.	Coeur d'Alene Oregonian Salmon Oregonian Mission Creek Oregonian Kingston Oregonian
Confirmation and site protection.	Implement actions to sites where Rocky Mountain Axetail, Blue-gray Taildropper, and Papillose Taildropper occur.	Conduct genetics work to confirm taxonomic identity of specimens currently in possession of IDFG. Work with land management agencies or private landowners to minimize disturbance to sites.	Rocky Mountain Axetail, Blue-gray Taildropper, and Papillose Taildropper
Conduct research and habitat conservation activities for cool air temperature associated gastropods (Lucid et al. 2015).	Develop a better understanding of requirements for these species.	Conduct research to assess ecological requirements for these species. Manage forest structure near microsites to maintain cool air temperatures. Manage these sites for minimal disturbance. Implement long-term monitoring of species and associated microclimate and other habitat requirements.	Magnum Mantleslug, Pale Jumping Slug, Hemphillia sp1, Shiny Tightcoil
Determine appropriate taxonomic status of species within the Mountainsnail complex.	Investigate and validate taxonomic status.	Conduct field surveys to collect specimens or use specimens from existing collections. Conduct morphological and genetics work to determine species status.	Costate Mountainsnail Striate Mountainsnail
Determine appropriate taxonomic status of species within the Hemphillia complex.	Investigate and validate taxonomic status.	Conduct field surveys to collect specimens or use specimens from existing collections. Conduct morphological and genetics work to determine species status.	Pale Jumping-slug Marbled Jumping-slug *Hemphillia* sp.1
Monitoring.	Develop strategy.	Develop and implement multitaxa monitoring strategy for ground dwelling invertebrates.	Pale Jumping-slug Marbled Jumping-slug *Hemphillia* sp.1

Objective	Strategy	Action(s)	Target SGCNs
			Magnum Mantleslug Blue-gray Taildropper Papillose Taildropper Rocky Mountain Axetail Nimapuna Disc Salmon Coil Costate Mountainsnail Striate Mountainsnail Selway Forestsnail Salmon Oregonian Mission Creek Oregonian Kingston Oregonian, Coeur d'Alene Oregonian Shiny Tightcoil Harvestman Species Group Spur-throated Grasshopper Group Giant Palouse Earthworm

Target: Pond-breeding Amphibians

Amphibians are a highly vulnerable taxonomic group which, globally, hosts more species in decline than birds or mammals (Stuart et al. 2004). Amphibian populations have been declining worldwide for decades (Houlahan 2000) and sometimes occur rapidly in seemingly pristine environments (Stuart et al. 2004). Amphibians are susceptible to pathogens, climate change, environmental pollution, ultraviolet-b exposure, and invasive species (Bridges and Semlitsch 2000, Cushman 2006, Kiesecker et al. 2001, Stuart et al. 2004), tend to have relatively low vagilities (Bowne and Bowers 2004, Cushman 2006), and often have narrow habitat requirements (Cushman 2006).

Western Toad has experienced rangewide declines in western North America. Recent surveys in the Bitterroot Section detected this species at only one of 183 survey sites (Lucid et al. 2015). This indicates a pressing need to conduct work to determine reasons for and address this apparent population decline.

Target Viability

Poor. Amphibians are highly vulnerable taxonomic group. Western Toad is already facing rangewide declines and few were detected in the section. Western Toad faces invasive species/disease threats.

Prioritized Threats and Strategies for Pond-breeding Amphibians

High rated threats to Pond-breeding Amphibians in the Bitterroot Mountains

Chytrid fungus and other disease

Recent surveys for chytrid fungus on Columbia Spotted Frog across the Bitterroot Mountains indicated the fungus is widespread, occurring at approximately 82% of surveyed sites. Chytrid was found more commonly at low and high elevation sites than mid-elevation sites. Chytrid is known threat to Western Toad and has been documented to cause near total egg hatching failure of a Western Toad population in the Pacific Northwest (Blaustein et al. 1994). Further research is needed to assess the threat of chytrid to Western Toad. Local die-offs of Western Toad and other herptiles have been recorded in recent years. These die-offs may be disease related and those sites should be investigated and monitored.

