Draft Environmental Assessment and Land Protection Plan

Swan Valley Conservation Area

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In accordance with the National Environmental Policy Act and U.S. Fish and Wildlife Service policy, an environmental assessment and land protection plan have been prepared to analyze the effects of establishing the Swan Valley Conservation Area in western Montana.

- The environmental assessment analyzes the environmental effects of establishing the Swan Valley Conservation Area.
- The Swan Valley Conservation Area Land Protection Plan describes the priorities for acquiring 10,000 acres of conservation easements and up to 1,000 acres of limited fee-title lands within the project boundary.

Note: Information contained in the maps within these documents is approximate and does not represent a legal survey. Ownership information may not be complete.

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Abbreviations

BMU	bear management units
CoCE	Crown of the Continent ecosystem
dbh	tree diameter at breast height
DNRC	(Montana) Department of Natural Resources and Conservation
EA	environmental assessment
FONSI	finding of no significant impact
FTE	full-time equivalent
GIS	geographic information system
GNLCC	Great Northern Landscape Conservation Cooperative
HAPET	Habitat and Population Evaluation Team
LCC	landscape conservation cooperative
LPP	land protection plan
LWCF	Land and Water Conservation Fund
MFWP	Montana Department of Fish, Wildlife and Parks
MTNHP	Montana Natural Heritage Program
NCDE	Northern Continental Divide Ecosystem
NEAT	National Ecological Assessment Team
NEPA	National Environmental Protection Act
NHPS	National Historic Preservation Act
NWR	National Wildlife Refuge
PCTC	Plum Creek Timer Company
PFW	Partners for Fish and Wildlife
Service	U.S. Fish and Wildlife Service
SHC	strategic habitat conservation
SWAP	Small Wetlands Acquisition Program
TNC	The Nature Conservancy
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WUI	wildland-urban interface

1 Purpose of and Need for Action

The Swan Valley is part of the Interior Columbia River Basin Area which includes the larger Columbia Basin and the Upper Missouri/Yellowstone rivers watersheds (see figure 1). Swan River originates at Gray Wolf Lake in the Mission Mountains and flows through Swan Lake at the northern end of the valley, before entering the Flathead Lake watershed, ultimately flowing into the Columbia River System.

Swan Valley lies at the western edge of the Crown of the Continent ecosystem (CoCE) which is the last remaining ecosystem that still supports the full assemblage of large mammalian predators including grizzly bears, gray wolves, wolverine, and Canada lynx. Within the CoCE, an exceptional diversity of wetland types occurs including: major riparian areas, smaller riparian tributaries, glacial prairie potholes, lakes, bogs, fens, swamps, and boreal peatlands. The lowlands support over 170 different species of wetland plants. Along the elevation gradient, large expanses of fescue grasslands phase into alpine meadows or sagebrush steppe, which then transition into montane forests consisting of white pine, Douglas-fir, and ponderosa pine. These transitional zones of valley floors to montane forests are extremely important to fish and wildlife.

The continued presence in the Swan Valley of a large expanse of intact habitat and historic wildlife corridors would benefit federal trust species such as the grizzly bear, gray wolf, wolverine, pine martin and Canada lynx; migratory birds such as harlequin ducks, common loons, red-necked grebes, black tern, olive-sided flycatcher, peregrine falcons, greater sandhill cranes and trumpeter swans; westslope cutthroat trout and bull trout. Swan Valley provides excellent habitat for black bear, elk, mule deer, white-tailed deer, moose, mountain lion, bobcat, coyote, wolverine, fisher, and a wide variety of small mammals, and water howellia.

PROPOSAL

The Swan Valley Conservation Area is a conservation strategy to protect one of the last undeveloped, low elevation coniferous forest ecosystems in western Montana. Swan Valley is situated between the roadless areas of the Glacier National Park/ Bob Marshall Wilderness Complex, the Mission Mountains Wilderness, and the Bitterroot/Selway Wilderness Complex to the southwest. As such, it provides an avenue of connectivity between the Canadian Rockies and the Central Rockies of Idaho and Wyoming.

This proposal focuses on the strategic purchase of 10,000 acres of conservation easements on private lands nestled between the Bob Marshall Wilderness and the Mission Mountain Wilderness. This proposal also includes the purchase of up to 1,000 acres immediately adjacent to Swan River National Wildlife Refuge (NWR) (see figure 2).

Unlike many other rural valleys in Montana, Swan Valley has the potential to maintain its role in connecting the surrounding landscapes. However, a combination of depressed timber markets and high recreational values of the land have recently threatened not only the connectivity for wildlife, but are also impacting the traditional rural way of life for residents of Swan Valley. Funding would come primarily from the Land and Water Conservation Fund (LWCF) and potential conservation partners. See appendix A for a list of preparers of this environmental assessment (EA).

Figure 1. Crown of the Continent ecosystem.

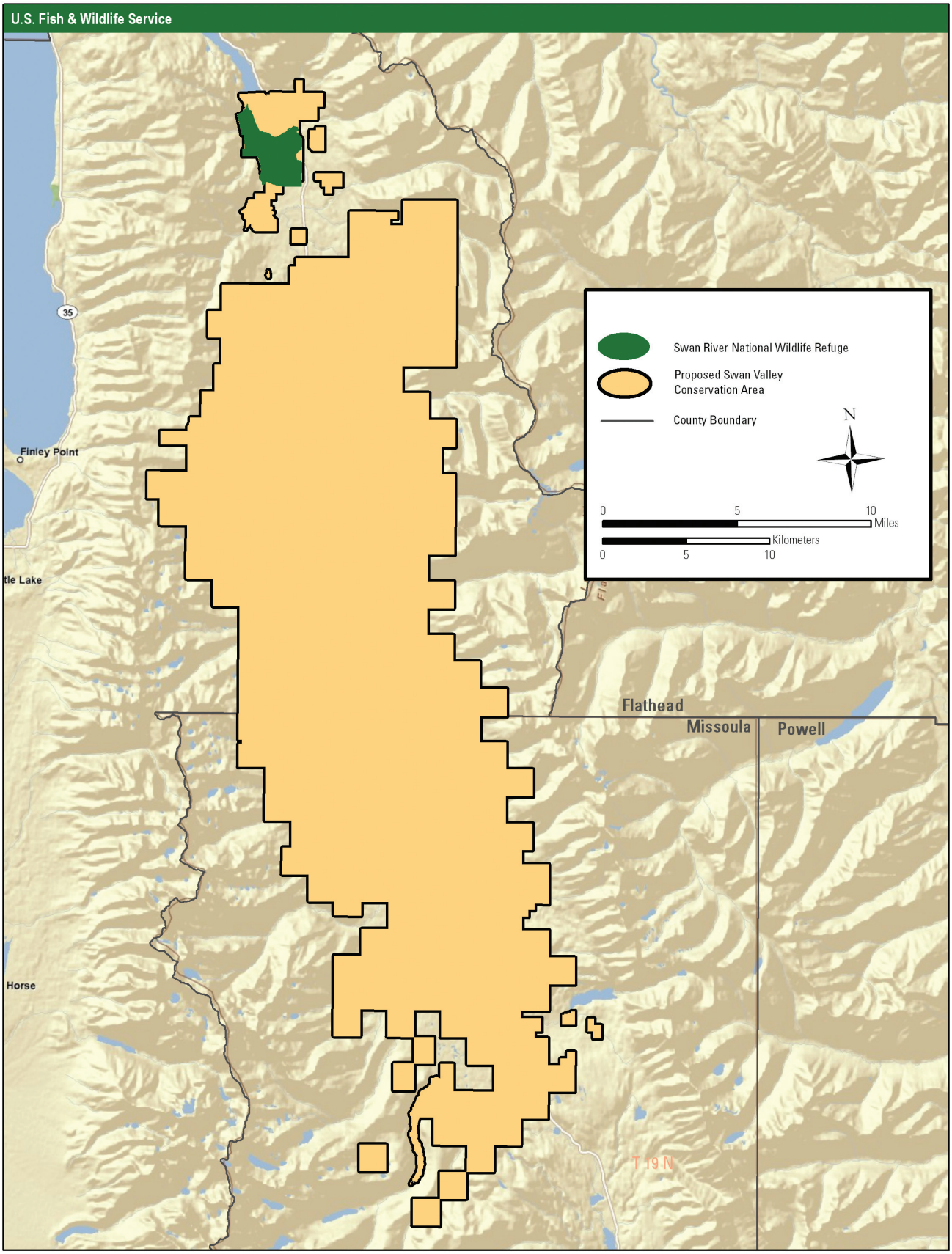

Figure 2. Swan Valley Conservation Area project area.

PROJECT AREA

The Swan Valley is located on the western edge of the CoCE, approximately 30 miles southeast of Kalispell, Montana. The Bob Marshall Wilderness and Glacier National Park mark the eastern boundary, with the Mission Mountains Wilderness and Confederated Salish and Kootenai tribal lands on the western boundary, and the Blackfoot River Valley flanking the southern side of the watershed. The project area encompasses an 187,400-acre landscape on the valley floor of the 469,000-acre Swan River watershed. The watershed contains approximately 332,000 acres in protected public ownership.

DECISIONS TO BE MADE

Based on the analysis in this EA, the U.S. Fish and Wildlife Service's (Service) director of region 6, with the concurrence of the director of the U.S. Fish and Wildlife Service, will make three decisions:

- Determine whether the Service should establish the Swan Valley Conservation Area.
- If yes, select an approved project boundary that best fulfills the habitat protection purposes.
- If yes, determine whether the selected alternative would have a significant impact on the quality of the human environment. The National Environmental Policy Act (NEPA) of 1969 requires this decision. If the quality of the human environment would not be significantly affected, a finding of no significant impact (FONSI) will be signed and made available to the public. If the alternative would have a significant impact, completion of an environmental impact statement would be required to address further those impacts.

ISSUES IDENTIFIED AND SELECTED FOR ANALYSIS

Open house public meetings were held at the community center in Condon, Montana May 18 and June 2, 2010. Public comments were taken to identify issues to be analyzed for the proposed project. Approximately thirty-seven landowners, citizens, and elected representatives attended the meetings and most expressed positive support for the project. Following the open house meeting, factsheet and flyers were posted in the Benton Lake NWR Complex headquarter's visitor center notifying visitors of the proposed project. Additionally, twenty-seven letters providing comments and identifying issues and concerns were also submitted.

In addition, the Service's field staff has contacted local government officials, other public agencies, and conservation groups which have expressed an interest in and a desire to provide a sustainable future for Swan Valley. Factsheet flyers were distributed at the public meetings; local newpapers ran articles on the meetings, and posters were displayed at local businesses. Project information was also made available on the refuge and regional planning websites.

Many of the comments received addressed the need for a balance between natural and cultural systems. There are two main categories of commonly expressed issues and concerns.

Biological Issues

- The impacts of habitat fragmentation due to residential development.
- The Service's role in management of private land encumbered with a conservation easement.
- Concerns about habitat fragmentation involve potential impacts on wildlife habitat and water resources.
- The impact of climate change on the long term sustainability and resiliency of the Swan Valley.
- The value of intact ecosystems.

Wildlife Habitat

Habitat fragmentation is a concern not only in the Swan Valley, but also in other areas of Montana. Given the current strong market for scenic western properties, there is concern that properties in the Swan Valley will be vulnerable to sale and subdivision for residential and commercial development.

Water Resources

Residential development in the Swan Valley presents a potentially significant threat to the aquatic ecosystem. Housing developments can bring about sewage-derived nutrient additions to streams and lakes, additional wetland drainage, water diversion and introduction of invasive species.

Socioeconomic Issues

- The need to keep private land in private ownership.
- The impacts of conservation easements on local community centers and their ability to grow.
- Concern regarding fee-title purchase of lands around Swan River NWR, and the potential loss of tax revenue to local counties.
- Since parcel sizes are typically smaller in the Swan Valley than other areas of Montana; the need to consider easements for smaller parcels (<160 acres) in this region.
- Wind energy development.

Landownership and Land Use

There is concern that perpetual easements would negatively affect future generations of landowners. A concern is that conservation easements would limit the choices of future landowners, even though they may have paid as much for the land as if it had no restrictions. There are concerns that perpetual easements would lower the resale value of the land.

There is concern that the selection process would favor landowners whose properties are larger in size over smaller but biologically valuable properties.

Public Use

The public's right to use or access lands encumbered with a conservation easement is a concern. Landowners are concerned they would be forced to allow the public to access their land for hunting, fishing, or other recreational uses.

Issues Not Selected for Detailed Analysis

Currently, landowners pay the counties property taxes on their private lands. The Swan Valley CA is mainly a proposed conservation easement program, the land does not change hands, and therefore the property taxes paid by the landowner to the county are not affected. Minimal changes to the tax base are anticipated. Fee-title lands purchased would be subject to the Revenue Sharing Act (16 USC 715s) which requires revenue sharing payments to counties for purchase of the land. The amount is based on the greatest of (1) ¾ of 1 percent of the market value, (2) 25 percent of the net receipts, or (3) 75 cents per acre.

NATIONAL WILDLIFE REFUGE SYSTEM AND AUTHORITIES

The mission of the National Wildlife Refuge System is to preserve a national network of lands and waters for the conservation, management and, where appropriate, restoration of fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. Swan Valley CA would be managed as part of the Refuge System in accordance with the National Wildlife Refuge System Administration Act of 1966 and other relevant legislation, executive orders, regulations, policies, and management plans such as:

- Land and Water Conservation Fund Act (1965)
- Migratory Bird Treaty Act (1918)
- Endangered Species Act (1973)
- Bald Eagle Protection Act (1940)
- Migratory non-game Birds of Management Concern in the U.S. (2002)
- U.S. Fish and Wildlife Act (1956)
- North American Waterfowl Management Plan (1994)

RELATED ACTIONS AND ACTIVITIES

In 2008, The Nature Conservancy (TNC) and the Trust for Public Lands (TPL) entered into an agreement with Plum Creek Timber Company (PCTC) to purchase, in a three-phase project, a total of 312,500 acres in western Montana known as the Montana Legacy Project. A total of 65,630 acres are located on the valley floor in the Swan Valley. The U.S. Forest Service (USFS) is scheduled to purchase 44,821 acres in 2010 and 20,809 acres will be purchased by the Montana Department of Natural Resources (DNRC) in 2011. This transfer of ownership from corporate lands to public lands will have major benefits in reducing the checkerboard pattern of ownership within the valley and in protecting critical fish and wildlife habitat.

At the northern end of the valley where the Swan River flows into Swan Lake, the Service owns the Swan River National Wildlife Refuge. This 1,568-acre refuge with an additional 210-acre USFS inholding was purchased for migratory birds under the Migratory Bird Conservation Act, 16 U.S.C. 715-715. Adjacent to the refuge, TNC purchased a 392-acre property called the Swan River Oxbow Preserve in 1986. These critically important fee-title lands form a crucial biological anchor in the northern part of the Swan River watershed.

This jointly owned 2,170 acre area is home to a variety of wetland communities, many species of birds, and several rare plants including the threatened water howellia. Historically, portions of this land served as a homestead site and supported such activities as farming, logging, grazing, and even a muskrat farm. The essential element of this landscape is water. Most of the refuge and preserve lies within a delta formed by the Swan River as it flows north to Swan Lake. The water table is high throughout this area due to the flooding of the river and a system of perennial springs and seeps along the eastern border of the preserve. Water moving through the Swan River NWR and TNC Preserve supports an amazing variety of wetland communities. Spruce forest predominates along the southern boundary. A complex of sedge fen and birch carr communities lies adjacent to the spring system. To the west, cottonwood forest dominates the area.