Objective	Strategy	Action(s)	Target SGCNs
Determine level of threat to Western Toad.	Determine status of chytrid in Western Toad.	Visit known Western Toad sites and swab toads for chytrid.	Western Toad
Monitor amphibian disease.	Develop amphibian disease monitoring program.	Develop monitoring program which encompasses monitoring chytrid presence, chytrid levels, and other potential amphibian disease.	Western Toad

Climate planning and monitoring

Delineating temperature refugia for cool water or air temperature dependent species is a relatively new idea (Isaak et al. 2015). Recent microclimate monitoring work in the Idaho Panhandle identified a portion of the St. Joe Mountains to have a cooler than average mean annual air temperature in the Panhandle. Additionally, the Coeur d'Alene Mountains tend to have warmer mean annual air temperatures than other mountain ranges in the Panhandle. Monitoring both the organisms which inhabit these mountains along with abiotic climate measurements will be an important component of adaptively managing wildlife in a changing climate (Lucid et al. 2015).

Objective	Strategy	Action(s)	Target SGCNs
Climate monitoring.	Monitor climate variables and species and disease co-occurrence over time.	Develop climate monitoring program using a variety of microclimate variables along with co-occurrence of SGCN and associates. Monitor chytrid fungus in relation to microclimate variables.	Western Toad

Unknown status or causes of decline

Multiple species identified as SGCN are declning as as result of unknown causes. The priority for many of these species in the coming years is to identify what is/are the root cause(s) of their apparent decline, and develop a strategy for addressing it.

Objective	Strategy	Action(s)	Target SGCNs
Determine causes of decline in Western Toad.	Determine relative importance of known and suspected threats to Western Toad, its prey, and its habitats. Investigate factors affecting reproductive	Promote cooperation and collaboration with established wildlife diversity working groups to fill knowledge gaps and to mitigate threats. Develop monitoring plan for Western Toad and other amphibians to enumerate population and distribution trends.	Western Toad Northern Leopard Frog

Objective	Strategy	Action(s)	Target SGCNs
	output, survival, and fidelity to breeding sites.		

Target: Forest Carnivores

Forest carnivores naturally occur at low densities and can be directly affected by human activities. This presents unique opportunities to directly affect positive conservation outcomes for these species. This group consists of mammals traditionally considered “furbearers” including American Marten (*Martes americana*), weasels (*Mustela* spp.), and American Mink (*Vison vison*). Wolverine and Fisher are the 2 forest carnivore SGCN that occur within the Bitterroot Mountains Section. Recent surveys detected 2 individual male Wolverines within this section (Lucid et al. 2015).

Wolverine, IDFG

Fisher has been documented to occur across a large swath of northern Idaho including the Bitterroot Mountains. Fisher is naturally found at low densities, with males and females maintaining intrasexually exclusive home ranges that average approximately 40 mi^2 and 20 mi^2, respectively. Throughout its range, Fisher is associated with forested habitats with high canopy closure, complex vertical and horizontal structure, plentiful snags, and an abundant prey base (Proulx et al. 2004). Conservation efforts in this section should focus on maintaining or improving ecosystem integrity conducive to increasing the number and distribution of individual Wolverine and Fisher.

Target Viability

Poor-Fair. Only a few individual Wolverines are known to occur in the Bitterroot Mountains Section. Currently, the species is known to be distributed from the Idaho–Canada border south at least 300 mi to the area around Cascade, ID. No formal estimate exists of the number of Fishers in Idaho. As Fisher is associated with mature forest characteristics, timber management and harvest activities may impact its abundance and distribution. Lastly, Fishers are incidentally captured and killed during recreational trapping for other species. Between 2000 and 2005, 3 Fishers were incidentally captured and submitted to the Department for a reward (trappers are required to report all nontarget captures such as Fisher; a $10 “reward” is offered for each report to encourage compliance with this regulation). Between 2010 and 2014, the most current data available, 54 were submitted for a reward (IDFG 2013, 2014). The causes and ramifications of this trend are poorly understood.

Prioritized Threats and Strategies for Forest Carnivores

High rated threats to Forest Carnivores in the Bitterroot Mountains

Even-aged management on moist productive sites (e.g., western redcedar, western hemlock, white pine) on nonfederal industry and state-endowed lands

Timber management practices that result in creating large open areas on the landscape and that result in inadequate amounts of late-seral forest retention results in degraded habitat quality for Fisher. For-profit timber companies do not manage for late-seral conditions except for Class 1 riparian areas, which represents about 5% of any forest type.

Objective	Strategy	Action(s)	Target SGCNs
Reduce the number of large open areas on the landscape and increase late-seral forest retention.	Identify optimal fisher habitat needs and travel connectivity corridors.	Provide travel corridors where too steep to harvest, SPZs. Promote participation by timber company landowners in certification programs that demonstrate 95% compliance. Regularly review minutes from Idaho Forest Practices Act Advisory Committee (FPAAC).	Fisher
	Use conservation easements to improve habitats.	Promote participation in landowner incentive programs, e.g., IDFG, NRCS. American Tree Farm program, Idaho Forest Group pays increased stumpage price (i.e., price that the mill paid to landowner for their logs because it's green-certified), because they can sell for a premium i.e., incentive for landowner to be in program because they receive management advice. NRCS, American Tree Farm Program, and Idaho Forest Stewardship Program accept the same management plan that qualify landowner for the incentives each program offers.	Fisher

Genetic isolation

Wolverine and Fisher were nearly or completely extirpated from the lower 48 states in the early 20th century. A variety of natural (Wolverine) and human mitigated (Fisher) recolonization events have likely affected the genetic structure of the species' populations (Aubry et al. 2007, Vinkey et al. 2006). Populations of both species likely have low genetic diversity due to founder affects. Proper habitat management and gene flow mitigation may help improve genetic isolation and increase species occurrence on the landscape.

Objective	Strategy	Action(s)	Target SGCNs
Monitor genetic	Determine	Conduct genetic analyses to determine	Wolverine

Objective	Strategy	Action(s)	Target SGCNs
isolation.	current levels of genetic isolation.	currently population sizes and levels of gene flow. Maintain transboundary collaborations to assess and monitor Wolverine gene flow with Canadian populations.	Fisher
Assess and enhance gene flow.	Manage connectivity habitat and assess potential to enhance gene flow.	Implement actions outlined in *Management Plan for the Conservation of Wolverines in Idaho 2014–2019* (IDFG 2014).	Wolverine Fisher

Habitat loss

Stable Fisher and Wolverine populations require large land areas that include a mosaic of proper timber management (Fisher); a prey base of small- to medium-sized mammals (Fisher); deep, late spring snowpack (Wolverine); and opportunities for gene flow (both species).

Objective	Strategy	Action(s)	Target SGCNs
Maintain sustainable habitat for a secure Fisher and Wolverine population.	Promote timber management and harvest strategies that are suitable for Fisher.	Work with managing agencies to ensure forest treatments and timber harvest are conducted at levels and in patterns that are suitable for continued use by Fishers. Continue fine-scale habitat studies that will facilitate integration of Fisher habitat requirements into timber harvest plans. Conduct studies to determine why prey base in Coeur d'Alene Mountain Range is relatively less abundant than adjacent areas.	Fisher
	Implement current management plans.	Implement habitat actions detailed in the *Management Plan for the Conservation of Wolverines in Idaho 2014–2019* (IDFG 2014).	Wolverine

Winter recreation

The Idaho Wolverine Conservation plan (IDFG 2014) outlines specific actions to minimize potential disturbance of Wolverine by oversnow recreation and ski area infrastructure.