TNC has identified five rare plant populations and two rare lichens within the variety of wetland communities of the Swan River NWR and Preserve. Round-leafed pondweed grows in the oxbow and adjacent ponds. Northern bastard toadflax inhabits the wet spruce forest. Buchler fern is found where carr vegetation and spruce forest intermingle. Small yellow lady's slipper grows on the preserve.

Protecting habitat for the federally listed water howellia is a high priority of this project proposal. Howellia is thought to be extinct in California and Oregon, and is threatened in Washington, Idaho, and Montana. On the TNC Preserve, water howellia grows in the extensive marshes. Water howellia populations fluctuate with changes in the climate and it is estimated that the Swan River Oxbow Preserve supports approximately 5,000 plants, due in part to the variable drying regimes found across the refuge and preserve. This population, however, is extremely sensitive to climatic change, soil conditions, and disturbance.

The Bob Marshall and Scapegoat Wilderness Areas to the east perpetually protect over 1.5 million acres, connecting the Rocky Mountain Front and Blackfoot Valley to Swan Valley. To the west lies the 73,877-acre Mission Mountains Wilderness which provides connectivity to the Selway/Bitterroot Wilderness to the southwest covering an additional 1.3 million acres (see figure 1).

HABITAT PROTECTION AND EASEMENT ACQUISITION PROCESS

Swan Valley Conservation Area includes the communities of Condon, Salmon Prairie, and Swan Lake in Missoula and Lake counties.

The proposal would protect 11,000 acres primarily through conservation easements and up to 1,000 acres of fee-title acquisitions. Fee-title purchase would be limited to lands immediately adjacent to Swan River National Wildlife Refuge.

On approval of a project boundary, habitat protection would occur through the purchase of conservation easements. It is the long-established policy of the Service to acquire minimum interest in land from willing sellers to achieve habitat acquisition goals. Some fee-title acquisition would be authorized within the proposed project boundary.

The acquisition authority for the proposed project is the Fish and Wildlife Act of 1956 (16 U.S.C. 742 a-742j). The federal monies used to acquire conservation easements from the Land and Water Conservation Fund are derived primarily from oil and gas leases on the outer continental shelf, motorboat fuel tax revenues, and the sale of surplus federal property. There could be additional funds to acquire lands, waters, or interest therein for fish and wildlife conservation purposes through congressional appropriations, the Migratory Bird Conservation Fund, the North American Waterfowl Conservation Act funds, and donations from nonprofit organizations.

The basic considerations in acquiring an easement interest in private land are the biological significance of the area, existing and anticipated threats to wildlife resources, and landowner interest in the program. The purchase of conservation easements would occur with willing sellers only and would be subject to available funding.

2 Alternatives, Including the Proposed Action

This chapter describes the two alternatives identified for this project:

- no-action alternative
- proposed action, giving the Service the authority to establish the Swan Valley Conservation Area

The alternatives consider the effects of a conservation program within the boundaries identified for this project area in this EA.

ALTERNATIVE A (NO ACTION)

Currently, Service easements are available through the small wetlands acquisition program for landowners that qualify in Lake County.

Habitat enhancement or restoration projects on private lands such as wetland restoration, timber management, instream restoration, and grassland management could continue through cooperative efforts with private landowners.

Private efforts by land trusts would continue to secure conservation easements.

ALTERNATIVE B (PROPOSED ACTION)

This alternative focuses on the strategic purchase of up to 10,000 acres of conservation easements on private lands nestled between the Bob Marshall Wilderness and the Mission Mountain Wilderness. Fee-title acquisition would be limited to no more than 1,000 acres on lands immediately adjacent to Swan River National Wildlife Refuge. A combination of depressed timber markets and high recreational values of the land have recently threatened not only the connectivity for wildlife, but are also impacting the traditional rural lifestyle for residents of the Swan Valley. The watershed is just over 469,000 acres with over 332,000 acres in protected public ownership.

The Service would seek to purchase conservation easements and fee-title lands from willing sellers only. Conservation easement contracts would specify perpetual protection of habitat for trust species and restrict development. Fee-title lands would be managed as additions to the Swan River National Wildlife Refuge.

Prioritization of areas considered for conservation easements or fee-title acquisition within the project areas will be based on the biological needs of the wildlife species of concern, (migratory birds and threatened and endangered species), the threat of development, connectivity with other protected lands, and quality of habitat types (including riparian areas, wetlands, and native grasslands) for trust species. The Service generally focuses on parcels >160 acres, however parcels <160 acres may be considered for conservation easements if unique biological values exist. The land protection plan (LPP) within this volume describes these priorities in detail.

The easement program would rely on voluntary participation from landowners. Grazing would not be restricted on the land included in the easement contract.

Development for residential, and commercial or industrial purposes, such as energy and aggregate extraction would not be permitted on properties under a conservation easement. Alteration of the natural topography, conversion of native grassland to cropland, drainage of wetlands, and establishment of game farms would also be prohibited. Haying would be permitted after July 15th. Timber harvest is permitted on lands with an approved timber harvest management plan.

Conservation easement lands would remain in private ownership; property tax and land management, including invasive weed control, would remain the responsibility of the landowner. The Service would seek to provide participating landowners with additional assistance with invasive

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Swan Range.

plant control. Control of public access to the land would remain under the control of the landowner.

The project area would be managed by the Benton Lake NWR Complex staff headquartered in Great Falls, Montana. The Benton Lake NWR Complex staff would be responsible for monitoring and administration of all easements on private land. Monitoring would consist of periodically reviewing land status in meetings with the landowners or land managers to ensure that the stipulations of the conservation easement are being met. A baseline inventory study which includes photo documentation would be completed at the time the easements are established to document baseline conditions. An estimated 1.67 full-time equivalent (FTE) employees would be hired at an average salary of $54,911 per employee under this management alternative.

ALTERNATIVES CONSIDERED BUT NOT STUDIED

There was no further analysis for the following alternative.

County Zoning

In a traditional approach used by counties and municipalities, the local government would use zoning as a means of designating what type of development could occur in an area. Comments received from county commissioners to date have expressed support for conservation easements (alternative B) as a means of compensating private landowners for maintaining the rural area values. In counties where zoning occurs, conservation easements are recognized as a tool to ensure the long-term prevention of residential or commercial development in the conservation area.

3 Affected Environment

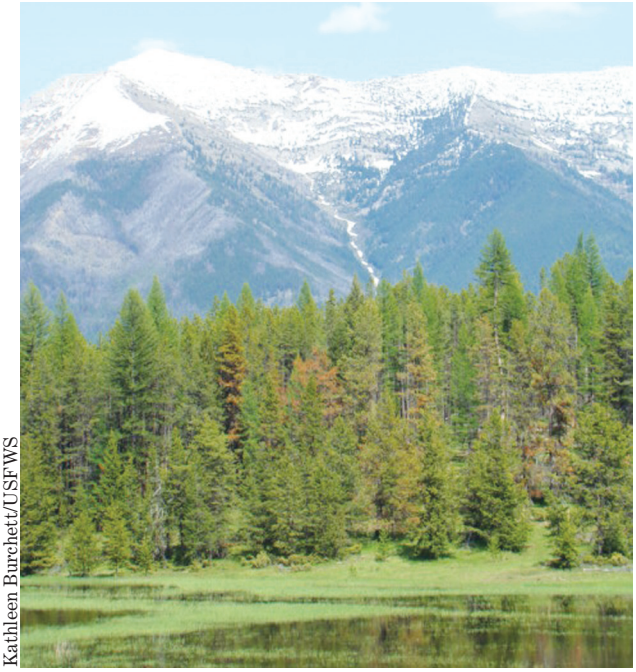
This chapter describes the biological, cultural, and socioeconomic resources most likely affected by establishing the Swan Valley CA.

BIOLOGICAL ENVIRONMENT

The biological environment studied included climate, geological resources, habitat, and wildlife.

Climate

The Upper Swan Valley is at the eastern limit of the Pacific maritime climatic influence, common to northern Idaho and northwestern Montana. The Mission Mountains experience more of the maritime influence than the Swan Range. The climate is generally cool and dry with precipitation increasing from south to north in the valley. Precipitation in the form of snow and rain varies between an average of 30 inches on the valley floor to over 100 inches along the Swan and Mission divides. The highest precipitation usually comes from late October to mid-February and again from mid-May to early July. The highest precipitation intensity occurs when a moist weather front from the Pacific collides with cool continental weather. Swan River receives a yearly average of 28.36 inches of precipitation with 125 inches of snow. Maximum snowfall was 256 inches from the fall 1996 to spring 1997 period, and the maximum precipitation was 37.73 inches in 1964.



Kathleen Burchett/USFWS

Swan Valley.

At the lower elevations the average annual temperature approximates 40°F. The average maximum temperature at Swan Lake is 55.3 degrees with the coldest average minimum temperature of 15.6 degrees occurring in January and the warmest average high temperature of 81.4 degrees occurring in July. Occasionally, cold arctic air slips over the Continental Divide from the northeast and down the valley, bringing extreme subzero temperatures from the continental weather system. Summer temperatures average in the 80s at the lower elevations with extreme temperatures of 90°F to 100°F during drought years. The relatively short growing season (2 to 3 months) limits widespread agricultural development. Frosts can occur any month of the year. Therefore, conversion of forest types to cultivated crops has been limited in comparison to other western Montana valleys. The highest temperature recorded was 103°F on August 24, 1969 and the lowest recorded temperature was -40°F on February 29, 1968 (Western Regional Climate Center 2010).

The average maximum temperature in Seeley Lake in the southern part of the valley is also 55.3°F. Annual precipitation in Seeley Lake is 20.9 inches with average annual snowfall totaling 120 inches. The highest temperature recorded in Seeley Lake was 102 degrees on 7/7/2007 and the lowest recorded temperature was -53 on 1/7/37 (Western Regional Climate Center 2010).

Geological Resources

The Mission Mountains and Swan Range resulted from the uplifting of ancient sea sediments laid down millions of years ago. The first phase pushed and bent these compressed sediments eastward along fault zones. The sediments were then formed into thick beds of compressed limestone, mudstone, and sandstone called the Belt Sedimentary Formation. Other rock deposits were added over millions of years.

Swan Valley was created by block faulting, with a large block of rock being pushed up along the fault lines forming the steep Swan Range on the east side of the valley and the west side of the fault dipping down, forming the Mission Mountains along the

west side. The general direction of the faulting was northwest to southeast, with the mountain ranges tilted in an easterly direction. This faulting history generally left steeper and more rugged mountains in the Swan Range. Both the Mission Mountains and the Swan Range are Precambrian sedimentary formations.

Further alteration of the geological landscape in the Swan Valley resulted from mountain valley or alpine glaciation. During the Bull Lake Ice Age that peaked roughly 100,000 years ago, the northern end of the Mission Mountains split the Rocky Mountain Trench (or Cordilleran) Glacier which flowed south from British Columbia. One lobe of the glacier went through the Swan Valley south to the Blackfoot River forming a continuous sheet over the mountains, especially the northern portion of the Mission Mountains. Only the highest peaks and ridges remained uncovered.

Ice again advanced through the valley to the lower end of Salmon Lake during the Pinedale Ice Age about 15,000 years ago. After this massive ice sheet melted, large glaciers repeatedly moved down the Mission and Swan valleys. Gravel beds of meltwater streams within the receding glaciers remained as long ridges (eskers) of sand and gravel. Additionally, long tongues of ice thrust out of the mountains into the valley, depositing moraines at their edges. The last fingers of ice formed the high ridges or high moraines that now enclose glacial lakes such as Holland and Lindbergh lakes, as well as others at the mouths of canyons in the Mission Mountains and Swan Range. The alpine glaciers may have merged to form a very large ice sheet in the Swan Valley that flowed north to meet the Cordilleran ice sheet near Bigfork. Giant glacial grooves cut in the northern tip of the Mission Mountains and along the east flank of the Mission Mountains and the west flank of the Swan Range may have been made by the south-flowing Cordilleran ice sheet or the north-flowing Swan Valley glacier. As the valley glacier melted, dirt and debris were left behind. Large piles of these sediments remained as humps on the valley floor or were pushed into ridges or eskers as the glaciers moved. In other areas, pockets of ice were left behind. When they melted, they left depressions that became lakes, ponds, potholes or wetlands. This complex of wetlands intermingled with upland terrain is unique. (Swan Ecosystem Center 2004)

The Swan River Basin, tributary to the Flathead Lake and the Flathead River in the headwaters of the Columbia River, is approximately 1,286 square miles in area. A wide diversity of lakes, riparian areas, rivers, creeks, alpine and subalpine glacial lakes, and springs feed the basin (Friessell et al. 1995). The Swan and Mission Mountains (peak elevations reaching over 9,000 feet), have picturesque canyons that were formed by streams cutting through the Precambrian Belt Series metasedimentary rock (Alt and Hyndman 1997). The Swan River, forged from flows through the mountains, winds across the morainal foothills and through the valleys forming braided delta areas. The river travels over a dense forest floor composed of variously graded, porous glacial till and alluvium averaging 6.2 miles wide at an elevation range of 2,500 to 9,000 feet. (Friessell et al. 1995). Several large lakes (250 to 2,700 acres) occur along the course of the river and its main tributaries. These large lakes within the valley were carved by large alpine glaciers (Alt and Hyndman 1997). Hundreds of kettle lakes, fens, bogs, and other lacustrine and palustrine wetlands, with many perched aquifers not directly connected to surface streams, lie scattered across the glacial and alluvial valley floors and foothills (Friessell et al. 1995). Forested riverine and palustrine wetlands fringe the river channel and dominate its extensive floodplains and relict paleochannels (an ancient inactive stream channel filled by the sediments of younger overlying rock).

Habitat

Swan Valley is a biologically rich coniferous forest ecosystem located between the Bob Marshall Wilderness and the Mission Mountains Wilderness complexes, in the heart of the CoCE. The Swan Valley supports Canada lynx, wolves, wolverine, grizzly bear, black bear, bull trout, elk, moose, goshawks, loons, eagles, and numerous other species.

The Swan Valley is unique among Montana's spectacular valleys in that it contains over 4,000 glacially derived wetlands. In fact, approximately 16% of the land in the Swan Valley is considered wetland habitat (lakes, rivers, ponds, marshes, wet meadows, peatlands, and riparian areas). By comparison, the remainder of Montana averages 1% wetland habitat. This fact, along with its diverse forest types, makes the Swan Valley ideal habitat for a diverse array of wildlife. Rare carnivores, threatened trout, and a high diversity of songbirds and waterfowl depend upon the Swan Valley's unique habitats.

The Swan Valley contains fourteen ecologically significant wetlands as identified in the Montana Natural Heritage Program's report; "Ecologically Significant Wetlands in the Flathead, Stillwater, and Swan River Valleys" (Greenlee 1999). There is a higher number of wetland-associated rare-plant species in the Swan Valley, including, federally threatened water howellia. Water howellia is found exclusively in small, shallow depressional wetlands scattered across the valley floor. The Swan Valley is believed to contain the world's greatest density of water howellia.

The Swan Valley also supports a rich diversity of forest types ranging from high elevation white bark

pine communities to dry ponderosa pine communities on the valley floor, to wet cedar/hemlock and Engelmann spruce/subalpine fir communities on the east side of the valley.

Wildlife

The Swan Valley's moist low elevation forest ecosystem supports a rich diversity of fish and wildlife species (see appendix B). The federal trust species that would benefit from the proposed habitat protection include listed and candidate species such as grizzly bear, wolf, wolverine, pine martin, and lynx; migratory birds such as harlequin duck, common loon, red-necked grebe, black tern, peregrine falcon, and greater sandhill crane; and native salmonoids such as the westslope cutthroat trout and bull trout.

Amphibians and Reptiles

The Montana Natural Heritage Database (MTNHP 2010) documents ten species of amphibians and reptiles on record within the Swan Valley (see appendix B). Many of the species documented include S4 Status Species (apparently secure, through it may be quite rare in parts of its range or is suspected to be declining) such as common garter snake, painted turtle, rubber boa, Columbia spotted frog, long-toed salamander, and Rocky Mountain tailed frog. The northern alligator lizard is listed as a S3 Status Species (species potentially at risk because of limited or declining numbers, range or habitat, even though it may be abundant in some areas of Montana). The western toad is listed as a S2 Status Species (species at risk because of very limited or potentially declining population numbers, range or habitat, making it vulnerable to global extinction or extirpation in Montana). The northern leopard frog is listed as a S1 Status Species (at high risk because of extremely limited or rapidly declining population numbers, range or habitat, making it highly vulnerable to global extinction or extirpation in Montana).

USFWS

Garter snake.

Species not listed in the Natural Heritage Database, but known to occur in the Valley include: Pacific treefrog, western skink, eastern racer, gophersnake, terrestrial garter snake, and western rattlesnake (Werner et al. 2004). A total of sixteen species of amphibians and reptiles are known to inhabit the diverse habitats within the Swan Valley.

Fish

Common fish species of the Swan Valley include longnose suckers, largescale suckers, and slimy sculpin. In addition, potential species of concern within the project area include the brook stickleback and pygmy whitefish. Westslope cutthroat trout are currently a species of special concern, and utilize clear, cold lakes and streams found in the project area.

Swan Valley Conservation Area is within the designated recovery area for the federally threatened bull trout. Critical habitat has been designated for bull trout within the project area.

Mammals

The Montana Natural Heritage Database (Montana Natural Heritage Program 2010) documents forty-two species of mammals on record within the Swan Valley (see appendix B). Many of the species documented include S2 Status Species such as grizzly bear and Townsend's bat. Other species include S3 Status Species such as wolverine, fisher, hoary bat, fringed myotis, hoary marmot, and Canada lynx, a federally threatened species.

Game species not listed in the Natural Heritage Database, but known to occur in the valley include: moose, elk, white-tailed deer, mule deer, big horn sheep, and mountain goat (Foresman 2001). Other species documented to occur within the Valley include: northern pocket gopher, southern red-backed vole, long-tailed vole, montane vole, heather vole, northern grasshopper mouse, house mouse, Norway rat, northern bog lemming, yellow-bellied marmot, northern flying squirrel, coyote), red fox, striped skunk, long-tailed weasel, mink), badger, raccoon, white-tailed jackrabbit, mountain cottontail, and porcupine (Foresman 2001).

A total of sixty-nine species of mammals are known to inhabit the diverse habitats within the Swan Valley. This vast array of species including large charismatic megafauna such as the grizzly bear, black bear, elk, moose, lynx, mountain lion, and wolf to more sublime species such as long-tailed voles and yellow-bellied marmots.

Migratory and Other Birds

Over 160 bird species are known to occur in watershed with 110 breeding bird species documented.

Wetland complexes in the Swan Valley provide important breeding habitat for twenty species of waterfowl including: mallard, lesser scaup, wood duck, redhead, ring-necked duck, canvasback, American wigeon, Canada goose, green-winged teal, blue-winged teal, cinnamon teal, northern shoveler, gadwall, common goldeneye, Barrow's goldeneye, harlequin duck, bufflehead, hooded merganser, common merganser, red-breasted merganser, and ruddy duck.

The Swan Valley is one of the only watersheds in the western continental United States that supports breeding common loons. Currently, there are a total of six breeding pairs in the Swan Valley (Van, Loon, Summit, Lindbergh, Swan, and Holland lakes). Historical records indicate Shey and Peck Lakes as being previously occupied by common loons.

Species of Special Concern

Twenty-seven of the 160 known bird species in the project area are Intermountain West Joint Venture conservation priority species. The U.S. Forest Service lists flammulated owl, bald eagle, black-backed woodpecker, common loon, and peregrine falcon as sensitive species occurring in the valley.

Partners In-Flight Draft Bird Conservation Plan for Montana (Rich 2004) identifies thirty-six species designated as conservation priority occurring in the Swan Valley Conservation Area:

- *4 Level 1 Priority Species:* Common loon, black-backed woodpecker, olive-sided flycatcher, and brown creeper.
- *14 Level 2 Priority Species:* Barrow's goldeneye, hooded merganser, bald eagle, northern goshawk, peregrine falcon, Vaux's swift, calliope hummingbird, Lewis' woodpecker, ruffed grouse, three-toed woodpecker, pileated woodpecker, willow flycatcher, Hammond's flycatcher, Cordilleran flycatcher, winter wren, red-naped sapsucker, and red-eyed vireo.
- *28 Level 3 Priority Species:* Northern harrier, sharp-shinned hawk, blue grouse, killdeer, western screech-owl, treat tray owl, rufous hummingbird, downy woodpecker, Clark's nutcracker, chestnut-backed chickadee, American dipper, golden-crowned kinglet, Townsend's solitaire, varied thrush, gray catbird, Cassin's vireo, warbling vireo, Townsend's warbler, American redstart, MacGillivray's warbler, chipping sparrow, song sparrow, red-winged blackbird, yellow-headed blackbird, Brewer's blackbird, Cassin's finch, and red crossbill.

The U.S. Fish and Wildlife Service Division of Migratory Bird Management report "Birds of Conservation Concern 2008" has identified the following twenty-two species of concern occurring in the Swan Valley Conservation Area:

- *7 Species on Bird Conservation Region 10 (Northern Rockies) List:* Bald eagle, peregrine falcon, calliope hummingbird, Lewis' woodpecker, olive-sided flycatcher, and willow flycatcher.
- *8 Species on USFWS Region 6 (Mountain-Prairie Region) List:* American bittern, bald eagle, golden eagle, peregrine falcon, prairie falcon, Lewis' woodpecker, willow flycatcher, and Cassin's finch.
- *7 Species on National List:* Bald eagle, peregrine falcon, calliope hummingbird, rufous hummingbird, Lewis' woodpecker, olive-sided flycatcher, and willow flycatcher.

Federally listed animal species found in the Swan Valley include the threatened bull trout, grizzly bear, and Canada lynx. The gray wolf, which was delisted from endangered status in March 2009, the bald eagle, which was delisted from threatened status in July 2007, and the fisher, which is a candidate for listing, also occur in the watershed (USFWS 2009b). The relationship of the watershed to Endangered Species Act planning units is as follows:

Bull Trout

For listing purposes, the Service divided the range of bull trout into distinct population segments, and twenty-seven recovery units. Swan River Valley falls within the Clark Fork River Recovery Unit, and the Upper Clark Fork Recovery Subunit. Within this subunit, the watershed has been identified as a core recovery area (USFWS 2002).

Within the Clark Fork Recovery Area (all of western Montana, except the Kootenai River, plus parts of Idaho), the Swan Lake bull trout population has remained strong. The Swan Lake population is stable because fish can access about 150 miles of high quality tributary spawning habitat. Most bull trout populations are declining, because of habitat degradation, but many of the Swan Valley's tributary streams are in good to excellent condition.

Continuous identifiable female bull trout nesting areas (redd) count history dating to 1982 is available for bull trout for four index streams in the Swan River Watershed (MFWP 2009). Bull trout may have reached equilibrium in this system at a population level of about 2,000 adults and the current trend appears stable.

The total redd count was 598 in 2008, representing roughly 2,000 adults in the spawning run. Given that some adults do not spawn every year, the total adult population is likely over 2,500 adult bull trout.

Grizzly Bear

Grizzly bears are currently listed as a federally threatened species in the Northern Continental

Divide Ecosystem (NCDE) (USFWS 2009b). The NCDE is an area of the northern Rocky Mountains, contained within the CoCE, with large blocks of protected public land containing some of the most pristine and intact environments found in the contiguous United States. The NCDE supports the largest population (765 individuals) of grizzly bears in the lower forty-eight states. Despite dramatic losses of habitat throughout North America, the grizzly has maintained a presence in Montana and bears occur in many portions of the Swan Valley watershed. The watershed is the southern boundary for the NCDE grizzly bear recovery zone. The Grizzly Bear Recovery Plan (USFWS 1993) includes all of Swan River watershed as suitable or occupied habitat.

The U.S. Geological Survey (USGS) Northern Divide Grizzly Bear Project, designed to estimate population size and distribution, confirmed the presence of forty-five grizzly bears in the Swan Valley in 2003 and 2004. The USGS estimates that at least sixty-one bears are present during all or part of the year in the watershed (USGS 2004). This area has been identified an important habitat link for grizzlies moving between the Glacier National Park/Bob Marshall Wilderness Complex and the Mission Mountains Wilderness. The Swan Valley is also believed to be the key linkage zone to the large and important Bitterroot/Selway Wilderness Complex to the southwest. As such, it provides an avenue of connectivity between the Canadian Rockies and the Central Rockies of Idaho and Wyoming. Maintaining habitat connectivity is critical to sustaining grizzly bear life histories and maintaining sustainable subpopulations within the southern portion of the NCDE.

Numerous studies by the Service and Montana Fish, Wildlife and Parks (MFWP) have documented significant grizzly bear use on private lands in the Swan Valley. Lakes, ponds, fens and spring-fed creeks, common in portions of the valley floor, provide excellent bear habitat. Additionally, the vegetation found along certain reaches of the Swan River and its tributaries provide bears with cover, food, and natural movement corridors.

Northern Rocky Mountain Gray Wolf

The Northern Rocky Mountain Gray Wolf Recovery Plan established three recovery zones in Montana, Idaho, and Wyoming. The Swan River watershed is in the Northwest Montana Recovery Area (USFWS 1987). In March 2009, the Service removed the gray wolf from the list of threatened and endangered species in the western Great Lakes, the northern Rocky Mountain states of Idaho and Montana and parts of Washington, Oregon, and Utah (USFWS 2009b). The status of the gray wolf, however, is not yet resolved due to the likelihood of litigation over delisting. As of 2009, MFWP has confirmed the presence of three resident wolf packs and estimates that at least fifteen to twenty-five wolves inhabit the watershed.

Canada Lynx

The Canada Lynx Recovery Outline categorized lynx habitat and occurrence within the contiguous United States as (1) core areas, (2) secondary areas, and (3) peripheral areas. Core areas are defined as the areas with the strongest long-term evidence of the persistence of lynx populations. Core areas have both persistent verified records of lynx occurrence over time and recent evidence of reproduction. Six core areas and one "provisional" core area are identified within the contiguous United States (Nordstrom 2005).

The Swan River watershed is located within the Northwestern Montana/Northeastern Idaho Core Area (Ruediger et al. 2000). The watershed is a stronghold for the Canada lynx in the northern Rocky Mountains. Based on ongoing research in the Blackfoot and Swan watersheds, lynx populations appear stable, although low reproductive rates are characteristic of this population. Since 1998, over eighty lynx have been monitored in this area, providing information on habitat use, reproduction, mortality, and movement. This research has shown that the Swan and Blackfoot watersheds contain some of the best remaining habitat for lynx in the continental United States. Large, intact spruce/subalpine fir forests above 4,000 feet in this area provide high quality habitat for lynx and for snowshoe hares, the primary lynx food source. Regenerating forest stands are often used as foraging habitat during the snow-free months while older, multi-storied stands serve as denning and year-round habitat (Blackfoot Challenge 2005). Conservation easements protecting critical forested/wetland habitats including ponderosa pine, cedar/hemlock and Engelmann spruce/subalpine fir communities on the valley floor as well as riparian areas will have long lasting benefits for the species listed above.

See appendix C for a list of federally listed animals present in the project area.

CULTURAL RESOURCES

The Service has a trust responsibility to American Indian tribes that includes protection of the tribal sovereignty and preservation of tribal culture and other trust resources.

Currently, the Service does not propose any project, activity, or program that would result in changes in the character of, or adversely affect, any historical cultural resource or archaeological site. When such undertakings are considered, the Service takes all necessary steps to comply with section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. The Service pursues compliance with section 110 of the NHPA to survey, inventory, and evaluate cultural resources.

SOCIOECONOMIC ENVIRONMENT

This section discusses landownership, timber resources, property taxes, and public use and wildlife-dependent recreational activities.

Landownership

The Swan Valley watershed ownership consists of 286,798 acres of federal (U.S. Forest Service and Service) lands, 45,676 acres of state (Montana Department of Natural Resources) land, 66,066 acres owned by The Nature Conservancy, 12,154 acres owned by Plum Creek Timber Company, and 51,808 acres of private lands. Most of the middle and high elevation forested lands within the watershed are administered by the U.S. Forest Service. Private lands are concentrated in the low elevation portions of the watershed. See figure 3, map of landownership in Swan Valley Conservation Area.

In 2008, The Nature Conservancy and the Trust for Public Lands entered into an agreement with PCTC to purchase, in a three-phase project, a total of 312,500 acres in western Montana known as the Montana Legacy Project. A total of 65,630 acres are located on the valley floor in the Swan Valley. The USFS is scheduled to purchase 44,821 acres in 2010 and 20,809 acres will be purchased by the Montana DNRC in 2011. The Montana Legacy Project is the single largest conservation effort in the country to date. This transfer of ownership from corporate lands to public lands will have major benefits in reducing the checkerboard pattern of ownership within the valley and in protecting critical fish and wildlife habitat.

Timber Resources

The Swan Valley lies at the border of the maritime and continental climates and thus has a mixture of Pacific Coastal Forest and inter-mountain tree species (see tables 1–3). Western red cedar, grand fir, western hemlock, and western larch grow in the valleys, along with more familiar species such as Douglas-fir, Englemann spruce, ponderosa pine, and lodgepole pine.

Forest types range from wet riparian forest to drier ponderosa pine/snowberry communities. Cottonwood, aspen, and birch commonly surround the wetland and riparian areas or in other wetter upland sites. Cottonwood and spruce also dominate much of the Swan River's floodplain. Most of the lower elevation uplands consist of mixed conifers dominated by Douglas-fir, western larch, ponderosa pine, and lodgepole pine. Other common species include grand fir and subalpine fir. Stand types at most of the low elevation lands range from regenerated seedling and pole stands, to mixed-aged stands of mature timber. For the lower elevations, typical forest rotations for saw timber range from 50–75 years.

Forest types on the higher lands consist primarily of subalpine fir and lodgepole pine, with components of western larch, Douglas-fir, whitebark pine, and other species. Given the higher and colder conditions, typical forest rotations for saw timber range from 60–80 years.