Objective	Strategy	Action(s)	Target SGCNs
Manage winter recreation to minimize disturbance.	Coordinate efforts between public and private entities.	Implement strategies outlined in the *Management Plan for the Conservation of Wolverines in Idaho 2014–2019* (IDFG 2014). Work with winter recreation groups to develop educational materials and programs.	Wolverine

Climate planning and monitoring

Delineating temperature refugia for cool-water or air temperature dependent species is a relatively new idea (Isaak et al. 2015). Recent microclimate monitoring work in the Idaho

Panhandle identified a portion of the St. Joe Mountains to have a cooler than average mean annual air temperature in the Panhandle. Additionally, the Coeur d'Alene Mountains tend to have warmer mean annual air temperatures than other mountain ranges in the Panhandle. Monitoring both the organisms that inhabit these mountains along with abiotic climate measurements will be an important component of adaptively managing wildlife in a changing climate (Lucid et al. 2015).

Objective	**Strategy**	**Action(s)**	**Target SGCNs**
Climate monitoring.	Monitor climate variables and species co-occurrence over time.	Develop climate monitoring program using a variety of microclimate variables along with co-occurrence of associated SGCN.	Wolverine Fisher
Implement other state management plans.	Implement the *Management Plan for the Conservation of Wolverines in Idaho 2014–2019* (IDFG 2014).	Implement specific actions outlined in the climate section of the *Management Plan for the Conservation of Wolverines in Idaho 2014–2019* (IDFG 2014).	Wolverine

Species designation, planning and monitoring

Basic knowledge of current distribution for these species is well documented relative to other species. However, managing these species' needs in an adaptive capacity will require continued monitoring to determine changes in population levels, distribution, and gene flow. It is essential to build on current inventory programs and implement programs that allow continued monitoring work for these species.

Objective	**Strategy**	**Action(s)**	**Target SGCNs**
Monitor species population and distribution trends.	Expand knowledge of the distribution, abundance, and habitat requirements of Fisher and Wolverine. Expand knowledge of the distribution, abundance. and habitat requirements of Fisher.	Develop and participate in a multistate–provincial effort to monitor multiple carnivore species the US Northern Rockies. Develop a population estimate for Fisher.	Fisher Wolverine Fisher

Target: Pollinators

Pollinators provide an essential ecosystem service that benefits agricultural producers, agricultural consumers, and gardeners (Mader et al. 2011) in the Bitterroot Mountains. A wide range of taxa includes birds and a wide array of insects provide pollination activities. Two butterflies (Gillette's checkerspot and Monarch) and 8 bee species compose the group of 10 SGCN pollinators that are known to occur within this section.

Western Bumble Bee

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

Target Viability

Fair. Many pollinators declining rangewide.

Prioritized Threats and Strategies for Pollinators

High rated threats to Pollinators in the Bitterroot Mountains

Pesticides

Pollinators are negatively affected by pesticides by absorbing pesticides through the exoskeleton, drinking nectar containing pesticides, and carrying pollen laced with pesticides back to colonies (Mader et al. 2011). Neonicotinoids are particularly harmful to bee populations and can cause dramatic die-offs (Hopwood et al. 2012). Although the most effective pollinator benefitting strategy is to eliminate pesticide use, significant benefit for pollinators can still be achieved through reducing use of and pollinator exposure to pesticides (Mader et al. 2011).

Objective	Strategy	Action(s)	Target SGCNs
Reduce native pollinator exposure to	Educate habitat managers, farmers,	Conduct educational activities that encourage potential pesticide applicators to eliminate use of pesticides	*Andrena aculeata, Perdita salicis,* Hunt's Bumble Bee,

Objective	Strategy	Action(s)	Target SGCNs
pesticides (Mader et al. 2011).	municipalities, and small property owners in methods to reduce pesticide use (Mader et al. 2011).	where practical. Where pesticides must be used encourage applicators to apply the minimum amount of chemical necessary and apply when pollinators are least active (i.e. nighttime and when flowers are not blooming) (Mader et al. 2011). Specifically target urban homeowners in educational efforts in the reduction of or proper application of pesticides (Mader et al. 2011). Conduct workshops that discuss pesticides in relation to other pollinator habitat management concerns (Mader et al. 2011).	Morrison Bumble Bee, Western Bumble Bee, Suckley Cuckoo Bumble Bee, *Hoplitis orthognathus*, Monarch, Gillette's Checkerspot
Reduce native pollinator exposure to pesticides on IDFG administered property (Mader et al. 2011).	Implement measures to reduce or eliminate pesticide use on IDFG WMAs and other properties (Mader et al. 2011).	Use the minimum recommended amount of pesticide (Mader et al. 2011). Apply pesticides at times when pollinators are least active such as nighttime, cool periods, low wind activity, and when flowers are not blooming (Mader et al. 2011). Mow or otherwise remove flowering weeds before applying pesticides (Mader et al. 2011).	*Andrena aculeata, Perdita salicis,* Hunt's Bumble Bee, Morrison Bumble Bee, Western Bumble Bee, Suckley Cuckoo Bumble Bee, *Hoplitis orthognathus,* Monarch, Gillette's Checkerspot
Eliminate use of neonicotinoid insecticides (Hopwood et al. 2012).	Education measures on the detrimental effects of neonicotinoids on bees (Hopwood et al. 2012).	Develop and distribute educational material. Distribute to municipalities, counties, agriculture producers, habitat managers, and other property owners (Hopwood et al. 2012). Do not employ the use of neonicotinoids on IDFG administered lands (Hopwood et al. 2012).	*Andrena aculeata, Perdita salicis,* Hunt's Bumble Bee, Morrison Bumble Bee, Western Bumble Bee, Suckley Cuckoo Bumble Bee, *Hoplitis orthognathus,* Monarch, Gillette's Checkerspot

Habitat loss

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

Objective	Strategy	Action(s)	Target SGCNs
Reduce impact of land management practices on pollinators (Mader et al.	Educate about and implement practices which benefit pollinators. (Mader et al.	Reduce grazing impacts by limiting grazing to one-third to one-fourth of management areas per season (Mader et al. 2011). Implement pollinator beneficial mowing	*Andrena aculeata, Perdita salicis* Hunt's Bumble Bee, Morrison Bumble Bee, Western Bumble Bee, Suckley Cuckoo

Objective	Strategy	Action(s)	Target SGCNs
2011).	2011).	techniques including use of flushing bar, cutting at ≤8 mph, maintaining a high minimum cutting height of ≥12–16 in, mowing only in daylight hours, mow in a mosaic instead of an entire site (Mader et al. 2011). Where prescribed fire is used implement pollinator-friendly burning protocols including rotational burning of ≤30% of each site every few years, leave small unburned patched intact, avoid burning too frequently (no more than every 5–10 years), avoid high-intensity fires unless the burn goal is tree removal. Work with Idaho Transportation Department to implement proper roadside pollinator habitat management (Mader et al. 2011).	Bumble Bee, *Hoplitis orthognathus*, Monarch, Gillette's Checkerspot
Conserve existing pollinator habitat.		Map existing major known pollinator habitat. Identify and recognize landowners providing pollinator habitat and provide habitat management educational opportunity (Mader et al. 2011). Conduct surveys for native milkweed. Initiate seed saving program (Mader et al. 2011).	*Andrena aculeata, Perdita salicis*, Hunt's Bumble Bee, Morrison Bumble Bee, Western Bumble Bee, Suckley Cuckoo Bumble Bee, *Hoplitis orthognathus*, Monarch, Gillette's Checkerspot
Create new urban and rural pollinator habitat.	Develop programs to encourage urban landowners to create pollinator habitat.	Provide pollinator habitat workshops for homeowners and rural land owners. Provide other educational materials for homeowners. Provide an incentive program for homeowners to create pollinator habitat in urban yards. Convert most lawns at IDFG office and housing locations to pollinator habitat. Work with municipalities and businesses to create urban pollinator habitat. Provide bee nest boxes for purchase at the Coeur d'Alene IDFG regional office.	*Andrena aculeata, Perdita salicis*, Hunt's Bumble Bee, Morrison Bumble Bee, Western Bumble Bee, Suckley Cuckoo Bumble Bee, *Hoplitis orthognathus*, Monarch, Gillette's Checkerspot