Property Tax

Currently, landowners pay the counties property taxes on their private lands. The Swan Valley CA is mainly a proposed conservation easement program; the land does not change hands and, therefore, the property taxes paid by the landowner to the county are not affected. Minimal changes to the tax base are anticipated. Fee-title lands purchased would be subject to the Revenue Sharing Act (16 USC 715s) which requires revenue sharing payments to counties for the purchase of the land. The amount is based on the greatest of (1) ¾ of 1 percent of the market value, (2) 25 percent of the net receipts, or (3) 75 cents per acre.

Public Use and Wildlife-dependent Recreational Activities

Hunting and fishing are very popular throughout the project area. Hunting for a variety of wildlife includes waterfowl, upland game birds, pronghorn, elk, moose, deer, black bear, bighorn sheep, mountain lion, and furbearers. Private landowners often give permission for hunting and fishing on their land. Under a conservation easement, control of public access to land would remain under the discretion of the landowner. Any parcels acquired in fee-title adjacent to Swan River NW, would be administered and managed as part of the refuge, where a variety of wildlife-dependent recreational opportunities are available to the public.

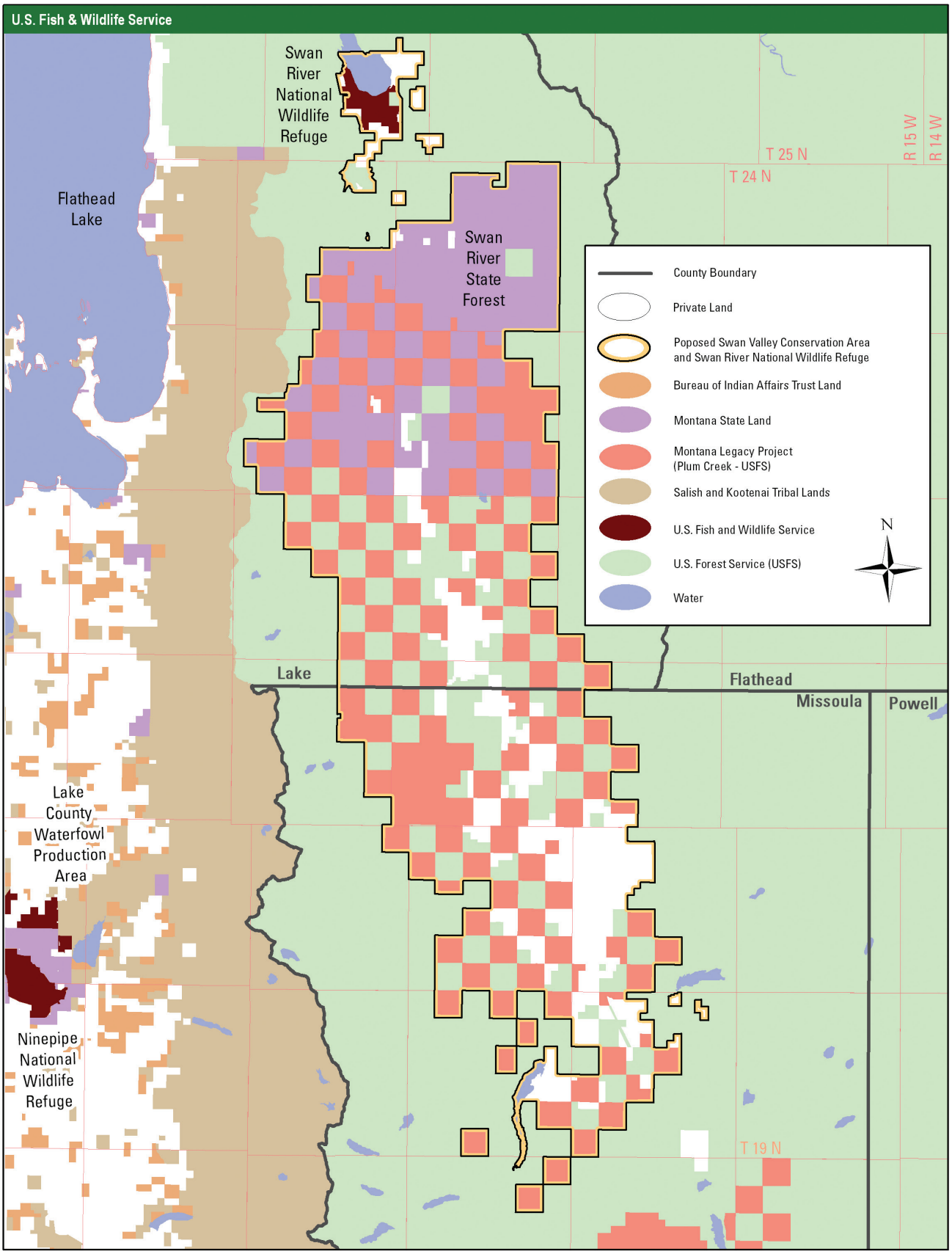


Figure 3. Landownership in the Swan Valley Conservation Area.

Table 1. Historical seral stages within the Swan sub-basin.

	Terrestrial Community Group		
	Subalpine	Montane	Lower Montane
Seral Stage	*Approx. Historic Range*	*Approx. Historic Range*	*Approx. Historic Range*
Late Seral (dominant trees >15" dbh*)	8-10%	20-22%	2-6%
Mid Seral (dominant trees 5"–15" dbh*)	7-10%	31-37%	2-5%
Early Seral (dominant trees <5" dbh*)	2-3%	7-18%	0-1%

**dbh is tree diameter at breast height*

Table 2. 1998 distribution of seral stages for the Swan sub-basin.

	Terrestrial Community Group		
	Subalpine	Montane	Lower Montane
Seral Stage	*Approx. Historic Range*	*Approx. Historic Range*	*Approx. Historic Range*
Late Seral (dominant trees >15" dbh*)	2%	10%	1%
Mid Seral (dominant trees 5"–15" dbh*)	11%	52%	1%
Early Seral (dominant trees <5" dbh*)	2%	11%	1%

**dbh is tree diameter at breast height*

Table 3. Forest habitat types of the Swan sub-basin.

Warm Dry	Ponderosa Pine and Douglas-fir/grass types
	Most Douglas-fir and dry grand fir types
	Douglas-fir/twinflower and most grand fir types
Warm Moist	Grand fir/queencup beadlilly types
	Western redcedar and western hemlock/queencup beadlilly and menziesia types
Cool Moist	Subalpine fir/queencup beadlilly and menziesia types
	Subalpine fir/beargrass and dwarf huckleberry types
Riparian	Western redcedar/devil's club types
	Subalpine fir/bluejoint types
Cold	Subalpine fir/grouse whortleberry and woodrush types
	Whitebark pine and alpine larch types

4 Environmental Consequences

This chapter assesses the environmental impacts expected to occur from the implementation of alternatives A or B, as described in chapter 2. Environmental impacts are analyzed by issues for each alternative and appear in the same order as discussed in chapter 2.

EFFECTS ON THE BIOLOGICAL ENVIRONMENT

This section describes the estimated effects on climate change, wildlife habitat, and water resources of carrying out alternatives A and B.

Climate Change

Climate change is the pre-eminent issue for conservation in future decades. Current trends in climate change are expected to affect high mountain ecotypes and lower elevation, snow-melt dependent watersheds, such as those found in the Swan Valley, more acutely than some other landscape ecotypes. Predictions regarding the specific effects of climate change in the Swan Valley are in the early stages. Empirical data indicates that during the twentieth century, the region has grown warmer, and in some areas drier. Annual average temperature has increased 1–3 degrees over most of the region. This seemingly modest increase masks much larger shifts in minimum winter temperatures (10°F) and shifts in maximum summer temperatures (7°F). In the 2007 Introduction to the Summary for Policy Makers Synthesis Report, the Intergovernmental Panel on Climate Change stated that average air temperatures may rise by up to 6°C by the end of this century, according to regionally downscaled models from the Pacific Northwest (USFWS 2009c).

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Coniferous forest of the Swan Valley.

Changes in temperature and precipitation are expected to decrease snowpack and will affect stream flow and water quality throughout the Swan Valley. Warmer temperatures will result in more winter precipitation falling as rain rather than snow throughout much of the region particularly in mid-elevation basins where average winter temperatures are near freezing. This will result in

- Less winter snow accumulation;
- Higher winter streamflows;
- Earlier spring snowmelt;
- Earlier peak spring streamflow and lower summer streamflows in rivers that depend on snowmelt (USFWS 2009c).

As glaciers and alpine snow fields melt and winters warm in Montana, specialized habitat for fish and wildlife species is expected to diminish. Snow conditions that facilitate hunting success for forest carnivores, such as Canada lynx, are now changing due to winter warming (Stenseth 2004). High elevation forest plants such as whitebark pine (an important food source for grizzly bears) and other birds and mammals throughout the Crown of the Continent and Greater Yellowstone ecosystems (Kendall and Arno 1989) will also be negatively impacted by winter warming. Whitebark pine is susceptible to increased mortality as the incidence of drought, high elevation wildfire, and mountain pine beetle attacks, all associated with a warming climate increase (Hanna et al. 2009).

This warming may also have impacts on grizzly bears. Important food resources are expected to decline as warming causes an increase in whitebark pine blister rust, reducing the availability of the pine to bears. This may result in shifts in foraging elevations and a potential increase in grizzly bear conflict with humans and livestock.

According to Service Grizzly Bear Recovery Coordinator, Chris Servheen (University of Montana, Missoula, MT; personal interview in person, 11 June 2008), it is highly likely that grizzly bear delayed fall den entry dates and earlier spring-emergence dates will begin occurring in the Swan Valley as they have in the Greater Yellowstone area, related to climate change. This will also potentially increase their likelihood of human-caused mortality from increased encounters (Endangered Species Coalition 2009).

As late summer flows are affected by global warming, fewer rivers will be able to supply ample cold water required by species such as bull trout. Bull trout distribution is expected to be interrupted by the heightened ambient air temperatures (Endangered Species Coalition 2009).

The impacts of climate change will extend beyond the boundaries of any single refuge or easement program and will require large-scale, landscape level solutions that extend throughout the CoCE. The collective goal of each of the proposed project areas (Blackfoot Valley, Rocky Mountain Front, Swan Valley) is to build resilience in ecological systems and communities, so that, even as climate conditions change, the CoCE will continue to support its full range of native biodiversity and ecological processes. Building resilience includes maintaining intact, interconnected landscapes, and restoring fragmented or degraded habitats.

Adaptation, Mitigation, and Engagement

The Service strategic response to climate change involves three core strategies: adaptation, mitigation, and engagement (USFWS 2009c). Through adaptation, the impacts of climate change on wildlife can be reduced by conserving habitats that are expected to be resilient.

Increased landscape connectivity is one of the most effective methods to help wildlife adapt to climate change. Large landscapes, especially those within mountains, and the ability to move between them, provide the best chances for plant and animal species, as well as ecosystems and ecological processes, to survive changing conditions. The ability to migrate to higher latitudes, higher elevations, or cooler exposures can make possible the successful adaptation of plants and animals. The Yellowstone to Yukon ecosystem, which includes the CoCE, is the most intact mountain ecosystem remaining on earth and is one of the world's few remaining areas with the geographic variety and biological diversity to accommodate the wide-scale adaptive responses that might allow whole populations of animals and plants to survive (Yellowstone to Yukon Conservation Initiative Yellowstone to Yukon 2009).

One of the results of changing climates is the alteration of the habitats upon which wildlife depend. Wildlife will have to adapt to changes in habitat to survive. Protecting and linking contiguous blocks of unfragmented habitat will facilitate movement of wildlife responding to climate change.

Carbon sequestration forms one of the key elements of mitigation. The Swan Valley CA will protect large forested areas from subdivision. Forests are critically important in the efforts to remove CO2 from the atmosphere and mitigate climate change. The CO2 from the atmosphere is absorbed by trees through photosynthesis and stored as carbon in the tree trunk, branches, foliage, and roots, with oxygen as a byproduct. The organic matter in forest soils, such as the humus produced by the decomposition of dead plant material, also acts to store carbon.

Engagement involves cooperation, communication, and partnerships to address the conservation challenges presented by climate change (USFWS 2009c). The proposed project is located in an area that is designated as a high priority for conservation and linkage protection by many of our partners including Montana Fish, Wildlife and Parks; The National Fish and Wildlife Foundation; The Nature Conservancy; The Kootenai River Network; The Swan Ecosystem Center; The Northwest Connections; Vital Ground; Trout Unlimited; Trust for Public Lands; and The Yellowstone to Yukon Initiative. Many of these organizations are involved in trans-boundary conservation, protecting and connecting habitat in the United States and Canada. Strong partnerships have already been developed to meet the challenges of climate change and wildlife resources.

Given the level of public and private partnerships focused on land protection within the Swan Valley CA, this landscape is an extremely promising large-scale opportunity in North America to improve species resiliency and adaptation in the face of climate change.

Wildlife Habitat—Alternative A

Although efforts by the Service's Partners for Fish and Wildlife (PFW) program and other partners would continue to enhance habitat on some private lands, degradation of resources on many unprotected lands would continue. These potential impacts could result in the further decline of migratory birds, resident wildlife, and listed species.

Increasing urbanization which causes increased fragmentation of habitat from housing developments and associated road development is a major threat to Swan Valley. Most current published statistics (2000–2009) by the U.S. Census Bureau reported Missoula and Lake counties experiencing a 13.4% increase in population from 2000. Montana as a whole experienced a 10.5% increase within that same period (U.S. Census Bureau 2010).

Many acres of land would likely be developed for recreational home sites or isolated commercial uses, as economic forces change in the future. In recent years, subdivision and the demand for recreational property has been present in western Montana, posing the greatest single threat to the Swan Valley. Lands adjacent to natural areas are choice home sites and are targeted for residential development.

No action would result in loss of opportunity to protect historically important upland and wetland habitats. Without the protection of private land with

conservation easements, the future of wildlife habitat in the project area would be uncertain.

Habitat fragmentation is one the greatest impacts caused by rural subdivision and residential development. In the Lake County portion of the proposed project area, the county has established density and development regulations (Lake County 2009). The private lands within the proposed project area have been restricted to between 10–40 acres per unit, depending on location. As long as these regulations are in place, this does provide some protection against high density housing units. However, some landowners did secure subdivision rights prior to the enactment of these regulations. In Missoula County, there are currently no zoning regulations and therefore rural subdivision and associated habitat fragmentation are a greater concern.

Private land subdivision results in smaller ownerships. Subsequent effects such as invasive plant infestations; increased fencing, roads, and vehicle traffic; and loss of habitat and travel corridors for wildlife would likely impact wildlife. In addition, these effects would bring increased human presence in the form of snowmobiles, predator–prey shifts, and sources of disturbance that can disrupt wildlife movement patterns and render habitat unusable.

Dispersed development leads to an increase in open road density and road use. Households in Montana are increasing faster than the population, due to an increase in second home development. An increase in the numbers of roads, cars, and truck traffic also accompanies this development. Numerous studies have shown the negative effects of open road densities on wildlife, which include wildlife displacement and increased mortality due to wildlife–vehicle collisions (Trombulak and Frissell 2000).

Increased human settlement can also result in increased human–wildlife conflicts, a known cause of increased mortality to bears. In addition, these effects would bring increased human presence in the form of snowmobiles, predator–prey shifts, and sources of disturbance that can disrupt wildlife movement patterns and render habitat unusable.