Climate planning and monitoring

Delineating temperature refugia for cool water or air temperature dependent species is a relatively new idea (e.g. Isaak et al. 2015). Recent microclimate monitoring work in the Idaho Panhandle identified a portion of the St. Joe Mountains to have a cooler than average mean annual air temperature in the Panhandle. Additionally, the Coeur d'Alene Mountains tend to have warmer mean annual air temperatures than other mountain ranges in the Panhandle. Monitoring both the organisms which inhabit these mountains along with abiotic climate measurements will be an important component of adaptively managing wildlife in a changing climate (Lucid et al. 2015).

Objective	Strategy	Action(s)	Target SGCNs
Climate monitoring.	Monitor climate variables and species co-occurrence over time.	Develop climate monitoring program using a variety of microclimate variables along with co-occurrence of associated SGCN.	*Andrena aculeata*, *Perdita salicis*, Hunt's Bumble Bee, Morrison Bumble Bee, Western Bumble Bee, Suckley Cuckoo Bumble Bee, *Hoplitis orthognathus*, Monarch, Gillette's Checkerspot

Species designation, planning and monitoring

Actions to enhance pollinator habitat will be most effective with knowledge of the current status of SGCN populations. Initiation of long term monitoring will allow a continuous data stream to assess conservation activities. Gillette's Checkerspot occurs in locally abundant colonies (Williams et al. 1984). Specific surveys for this species are required to map distribution. Known occupied sites should be managed to minimize disturbance.

Objective	Strategy	Action(s)	Target SGCNs
Determine pollinator population status.	Conduct surveys and implement long-term pollinator monitoring program.	Conduct surveys to identify colonies and breeding locations of bee SGCN. Conduct specific surveys for Gillette's Checkerspot. Protect known breeding sites. Develop program to monitor trends in species distribution and population size.	*Andrena aculeata, Perdita salicis,* Hunt's Bumble Bee, Morrison Bumble Bee, Western Bumble Bee, Suckley Cuckoo Bumble Bee, *Hoplitis orthognathus,* Monarch, Gillette's Checkerspot

Target: Bat Assemblage

In the Bitterroot Mountains, 11 species of bats are regularly documented on the landscape, including Townsend's Big-eared Bat, Hoary Bat, Silver-haired Bat, and Little Brown Myotis. Bats provide important ecological services through the regulation of forest and agricultural pests and nutrient cycling (USDA Forest Service 2013). However, little is known about population status and trends, migration routes, and hibernacula. In the Bitterroot Mountains, most bats are found foraging and roosting in most habitat types ranging from early-seral forest or clearcuts to mature- to late-successional forests (Hendricks and Maxwell 2005). Bats commonly forage along forest margins, above forest canopy, over water, and near the ground; generally preferring open stands or meadows to dense forests (Christy and West 1993). Bats roost in a variety of structures based on daily and seasonal needs ranging from trees and tree hollows to caves, mines and other anthropogenic structures (Hayes and Wiles 2013). All species are impacted by habitat loss and human disturbance at roost sites. Although white-nose syndrome (WNS) has not yet been detected in the western US, models predict it will spread to the West within 10 years. Its effect on bat populations has been severe in the eastern US and could potentially be equally severe in the western US. Conservation efforts should focus on white-nose syndrome disease surveillance, mitigating existing threats, and developing a response plan.