Loss of habitat and travel corridors for wolverine, Canada lynx, grizzly bear, gray wolf, and other species would likely have a negative impact on these species' populations in Swan Valley. These key geographic and biological linkages can be lost and wildlife populations can be isolated once an area is fragmented by subdivisions or other development.

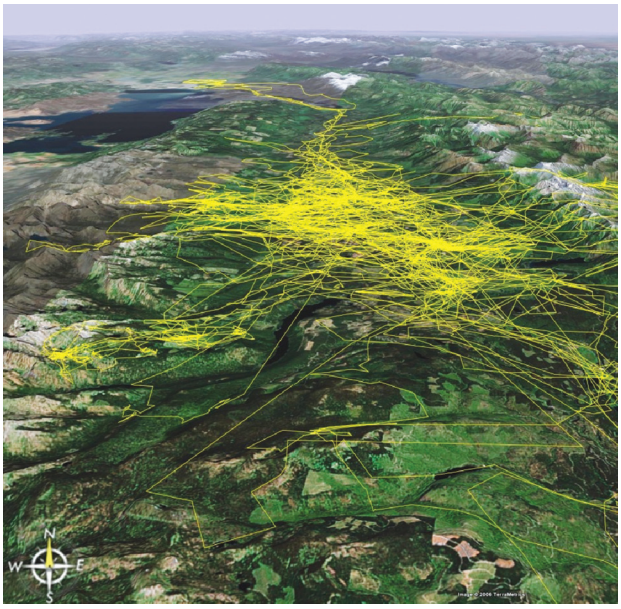
Dispersed development results in expansion of the wildland–urban interface (WUI). The WUI is the zone where structures and other human development are within the vicinity of forests and other wildlands.

In the 1990s mining, logging, and wood product industries were declining while health services, trade contractors, business services, and real estate development were growing. A major difference between the old economy (timber, mining, and ranching) and the new economy (residential development and amenities) is the level of permanence. Impacts from logging, and to a lesser extent, mining can be reclaimed; trees and other vegetative cover can regenerate and logging roads can be closed and obliterated. However, subdivisions and developments are more permanent and offer fewer possibilities of wildlife habitat restoration in the future.

Riparian habitat loss due to development is also a concern. Riparian habitat is a key component to grizzly bear movement between the mountains and valley. Riparian areas also provide nest sites for many species of migratory birds that may be negatively impacted by development. In addition, riparian habitat in the Swan Valley is important for the threatened bull trout.

When development occurs in close proximity to streams and rivers, riparian vegetation may be impaired and the natural flooding regime that helps to maintain riparian communities may be altered. Dispersed residential development can have multiple impacts on riparian communities, particularly if there is no stream setback zoning in the county where the watershed is located.

Residential and resort development, and its associated human activity near streams, lakes, and rivers can also impact native salmonids. Salmonids are a family of fish containing salmon, trout, and whitefish. Increased water use because of development can lead to reduced stream flows, elevated stream temperatures, and further constraints on rearing habitats and migratory corridors. Additionally, deforestation and



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Grizzly bear movements.

development along the stream banks can contribute to surface runoff and subsequent soil erosion which can cause excessive sedimentation. Sedimentation can degrade water quality and instream and riparian habitats, and can impact the health of fish, aquatic invertebrates, and aquatic plants.

Wildlife Habitat—Alternative B

Establishing the Swan Valley CA would provide for the conservation of up to 11,000 acres of important habitat on private land. This program would help maintain the uniqueness of the Swan Valley and complement conservation efforts of the MFWP, TNC, TPL, Montana Land Reliance, Vital Ground, Swan Valley Ecosystem Center, and other federal and state agencies.

Conservation easements within the Swan Valley would help alleviate habitat fragmentation issues. Key biological linkages would facilitate wildlife movement and provide for wildlife habitat requirements. The potential for human—wildlife conflicts would be greatly reduced.

Compatible agricultural practices such as livestock grazing or haying would continue, while sodbusting (breaking up of native rangeland) and wetland drainage would be prohibited. Easements would maximize the connectivity with other protected lands and decrease the negative impacts of habitat fragmentation on grassland birds (Owens and Myers 1972).

Water Resources—Alternative A

The prospect of residential development in the Swan Valley represents a potentially significant threat to aquatic habitat. Sewage-derived nutrient additions to streams and lakes could have detrimental effects of the aquatic ecology (Wernick et al. 1998).

Housing developments can also result in additional wetland drainage, water diversion, and introduction of invasive species. Development could also change drainage patterns or rate of surface runoff, increasing soil erosion and nonpoint source pollution.

As demand for potable water increases for new subdivisions, water rights could be questioned and challenged to a greater extent in the future. Groundwater aquifers would receive more demand, resulting in potential degradation to the hydrology of some wetland areas.

Water Resources—Alternative B

Water resources on the 11,000 acres of conservation easements and the additional fee-title acquisitions would be protected from increased nonpoint source pollution from residential subdivision, commercial development, and draining of wetlands, all of which are prohibited under the proposed easement program. This protection would also improve water resources throughout the Swan Valley watershed.

Landowners participating in the conservation easement program would continue to own and control water rights.

EFFECTS ON THE SOCIOECONOMIC ENVIRONMENT

This section describes the estimated effects of alternatives A and B on land ownership and land use, the value of intact ecosystems, wind energy development, public use, and economic impacts.

Landownership and Land Use—Alternative A

The resources studied by the Service for conservation easements and fee-title acquisition in the Swan Valley would remain in private ownership with no restrictions.

Landowners that subdivide could increase their revenue by developing recreational home sites. With subdivision, tracts could potentially increase in value if there is desire to cluster housing or to keep open space for future housing developments.

The community would lose open space and the aesthetics of the Swan Valley would diminish significantly. Subdivision and development would reduce hunting and wildlife observation opportunities and diminish revenue associated with these activities to local communities.

Landownership and Land Use—Alternative B

The Swan River watershed includes the communities of Condon, Salmon Prairie, Swan Lake, Ferndale, and Bigfork and spans portions of Lake and Flathead counties.

The remaining private land in the Swan Valley is relatively undeveloped except for two small communities totaling less than 400 people.

The Service will purchase up to 1,000 acres of fee-title land, and approximately 10,000 acres of conservation easements. Only willing sellers would be considered and paid appraised market value for these lands. Buffer areas will be maintained around rural communities to provide them with the ability to meet their community development goals and objectives.

Value of Intact Ecosystems

Humans influence every ecosystem on earth, leading to impairment of natural ecosystem structure and function (MEA 2005). Converting native land to row-crop agriculture, suppressing fire, diverting water flow, increasing nutrient and toxic pollution, altering global precipitation patterns and gas concentration, and homogenizing and lowering global biodiversity are a few of the ways humans have altered ecosystems. North American forests, savannas, and grasslands have experienced substantial losses, whereas woody savanna, shrubland, and desert areas have expanded because of desertification and woody expansion into grasslands (Wali et al. 2002), inevitably leading to changes in ecosystem function (Dodds et al. 2008).

Alternative A (no action)

Under the no action alternative, the threat of habitat fragmentation will continue unabated. Landowners may continue to face economic pressures to subdivide their property. Habitat fragmentation would compress the project area, leaving fewer larger parcels of intact habitat.

Alternative B – Proposed Action

Conserving native land cover is an important component of maintaining ecosystem structure and function. Under the proposed action, native forest habitats would remain intact, continuing to provide ecosystem goods and services to landowners and local communities. Ecosystem services include: soil erosion control, water supply, biodiversity, and carbon sequestration. The proposed action would help protect valuable ecosystem services (see figure 4). The Swan Valley is a relatively intact system. Protecting this system is cheaper than the prohibitively high cost of restoration.

Wind Energy Development—Alternative A

Wind development within the Swan Valley may occur, however, the valley is not conductive to large scale commercial or industrial development of wind energy. Wind energy effects on the landscape include habitat fragmentation and vertical structural barriers. The Service would focus on assisting with proper sighting of towers, because the placement of towers and associated infrastructure is critical in reducing impacts to habitat and wildlife.

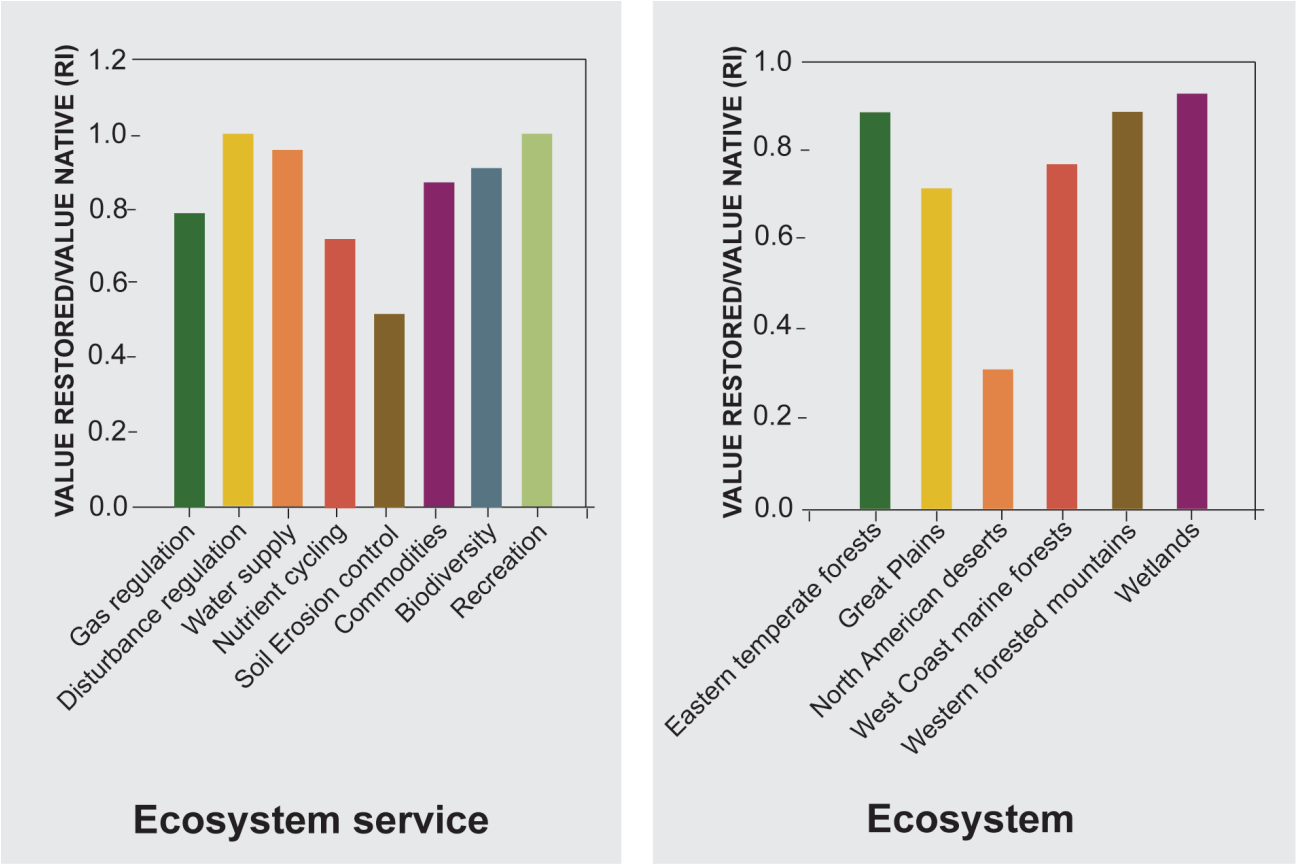


Figure 4. Relative native and restored benefits of ecosystem goods and services. The relative value, RI, is determined as the ratio of estimated benefits derived from native and restored acreages per year.
(Source: Dodds et al. 2008)

Wind Energy Development—Alternative B

Wind development within the Swan Valley Conservation Area would not occur on conservation easement and fee-title properties due to restrictions on wind development. This reduces fragmentation within the valley from the placement of towers and associated infrastructure development. This improves wildlife corridors' integrity throughout the valley and helps reduce human-bear conflicts. Restricting wind towers also prevents mortality from direct strikes of towers by migratory birds and other avian wildlife species.

Public Use—Alternative A

The Service would not purchase conservation easements, and landowners would manage public use. No additional public use opportunities in the Swan Valley would occur.

Public Use—Alternative B

Conservation easements purchased on private tracts would not change the landowner's right to manage public access to their property. Under the proposed easement program private landowners would retain full control over their property rights, including allowing or restricting hunting and fishing on their lands.

Lands purchased in fee-title would be managed as part of the Swan River NWR, which is provides public use. Wildlife-dependent recreation opportunities at the Swan River NWR include hunting, fishing, wildlife observation and photography, interpretation, and environmental education. Fee-title acquisition would provide additional recreational opportunities on the refuge.

Economic Impacts—Alternative A

Under alternative A, the no-action alternative, economic impacts will remain at current levels.

The Swan Valley CA does not currently exist; therefore there are no FTE employees or operating expenditures. There are no current economic impacts associated with the Swan Valley CA.

Economic Impacts—Alternative B

Under alternative B, increases in employment, annual operating expenditure and easement purchases would contribute to the economic activity that the Benton Lake National Wildlife Refuge Complex generates in the project area. The socioeconomic impact of visitor expenditure is not included in this analysis as historical public visitor data at conservation areas is not available, and visitor increases due to public awareness of conservation activities is difficult to quantify.

According to Service staff, new employment associated with alternative B will require 1.67 FTE employees and $91,518 in salaries or an average of $54,911 per new employee. Assuming employees spend 79 percent of their earnings locally, the direct socioeconomic impact of increased employment at Swan Valley CA is $72,299 annually.

Alternative B would add approximately $15,210 in operating expenditures associated with landowner management, employee training and travel expenses. These funds are spent on local goods and services and therefore directly impact the economy in the study area.

The direct economic impact of easement acquisitions are more difficult to attribute to the study area as it is less obvious where landowners may spend this income. In the Swan Valley CA, easements are worth an estimated $25,000,000. Table 4 presents a summary of annual operating costs and salaries associated with Alternative B.

Table 4. Swan Valley Conservation Area economic impacts.

	Current Impacts	*Alternative B Impacts*
Salaries	-	$72,299
Operations	-	$15,210
Total Impacts	-	$87,509
Increase above baseline	$87,509	

As shown above, the total direct economic impacts related to the Swan Valley CA under management Alternative B are estimated at $87,509.

UNAVOIDABLE ADVERSE IMPACTS

Any adverse effects that may be unavoidable while carrying out alternatives A and B are described on the following page.

Alternative A

The adverse impacts of degradation and habitat fragmentation would be expected to be more widespread and prevalent in the project areas.

Alternative B

No direct or indirect unavoidable adverse impacts to the environment would result from the selection of alternative B. The easement program would not result in unavoidable adverse impacts on the physical or biological environment. The selection of an approved boundary would not, by itself, affect any aspect of land ownership or values.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Any commitments of resources that may be irreversible or irretrievable as a result of carrying out alternatives A and B are described below.

Alternative A

There would be no additional commitment of resources by the Service if no action is taken.