Target Viability

Fair. Roost locations are impacted by human disturbance and Abandoned Mine Lands (AML) closures. Models suggest white-nose syndrome could spread to Idaho in the near future.

Prioritized Threats and Strategies for Bat Assemblage

High rated threats to Bat Assemblage in the Bitterroot Mountains

Abandoned Mine Lands (AML) closures

As traditional roosting locations such as large snags are lost or altered, abandoned mines have become important habitat for numerous bat species (Ducummon 2000). Townsend's Big-eared Bat and Little Brown Myotis in particular often rely on caves and mines for roost locations. In the Bitterroot Mountains, caves are infrequent on the landscape, however the long history of mining has left numerous abandoned mines with greater than 500 shafts, adits and trenches identified in the IPNF and surrounding areas. In the 1980s and 1990s, thousands of mines were closed because of concerns to human safety with little forethought on the impact to roosting bats (Pierson et al. 1999). Closure of abandoned mines typically includes fencing, gating, and internal blasting to preclude humans from entering. Use of bat-friendly gates would prevent human entry while also protecting bat roosts.

Objective	Strategy	Action(s)	Target SGCNs
Reduce human disturbance at mines, tunnels, and tubes.	Promote the use of bat-friendly mine closures.	Survey mines to determine bat use and install the appropriate closures.	Townsend's Big-eared Bat Little Brown Myotis

White-nose syndrome

White-nose syndrome (WNS) is a fungal epidemic that has impacted bat populations in eastern North America, with the disease confirmed as far west as Missouri (White-nose Syndrome.org, Accessed on Nov 11, 2015). Although the fungus responsible for the infection (*Pseudogymnoascus destructans*) has been confirmed as pathogenic, the pathway by which the fungus causes mortality in bats is not well understood (Knudsen et al. 2013). The fungal infection appears to affect hibernating bats by increasing mid-winter arousal, aberrant behavior, and loss of fat reserves (Knudsen et al. 2013). Mortality associated with WNS has led to the near regional extirpation of several bat species in the east (Knudsen eta al 2013).

Objective	Strategy	Action(s)	Target SGCNs
Minimize the potential spread	Implement WNS protection	Require mandatory compliance to WNS decontamination standard operation	Townsend's Big-eared Bat

Objective	Strategy	Action(s)	Target SGCNs
of white-nose syndrome to north Idaho.	measures proactively.	procedures at mines, caves, or any other visited caverns. Work with USFS abandoned mine training program to ensure continued focus on education regarding WNS education and management. Participate in regional WNS monitoring efforts. Implement agency and public efforts to educate key individual in proper protocol when dead bats are detected.	Silver-haired Bat, Little Brown Myotis

Species designation, planning and monitoring

Central to evaluating effectiveness of conservation actions will be programs to monitor changes in species distribution and abundance.

Objective	Strategy	Action(s)	Target SGCNs
Determine bat population status.	Conduct surveys and implement long-term bat monitoring program.	Implement the North American Bat Monitoring Program (NABat) (Loeb et al. 2015). Implement and, incorporate bats into long-term multitaxa monitoring programs to monitor trends in species distribution and population size.	Townsend's Big-eared Bat, Hoary Bat, Silver-haired Bat, Little Brown Myotis

Bitterroot Mountains Section Team

An initial summary version of the Bitterroot Mountains Ecological Section project plan was completed for the 2005 Idaho State Wildlife Action Plan. A small working group developed an initial draft of the Section Plan (Miradi v 0.14), which was then reviewed by a much wider group of stakeholders at a 2-day meeting held at the Idaho Department of Fish and Game in February 2015 (this input captured in Miradi v 0.16). This draft was then subsequently revised and has undergone additional internal view within the Idaho Department of Fish and Game. Materials in this document are based on Miradi v. 0.20. Individuals and organizations/agencies involved in this plan are shown in Table 3.3.

Table 3.3 Individuals, agencies, and organizations involved in developing this plan[a]

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

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