Alternative B

There would not be any irreversible or irretrievable commitments of resources associated with establishing the conservation easement program, as lands will only be acquired as funding is available. Once easements are acquired, irreversible and irretrievable commitments of funds to protect these lands (such as expenditure for fuel and staff for monitoring) would exist.

SHORT-TERM USE VERSUS LONG-TERM PRODUCTIVITY

This section discusses the short- and long-term impacts for alternatives A and B.

Alternative A

Properties may be sold to developers for short-term gains, which would have a negative impact on the long-term biological productivity of the area.

Over the long term, the costs to counties to sustain development in rural areas could be significant (see the "Landownership and Use" section on page 20).

Alternative B

The proposed conservation easement program would maintain the long term biological productivity of the Swan Valley and increased protection of endangered and threatened species and maintenance of biological diversity.

The nation would gain the protection of a variety of wildlife species for future generations of Americans. The public would gain long-term opportunities for wildlife-dependent recreational activities from the continued presence of wildlife in the Swan Valley.

CUMULATIVE IMPACTS

This section describes the cumulative impacts that may result from the combination of expected actions in alternatives A or B, together with other biological and socioeconomic conditions, events, and developments.

Alternative A

Current Service program work such as Partners for Fish and Wildlife would continue within the Swan watershed. The Service would continue to work cooperatively with landowners to voluntarily improve habitat on private land and minimize bear–human conflicts.

Alternative B

Through the proposed easement program and limited fee-title purchase, approximately 11,000 acres of privately owned biologically important habitats would be added to the 332,000 acres within the Swan Valley watershed project area that already have some level of protection. This would have long term positive impacts on wildlife habitat and result in the long term conservation of migratory birds, threatened and endangered species, native plants, and the overall biological diversity of the Swan River watershed.

Within the CoCE, areas that were not suitable for homesteading and settlement were designated as federal lands. Settlers selected the milder and fertile valleys for homesteading. Land use was predominately ranching, a lifestyle which maintained economic feasibility for the landowners and prevented the loss of habitat for residential or commercial development. These areas are now currently under the greatest developmental pressure as cattle prices continue to decline and developers offer large cash incentives.

The Swan Valley CA is one project area within the CoCE. All project areas within the CoCE focus on (1) maintaining biological diversity related to wildlife values, (2) linking together existing protected areas, (3) preserving existing wildlife corridors, and (3) protecting a large, intact, functioning ecosystem, while maintaining the rural character and agricultural lifestyle of western Montana. Funding would come primarily from the Land and Water Conservation Fund and potential conservation partners. Table 5 shows the proposed acquisition acreage, type of acquisition tool, focal species, and key partners for each of the three project areas, Blackfoot Valley Wildlife Management Area expansion, Rocky Mountain Front Conservation Area expansion, and Swan Valley Conservation Area.

The annual operations budget related to the current easement programs within the Benton Lake National Wildlife Refuge Complex is $22,123. These funds are spent on local goods and services and therefore directly impact the economy in the study area. An estimated 6.167 FTE are devoted to the two existing project areas (Blackfoot Valley Wildlife Management Area and the Rocky Mountain Front Conservation Area). These 6.167 FTEs have an average salary of $46,838 per employee or a total of $288,832. Using the Bureau of Labor Statistics Consumer Expenditure

Survey data for individuals in these income categories, roughly 79 percent of annual income is spent locally. Assuming employees spend 79 percent of their earnings locally, the socioeconomic impacts of increased employment among all conservation areas is $228,177 annually.

Combining the effects of USFWS employment and operations, the total economic activity generated by the conservation areas is approximately $250,300 annually.

If all three conservation area proposals occur, as described by Alterative B, new total direct economic impact would be $531,620 annually, an increase of $281,320 from current baseline impacts.

Table 5. Summary of project proposals for the Crown of the Continent ecosystem.

Project Area	*Proposed Project Area*	*Potential New Acreage*	*Type of Acquisition Tool*	*Focal Species*	*Key Partners*
Rocky Mountain Front Conservation Area Expansion	Expand existing area from 527,000 acres to 918,000 acres	125,000 acres	Conservation easement	Grizzly bear, migratory birds, long-billed curlew, Sprague's pipit, McCown's longspur	Private landowners, The Nature Conservancy, The Conservation Fund, Richard King Mellon Foundation
Blackfoot Valley Wildlife Management Area Expansion	Expand existing area from 165,000 acres to 824,024 acres	80,000 acres	Conservation easement	Grizzly bear, Canada lynx, bull trout, westslope cutthroat trout, migratory birds	Private landowners, The Blackfoot Challenge, The Nature Conservancy, Trout Unlimited
Swan Valley Conservation Area	New proposed area of 187,400 acres	11000 acres	Conservation easement and limited fee-title (less than 1,000 acres)	Grizzly bear, Canada lynx, bull trout, migratory birds: Lewis' woodpecker, black tern, trumpeter swan, olive-sided flycatcher	Private landowners, The Nature Conservancy, Trust for Public Lands, Swan Valley Ecosystem Center, Plum Creek Timber Company, Vital Ground, Trout Unlimited, Northwest Connections

5 Coordination and Environmental Review

The Service coordinated within the agency, as well as with other federal agencies and local agencies, while developing this EA. Coordination efforts for contaminants and hazardous materials is described below.

The Service conducted this environmental analysis under the authority of the National Environmental Policy Act. The resulting document will be distributed to the project mailing list; copies can be requested.

The analysis and documentation was prepared by a combination of field and regional Service staff, along with partners and private consultants.

AGENCY COORDINATION

The Service has discussed the proposal to establish the Swan Valley CA expansion with landowners; conservation organizations; other federal agencies; tribal, state, and county governments; and other interested groups and individuals.

The Service held two public meetings to provide information and discuss the proposal with landowners and other interested citizens. Information on the proposed Swan Valley Conservation Area has been made available to county commissioners in each of the two counties included in the project area.

At the federal level, the Service staff has briefed Senators Baucus and Tester as well as the Congressional delegation, and coordinated with representatives from other federal agencies such as the U.S. Forest Service. At the state level, Governor Schweitzer's staff, along with Montana Fish, Wildlife and Parks, was briefed on the project. In addition, the Service provided information to the Confederated Salish and Kooteni Tribes on this project.

Nongovernmental conservation groups are key to the success of the proposed project. Service staff has coordinated with partner organizations such as The Nature Conservancy, The Montana Land Reliance, and the Swan Valley Ecosystem Center.

Kathleen Burchett/USFWS

Wetland restoration on private land in the Swan Valley.

CONTAMINANTS AND HAZARDOUS MATERIALS

Fieldwork for the pre acquisition contaminant surveys would be conducted, on a tract-by-tract basis, prior to the purchase of any land interest. Any suspected problems or contaminants requiring additional surveys would be referred to a contaminants specialist located in the Service's ecological services office in Helena, Montana.

NATIONAL ENVIRONMENTAL POLICY ACT

As a federal agency, the Service must comply with provisions of the NEPA. An environmental assessment is required under NEPA to evaluate reasonable alternatives that will meet stated objectives, and to assess the possible impacts to the human environment. The EA serves as the basis for determining whether implementation of the proposed action would constitute a major federal action significantly affecting the quality of the human environment.

The analysis for, and development of this EA, facilitated the involvement of government agencies and the public in the decision making process.

LANDSCAPE CONSERVATION COOPERATIVES

The Service will use Landscape Conservation Cooperatives (LCCs) as a means to reach across broad landscapes, involve many partners, and function at a scale necessary to address wildlife adaptation in response to climate change.

The Swan Valley CA lies within the U.S. Fish and Wildlife Service's Great Northern Landscape Conservation Cooperative (GNLCC) (see figure 5). GNLCC includes the mountain and transitional habitats in regions of Wyoming, Montana, Idaho, and the upper Green River basin in southern Wyoming and small parts of Colorado and Utah, and portions of the Interior Columbia Plateau reaching into Oregon and Washington westward to the Cascade Mountains. The GNLCC also includes the international landscapes of the interior British Columbia and Alberta, Canada, and covers the entirety of the northern Rocky Mountains and mid-continent lowlands of the interior northwest.

The GNLCC has identified priority species including: bull trout, grizzly bear, Lewis' woodpecker, trumpeter swan, cutthroat trout, Arctic grayling, wolverine, willow flycatcher, sage grouse, burrowing owl, and Columbia spotted frog. Eight of the priority species exist within the project area.

The GNLCC works with a variety of science partners including many of which are also supporters of the proposed easement program. The protection of the Swan Valley, through a conservation easement program and fee-title acquisition, will significantly contribute to the conservation of GNLCC priority habitats and the federal trust species identified above.

As the GNLCC continues to develop, an overarching priority will be to serve as a convening body, bringing together partners to address existing and future issues related to climate change and landscape scale conservation. The Service will work with existing partnerships within the Swan Valley to further refine priorities and leverage resources for acquisition.

DISTRIBUTION AND AVAILABILITY

Copies of the EA were sent to federal and state legislative delegations, agencies, landowners, private groups, and other interested individuals.

Additional copies of the document are available from the following offices and websites.

U.S. Fish and Wildlife Service
Benton Lake National Wildlife Refuge Complex
922 Bootlegger Trail
Great Falls, MT 59404-6133
406 727-7400

and

U.S. Fish and Wildlife Service
Division of Refuge Planning
P.O. Box 25486 DFC
Denver, CO 80225
303 236-4378

Figure 5. Great Northern Landscape Conservation Cooperative with Swan Valley Conservation Area.

6 Draft Land Protection Plan

The land protection plan provides a general description of the operations and management of the Swan Valley Conservation Area, as outlined in alternative B, the proposed alternative of the Swan Valley Conservation Area environmental assessment. The U.S. Fish and Wildlife Service developed this LPP during the planning process to provide local landowners, governmental agencies, and the interested public with a general understanding of the anticipated management approaches for the proposed easement program. The purpose of the LPP is to present a broad overview of the Service's proposed management approach to wildlife and associated habitats, public uses, interagency coordination, public outreach and other operational needs.

PROJECT DESCRIPTION

The Swan Valley Conservation Area is a conservation strategy to protect one of the last undeveloped, low elevation coniferous forest ecosystems in western Montana. The Swan Valley is situated between the roadless areas of the Glacier National Park/Bob Marshall Wilderness Complex, the Mission Mountains Wilderness, and the equally large Bitterroot/Selway Wilderness Complex to the southwest. As such, it provides an avenue of connectivity between the Canadian Rockies and the Central Rockies of Idaho and Wyoming.

The Swan River Valley is part of the Interior Columbia River Basin Area. The Swan River originates at Gray Wolf Lake in the Mission Mountains and flows through Swan Lake at the northern end of the valley, before entering the Flathead Lake watershed, ultimately flowing into the Columbia River System. The Swan Valley lies at the western edge of the Crown of the Continent ecosystem that is the last remaining ecosystem that still supports a full assemblage of large mammalian predators including grizzly bears, gray wolves, wolverine, and Canada lynx.

The project area encompasses an 187,400-acre landscape on the valley floor of the 469,000-acre Swan watershed. The Swan Valley is located on the western edge of the CoCE, approximately 30 miles southeast of Kalispell, Montana. The Bob Marshall Wilderness and Glacier National Park mark the eastern boundary, with the Mission Mountains Wilderness and Confederated Salish and Kootenai tribal lands on the western boundary, and the Blackfoot River Valley flanking the southern side of the watershed.

STRATEGIC HABITAT CONSERVATION

Strategic Habitat Conservation (SHC) is a means of applying adaptive management across large landscapes. SHC involves an ongoing cycle of biological planning, conservation design, conservation delivery, outcome-based monitoring, and assumption-based research. SHC uses science to focus conservation in the right places (USFWS 2008).

In 2004, the U.S.Fish and Wildlife Service's Partners for Fish and Wildlife program led a statewide, strategic habitat conservation planning effort for focusing work in Montana. The state was divided into three broad geographic regions based on similar habitat types. Within each region, priority federal trust species and "guilds" were identified. The Montana Habitat and Population Evaluation Team (HAPET) office then assisted with gathering and creating spatially-explicit models and data sets for priority trust resources. In addition, the scientific-based planning efforts of partner agencies and conservation organizations were incorporated. These include the Strategic Habitat Conservation Report prepared by the National Ecological Assessment Team (NEAT); Upper Missouri/Yellowstone/Upper Columbia River Ecosystem Team Focus Area Plan; the Montana Partners Program 1999 Focus Area Plan; Montana's Comprehensive Fish and Wildlife Conservation Strategy Plan; and The Nature Conservancy of Montana's Statewide Conservation Plan. Seven stakeholder meetings were held to gather input from other partners to identify focus areas and develop and appropriate conservation strategy. The 2007 Montana Step-down Strategic Plan identified geographic focus areas, habitat accomplishment targets, and benefit to federal trust species. The comprehensive process ultimately produced ten conservation focus areas for Montana. The Swan Valley CA is within the identified focus areas.

The preparation of this project area LPP addresses the four key elements of SHC: planning, design, delivery, and monitoring and research (see figure 6).

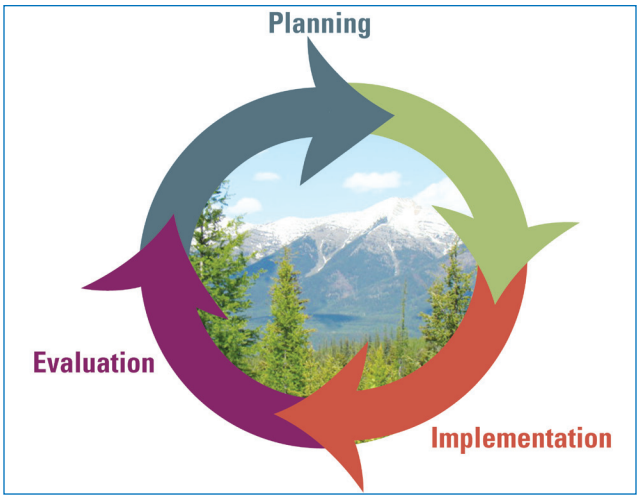


Figure 6. The elements of strategic habitat conservation.

Biological Planning

The Swan Valley is unique among Montana's spectacular valleys in that it contains over 1,000 glacially derived wetlands. In fact, approximately 16% of the land in the Swan Valley is considered wetland habitat (lakes, rivers, ponds, marshes, wet meadows, peatlands, and riparian areas). By comparison, the remainder of Montana averages 1% wetland habitat. There is a higher number of wetland-associated rare-plant species in the Swan Valley, including, federally threatened water howellia. Water howellia is found exclusively in small, swallow depressional wetlands scattered across the valley floor. The Swan Valley is believed to contain the world's greatest density of water howellia.

This fact, along with its diverse forest types, makes the Swan Valley an ideal habitat for a diverse array of wildlife. The federal trust species that would benefit from the proposed habitat protection include listed and candidate species such as grizzly bear, wolf, wolverine, pine martin, and lynx; migratory birds such as harlequin duck, common loon, red-necked grebe, black tern, peregrine falcon, and greater sandhill crane; and native salmonoids such as the westslope cutthroat trout and bull trout.

Focal Species

In order to strategically conserve habitat within the Swan Valley, the Service chose to focus on the grizzly bear and native salmonids, including the threatened bull trout. These species were chosen because they are federal trust resources, they represent the variety of key habitats and capture the needs of several other species in the Swan Valley, and there is sufficient information about them to develop a land protection plan. Water howellia was not chosen as a focal species because a significant number of known populations occur on land that is already protected. However, water howellia depend on dynamic, healthy, and functional wetlands and in Swan Valley the wetlands, streams, and rivers are connected through complex hydro-geomorphic processes (Frissell et al. 1995). Focusing on healthy rivers, streams and associated wetland complexes for bull trout may capture some of the needs for water howellia on private lands.

Population Objectives

Because each of the focal species for the Swan Valley are protected under the Endangered Species Act, specific mission-based population objectives have been defined that correspond to the species' recovery.

Bull Trout

The Swan Valley core area lies within the Clark Fork Recovery Unit (RU). For the Swan Lake core area, the total adult bull trout abundance, distributed among local populations, must exceed 1,000 fish, and adult bull trout abundance must exceed 2,500 in Swan Lake (USFWS 2002).

Grizzly Bear

The Swan Valley lies within the NCDE recovery zone. The Grizzly Bear Recovery Plan (USFWS 1993) specifies multiple thresholds that must be maintained before the grizzly bear population in the NCDE can be considered recovered. For the NCDE, 10 females with cubs inside Glacier National Park and 12 females with cubs outside GNP over a running 6-year average both inside the recovery zone and within a 10 mile area immediately surrounding the recovery zone, excluding Canada; twenty-one of twenty-three bear management units (BMUs) occupied by females with young form a running 6-year sum of verified sightings and evidence, with no two adjacent BMUs unoccupied; and known human-caused mortality not to exceed 4 percent of the population estimate based on the most recent 3-year sum of females with cubs. Furthermore, recovery cannot be achieved without occupancy in the Mission Mountains portion of the ecosystem.

Limiting Factors

Increasing urbanization which causes increased fragmentation of habitat from housing developments and associated road development is a major threat to the Swan Valley and the entire CoCE. Most current published statistics (2000–2009) by the U.S. Census Bureau reported Missoula and Lake Counties experiencing a 13.4% increase in population from 2000 (US Census Bureau 2010). Communities within the Swan Valley experienced a similar growth rate increase of 25%. Montana as a whole experienced a 10.5% increase within that same period (U.S. Census Bureau 2010).

USFWS

Subdivision development impacts habitat connectivity.

For wide-ranging species, such as grizzly bears, unplanned development leads to loss of habitat connectivity within the project area and, on a larger scale, between the CoCE and other historic or potential ranges. Riparian zones, for example, provide excellent habitat and cover for bears moving throughout the watersheds, but they are also among the most desired locations for building (Lolo National Forest 2003). An increase in development also leads to more frequent conflicts between bears and people, due in large part to the increased presence of bear attractants. Human garbage, dog food, and bird seed can condition and habituate bears, leading to more interactions and conflicts with people. These factors can lead to human-caused grizzly bear mortality, which in turn results in a decrease in grizzly bear reproduction, and loss of population and genetic viability. More than 17% of the NCDE is private land and as estimated 71% of bear-human conflicts and bear deaths occur on these private lands (Dr. Christopher Servheen, Grizzly Bear Recovery Coordinator, University of Montana, Missoula, MT; personal interview in person, 11 June 2008). Minimizing attractants on private lands and limiting subdivision are keys to reducing this threat to grizzly bears.

Ultimately, unmanaged growth and residential sprawl may be one of the biggest threats to the recovery of bull trout in the Clark Fork Recovery Unit as well. The entire Recovery Unit holds many of the attributes that increasingly attract people seeking relief from the urban environment. Human population growth in western Montana and northern Idaho has accelerated. The way in which this growth is managed, and our ability to limit the impacts of growth, in particular on bull trout spawning and rearing streams, is pivotal to the success of the bull trout recovery effort (USFWS 2002)

Increasing human populations have a direct impact on all of the other categories of risk that affect bull trout. Both legal and illegal angling (poaching) have direct impacts on bull trout populations, despite the implementation of restrictive fishing regulations and strong educational efforts. The problem of illegal take of bull trout is intensified in stream corridors where roads provide access to highly visible (and therefore vulnerable) spawning stocks. (USFWS 2002).

Key Habitats for Protection

For grizzly bears, the Service used a computer based geographic information system (GIS) to map the Swan Valley and identify the areas of highest human influence. Less developed areas, called "linkage zones," where human activity is still fairly light and appropriate cover (for example, in riparian areas) exists were identified (Pelletier 1995, Servheen et al.2001). If protected, linkage zones can serve to connect the Mission Mountains to the west and the Swan Range and Bob Marshall Wilderness to the east, thus preserving feeding, breeding and travel opportunities for the bears. Models such as these simplify reality in order to make complex interactions manageable for conservation planning. While this analysis cannot capture all of the fine-scale aspects of how grizzlies move across the landscape, it represents the best available scientific information on how human activity influences grizzly bears. In general, as interactions with humans are lowered, bear mortality will also be lowered (Servheen et al. 2001).

For the bull trout, critical habitat (figure 7) has been designated and explicitly mapped in each recovery unit (RU). Critical habitats are those stream reaches and lakes deemed essential to the conservation of the species (USFWS 2009a). To identify those habitats within each RU essential to the conservation of bull trout, the Service used the four biological indicators derived from the 2002 and 2004 bull trout draft recovery plans and seven newly developed "guiding principles" (USFWS 2002, 2004).

The four biological indicators are distribution, abundance, trend, and connectivity. The seven guiding principles are to (1) conserve opportunity for diverse life-history expression, (2) conserve opportunity for genetic diversity, (3) ensure bull trout are distributed across representative habitats, (4) ensure sufficient connectivity among populations, (5) ensure sufficient habitat to support population viability (for example, abundance and trend indices), (6) consider threats (for example., climate change), and (7) ensure sufficient redundancy in conserving population units. In addition to proposed critical habitat, we also considered spatially explicit analysis of river linkages and hydro-geomorphic connectivity of bull trout habitat to key wetland complexes (Frissell et al. 1995).

Conservation Design

The design stage of the SHC process involves assessment of the current state of the system, formulation of habitat objectives, and determination of priority areas.

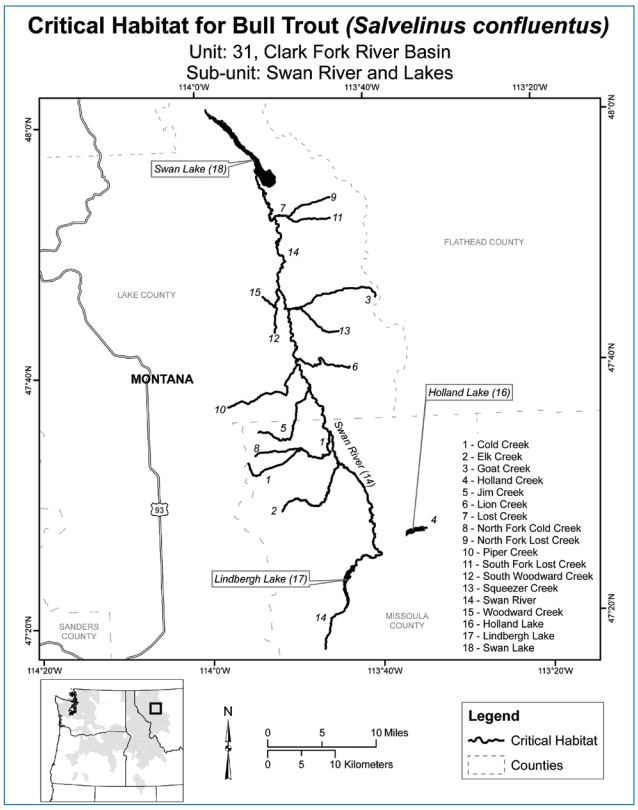


Figure 7. Critical habitat for bull trout.

Current State of the System

In recent years, the mortality threshold for grizzly bear recovery in the NCDE has been exceeded, but the significance of these numbers cannot be evaluated until there is accurate information on population size. Through the use of genetic analysis on collected hair samples, researchers were able to determine that an estimated 765 grizzly bears make their home in the Northern Continental Divide. Of those 765, researchers estimate 470 bears are females. Female bears were also found throughout the entire study area, indicating a good reproductive potential for the species. Analysis of hair samples has allowed researchers to determine genetic health of the grizzly bear population. Although overall genetic variation indicate a healthy population, it is only one piece of the puzzle that managers need for the recovery of grizzlies in the NCDE to be successful (Kendall et al. 2009).

Within the Clark Fork Recovery Area, the Swan Lake bull trout population has remained strong. The Swan Lake population is stable because fish can access about 150 miles of high quality tributary spawning habitat. Most bull trout populations are declining because of habitat degradation, but many of Swan Valley's tributary streams are in good to excellent condition. The core area populations (Swan, Holland, and Lindbergh lakes) represent working models for creating and sustaining bull trout recovery opportunities in heavily managed timber-producing watersheds (USFWS 2002).

Continuous identifiable female bull trout nesting areas (redd) count history dating to 1982 is available for bull trout for four index streams in the Swan River Watershed (MFWP 2009). Bull trout may have reached equilibrium in this system at a population level of about 2,000 adults and the current trend appears stable.

The total redd count was 598 in 2008, representing roughly 2,000 adults in the spawning run. Given that some adults do not spawn every year, the total adult population is likely over 2,500 adult bull trout.

Formulate Habitat Objectives

There are currently approximately 36,000 acres of private land in the proposed Swan Valley CA. 117 miles of bull trout critical habitat and 10,000 acres of grizzly linkage zones occur on private lands. With the current levels of development and fragmentation within the Swan Valley, bull trout populations appear stable, however, the pressure of human-cause mortality on grizzly bears is higher than acceptable for recovery. How much more fragmentation or development could occur, yet still keep bull trout populations stable, and not significantly add to

grizzly mortality, is unknown. Given that conserving all remaining private land with easements to prevent additional development is not a reasonable or desired goal, especially around the existing population centers of Condon and Salmon Prairie, we have set a goal to protect 11,000 acres of existing private lands. Long-term monitoring of grizzly bears and bull trout will be conducted and the goal of 11,000 acres will be periodically re-evaluated.

Priority Areas

The Service is proposing to establish the Swan Valley Conservation Area to purchase conservation easements in order to reduce future impacts of development and habitat fragmentation. Typically, the Service will purchase an easement for the entire ownership of a landowner, therefore the priorities for the Swan Valley Land Protection Plan are based on the best available data on existing private ownerships.

Given the models and habitat objectives we developed the priority areas shown in figure 8. Areas where we can highly benefit both grizzly bears and bull trout through conservation easements have been designated as Priority 1. Priority 1 also includes areas where it appears feasible to link easements to create corridors across the valley. Areas where only one of the species may benefit significantly or where connectivity is more difficult due to small ownerships (<80 acres) or other barriers were designated priority 2. And the remaining areas are Priority 3. These priority areas will be regularly reevaluated and may be adjusted as additional quantifiable data on the habitat needs and limiting factors for focal species in the Swan Valley become available. The monitoring and research section provides further details on this feedback loop.

Conservation Delivery

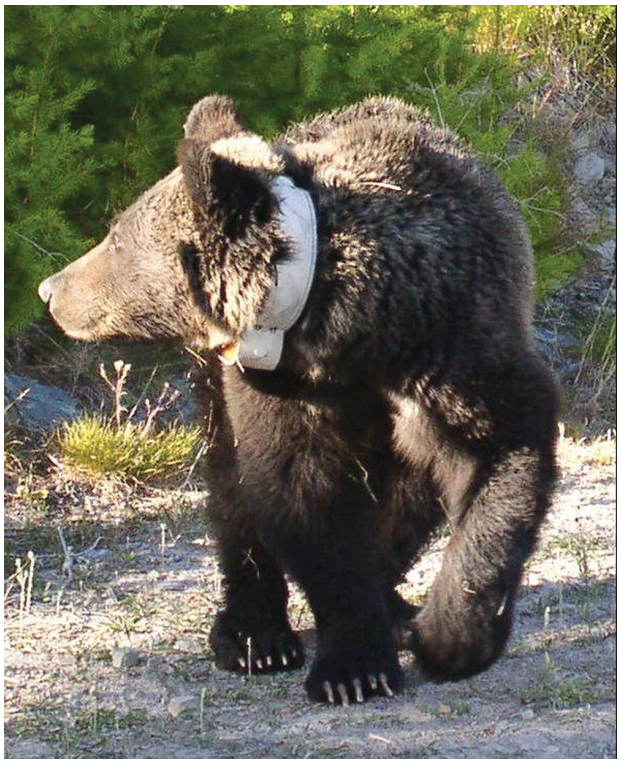
On approval of a project boundary, habitat protection would occur through the purchase of conservation easements. It is the long-established policy of the Service to acquire minimum interest in land from willing sellers to achieve habitat acquisition goals. Some fee-title acquisition would be authorized within the proposed project boundary immediately adjacent to Swan River NWR.

The acquisition authority for the proposed action is the Fish and Wildlife Act of 1956 (16 U.S.C. 742 a-742j). The federal money used to acquire conservation easements from the Land and Water Conservation Fund are derived primarily from oil and gas leases on the outer continental shelf, motorboat fuel tax revenues, and the sale of surplus federal property. There could be additional funds to acquire lands, waters, or interest therein for fish and wildlife conservation purposes through Congressional appropriations, the Migratory Bird Conservation Fund, North American Waterfowl Conservation Act funds, and donations from nonprofit organizations.

The basic considerations in acquiring an easement interest in private land are the biological significance of the area, existing and anticipated threats to wildlife resources, and landowner interest in the program. The purchase of conservation easements would occur with willing sellers only and would be subject to available funding.

Monitoring and Research

As the Swan Valley Conservation Area project develops and conservation easements are purchased, grizzly bears and bull trout will continued to be monitored. The U.S. Fish and Wildlife Service, MFWP, and USGS all have active grizzly bear monitoring and research projects. MFWP, in particular, is focused on developing a science-based population monitoring program that provides the information necessary to successfully manage bears in western Montana (Dood et al. 2006). Specifically, MFWP will monitor a representative sample of twenty-five or more adult females in the NCDE to establish population trends, MFWP will use verified sightings to document changes in bear distribution and linkage areas used, especially by female bears. MFWP will monitor mortality, including timing and causes, and gather survivorship data in cooperation with other agencies. In addition, results from the



MFWP

Collared grizzly bear movement is used to assess populations.

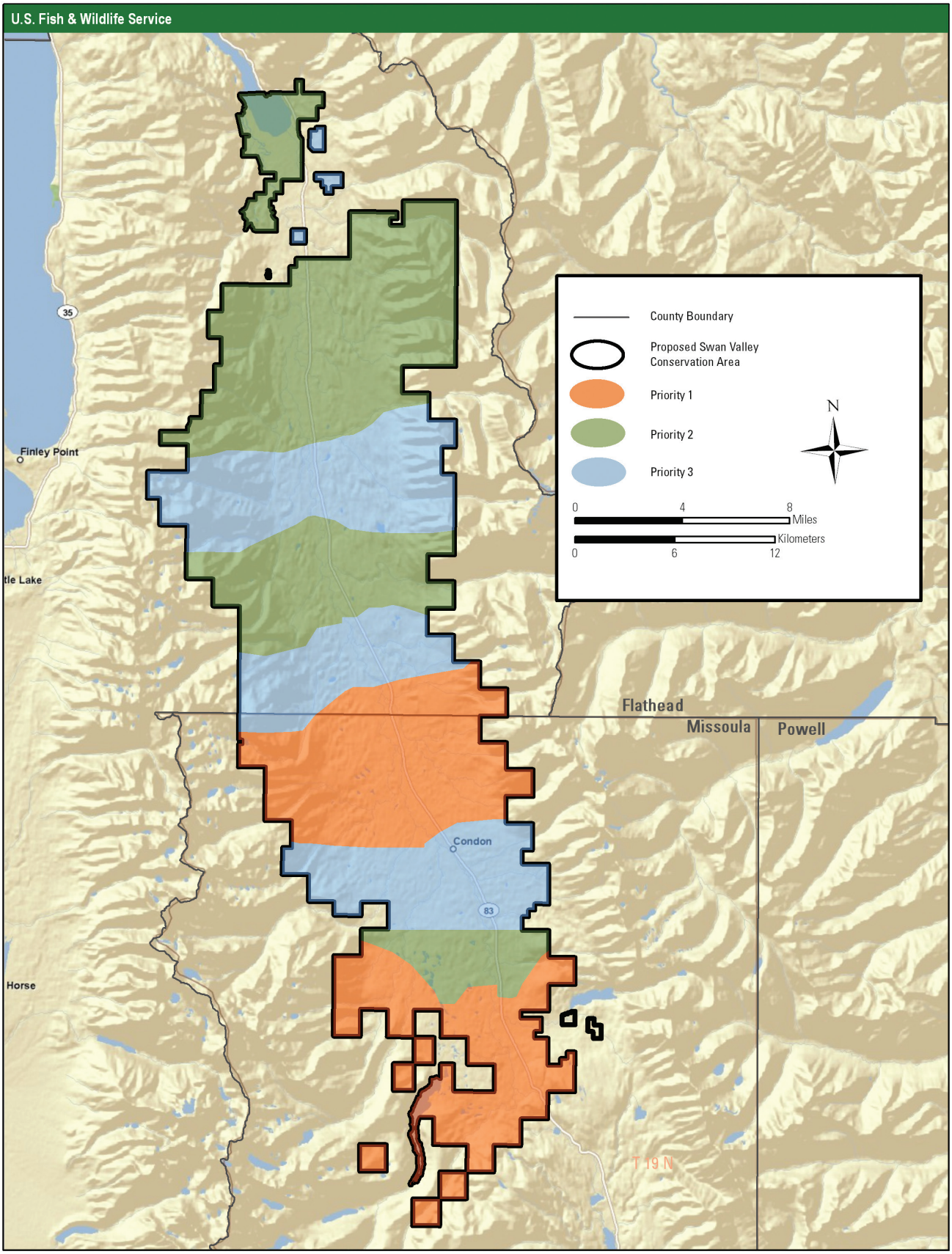


Figure 8. Swan Valley Conservation Area priorities.

2004 USGS NCDE Grizzly Bear DNA project will assist MFWP with bear population size estimation, distribution and population trend from that point (USGS 2004).

The state of Montana began development of a bull trout restoration plan in 1993. The final plan, published in June 2000, sets goals, objectives and criteria for restoration; outlines actions to meet those criteria; and establishes a structure to monitor implementation and evaluate the effectiveness of the plan (MBTRT 2000). One of the stated goals of the plan is to develop and implement a statistically valid population monitoring program. This monitoring program will be an effective tool to assess the status of bull trout in the Swan Valley CA.

Grizzly bears and bull trout have been identified as a focal species for the Great Northern Landscape Conservation Cooperative. The GNLCC was established, in part, to foster cooperation between agencies and support monitoring and research where there are common interests. Continual evaluation of grizzly bear population trends and habitat use will be used to evaluate and refine conservation efforts on the ground within the GNLCC.

COORDINATION

The proposed Swan Valley Conservation Area has been discussed with landowners, conservation organizations, government officials, and other interested groups and individuals. The proposal and associated EA address the protection of native habitats, primarily through acquisition of conservation easements by the Service under the direction of the National Wildlife Refuge System.

Public open houses were held in Condon, Montana on May 18 and June 2, 2010. Public comments were taken to identify issues to be analyzed for the proposed project.

Approximately thirty-seven landowners, citizens, and elected representatives attended and most expressed positive support for the project.

In addition, the Service's field staff has contacted local government officials, other public agencies, sportsmen's and women's groups, and conservation groups, all of which have expressed an interest in and a desire to protect the Front from the pressures brought about by rural subdivision.

SOCIAL AND CULTURAL CONSIDERATIONS

The Swan Valley watershed ownership consists of 286,798 acres of federal (U.S. Forest Service and Service) lands, 45,676 acres of state (Montana Department of Natural Resources) land, 66,066 acres owned by The Nature Conservancy, 12,154 acres owned by Plum Creek Timber Company, and 51,808 acres of private lands. Most of the middle and high elevation forested lands within the watershed are administered by the U.S. Forest Service. Private lands are concentrated in the low elevation portions of the watershed (see figure 3, map of landownership in Swan Valley Conservation Area).

In 2008, The Nature Conservancy and the Trust for Public Lands entered into an agreement with PCTC to purchase, in a three-phase project, a total of 312,500 acres in western Montana known as the Montana Legacy Project. A total of 65,630 acres is located on the valley floor in Swan Valley. The USFS is scheduled to purchase 44,821 acres in 2010 and 20,809 acres will be purchased by the Montana DNRC in 2011. The Montana Legacy Project is the single largest conservation effort in the country to date. This transfer of ownership from corporate lands to public lands will have major benefits in reducing the checkerboard pattern of ownership within the valley and in protecting critical fish and wildlife habitat.

Currently, landowners pay property taxes on their private land to the counties. The Swan Valley CA is mainly a proposed conservation easement program; the land does not change hands and, therefore, the property taxes paid by the landowner to the county are not affected. Minimal changes to the tax base are anticipated. Fee-title lands purchased would be subject to the Revenue Sharing Act (16 USC 715s) which requires revenue sharing payments to counties for the purchase of the land. The amount is based on the greatest of (1) ¾ of 1 percent of the market value, (2) 25 percent of the net receipts, or (3) 75 cents per acre.

Hunting and fishing are very popular throughout the project area. Hunting for a variety of wildlife includes waterfowl, upland game birds, pronghorn, elk, moose, deer, black bear, bighorn sheep, mountain lion, and furbearers. Private landowners often give permission for hunting and fishing on their land. Under a conservation easement, control of public access to land would remain under the discretion of the landowner. Any parcels adjacent to Swan River NWR acquired by fee-title, would be administered and managed as part of the refuge, where a variety of wildlife-dependent recreational opportunities are available to the public.

Appendix A

List of Preparers and Reviewers

Author's Name	*Position*	*Work Unit*
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Reviewer's Name	*Position*	*Work Unit*
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Appendix B

List of Plants and Animals

MAMMALS

SCIENTIFIC NAME	COMMON NAME
Castor canadensis	Beaver
Eptesicus fuscus	Big Brown Bat
Ursus americanus	Black Bear
Lynx rufus	Bobcat
Neotoma cinerea	Bushy-tailed Woodrat
Myotis californicus	California Myotis
*Lynx canadensis**	Canada Lynx
Spermophilus columbianus	Columbian Ground Squirrel
Peromyscus maniculatus	Deer Mouse
Sorex monticolus	Dusky or Montane Shrew
*Martes pennanti**	Fisher
*Myotis thysanodes**	Fringed Myotis
Spermophilus lateralis	Golden-mantled Ground Squirrel
Canis lupus	Gray Wolf
*Ursus arctos**	Grizzly Bear
*Lasiurus cinereus**	Hoary Bat
Marmota caligata	Hoary Marmot
Myotis lucifugus	Little Brown Myotis
Myotis evotis	Long-eared Myotis
Myotis volans	Long-legged Myotis
Martes americana	Marten
Sorex cinereus	Masked Shrew
Microtus pennsylvanicus	Meadow Vole
Puma concolor	Mountain Lion
Ondatra zibethicus	Muskrat
Lontra canadensis	Northern River Otter
Ochotona princeps	Pika
Tamiasciurus hudsonicus	Red Squirrel
Tamias ruficaudus	Red-tailed Chipmunk
Mustela erminea	Short-tailed Weasel
*Lasionycteris noctivagans***	Silver-haired Bat
Lepus americanus	Snowshoe Hare
Myodes gapperi	Southern Red-backed Vole

SCIENTIFIC NAME	COMMON NAME
*Corynorhinus townsendii**	Townsend's Big-eared Bat
Sorex vagrans	Vagrant Shrew
Sorex palustris	Water Shrew
Microtus richardsoni	Water Vole
Zapus princeps	Western Jumping Mouse
Myotis ciliolabrum	Western Small-footed Myotis
*Gulo gulo**	Wolverine
Tamias amoenus	Yellow-pine Chipmunk
*Myotis yumanensis***	Yuma Myotis

BIRDS

SCIENTIFIC NAME	COMMON NAME
Recurvirostra americana	American Avocet
*Botaurus lentiginosus**	American Bittern
Fulica americana	American Coot
Corvus brachyrhynchos	American Crow
Cinclus mexicanus	American Dipper
Spinus tristus	American Goldfinch
Falco sparverius	American Kestrel
Setophaga ruticilla	American Redstart
Turdus migratorius	American Robin
Picoides dorsalis	American Three-toed Woodpecker
Anas americana	American Wigeon
Dendroica coronata auduboni	Audubon's Warbler
*Haliaeetus leucocephalus**	Bald Eagle
Patagioenas fasciata	Band-tailed Pigeon
Riparia riparia	Bank Swallow
Hirundo rustica	Barn Swallow
Strix varia	Barred Owl
*Bucephala islandica***	Barrow's Goldeneye
Megaceryle alcyon	Belted Kingfisher
*Cypseloides niger**	Black Swift
*Chlidonias niger**	Black Tern
*Picoides arcticus**	Black-backed Woodpecker
Pica hudsonia	Black-billed Magpie
Poecile atricapillus	Black-capped Chickadee
Archilochus alexandri	Black-chinned Hummingbird
Pheucticus melanocephalus	Black-headed Grosbeak
Amphispiza bilineata	Black-throated Sparrow
Cyanocitta cristata	Blue Jay
Anas discors	Blue-winged Teal
*Dolichonyx oryzivorus**	Bobolink
Bombycilla garrulus	Bohemian Waxwing

SCIENTIFIC NAME	COMMON NAME
*Poecile hudsonicus**	Boreal Chickadee
Aegolius funereus	Boreal Owl
Fringilla montifringilla	Brambling
Euphagus cyanocephalus	Brewer's Blackbird
*Spizella breweri**	Brewer's Sparrow
*Certhia americana**	Brown Creeper
Molothrus ater	Brown-headed Cowbird
Bucephala albeola	Bufflehead
Icterus bullockii	Bullock's Oriole
Stellula calliope	Calliope Hummingbird
Branta canadensis	Canada Goose
Catherpes mexicanus	Canyon Wren
*Hydroprogne caspia**	Caspian Tern
*Carpodacus cassinii**	Cassin's Finch
Vireo cassinii	Cassin's Vireo
Bombycilla cedrorum	Cedar Waxwing
Poecile rufescens	Chestnut-backed Chickadee
Spizella passerina	Chipping Sparrow
Anas cyanoptera	Cinnamon Teal
*Nucifraga columbiana**	Clark's Nutcracker
Petrochelidon pyrrhonota	Cliff Swallow
Bucephala clangula	Common Goldeneye
*Gavia immer**	Common Loon
Mergus merganser	Common Merganser
Chordeiles minor	Common Nighthawk
Corvus corax	Common Raven
Acanthis flammea	Common Redpoll
Geothlypis trichas	Common Yellowthroat
Accipiter cooperii	Cooper's Hawk
Empidonax occidentalis	Cordilleran Flycatcher
Junco hyemalis	Dark-eyed Junco
Junco hyemalis montanus	Dark-eyed Junco (Montana Junco)
Junco hyemalis hyemalis / cismontanus	Dark-eyed Junco (Slate-colored)
Picoides pubescens	Downy Woodpecker
Empidonax oberholseri	Dusky Flycatcher
Dendragapus obscurus	Dusky Grouse
Tyrannus tyrannus	Eastern Kingbird
Sayornis phoebe	Eastern Phoebe
*Sturnus vulgaris****	European Starling
Coccothraustes vespertinus	Evening Grosbeak
Spizella pusilla	Field Sparrow
*Otus flammeolus**	Flammulated Owl
Passerella iliaca	Fox Sparrow

SCIENTIFIC NAME	COMMON NAME
Anas strepera	Gadwall
*Aquila chrysaetos**	Golden Eagle
Regulus satrapa	Golden-crowned Kinglet
*Ammodramus savannarum**	Grasshopper Sparrow
Dumetella carolinensis	Gray Catbird
Perisoreus canadensis	Gray Jay
*Leucosticte tephrocotis**	Gray-crowned Rosy-Finch
*Ardea herodias**	Great Blue Heron
Ardea alba	Great Egret
*Strix nebulosa**	Great Gray Owl
Bubo virginianus	Great Horned Owl
Pipilo chlorurus	Green-tailed Towhee
Anas crecca	Green-winged Teal
Picoides villosus	Hairy Woodpecker
Empidonax hammondii	Hammond's Flycatcher
*Histrionicus histrionicus**	Harlequin Duck
Catharus guttatus	Hermit Thrush
Acanthis hornemanni	Hoary Redpoll
*Lophodytes cucullatus***	Hooded Merganser
*Passer domesticus****	House Sparrow
Troglodytes aedon	House Wren
Charadrius vociferus	Killdeer
Chondestes grammacus	Lark Sparrow
Passerina amoena	Lazuli Bunting
*Ammodramus leconteii**	Le Conte's Sparrow
Empidonax minimus	Least Flycatcher
Aythya affinis	Lesser Scaup
*Melanerpes lewis**	Lewis' woodpecker
Melospiza lincolnii	Lincoln's Sparrow
Oporornis tolmiei	MacGillivray's Warbler
Dendroica magnolia	Magnolia Warbler
Anas platyrhynchos	Mallard
Cistothorus palustris	Marsh Wren
Sialia currucoides	Mountain Bluebird
Poecile gambeli	Mountain Chickadee
Zenaida macroura	Mourning Dove
Dendroica coronata coronata	Myrtle Warbler
Vermivora ruficapilla	Nashville Warbler
Colaptes auratus	Northern Flicker
Colaptes auratus cafer	Northern Flicker (Red-shafted)
*Accipiter gentilis**	Northern Goshawk
Circus cyaneus	Northern Harrier
*Surnia ulula***	Northern Hawk Owl

SCIENTIFIC NAME	COMMON NAME
Anas acuta	Northern Pintail
Glaucidium gnoma	Northern Pygmy-Owl
Stelgidopteryx serripennis	Northern Rough-winged Swallow
Aegolius acadicus	Northern Saw-whet Owl
Lanius excubitor	Northern Shrike
Seiurus noveboracensis	Northern Waterthrush
Contopus cooperi	Olive-sided Flycatcher
Vermivora celata	Orange-crowned Warbler
Pandion haliaetus	Osprey
Gavia pacifica	Pacific Loon
*Falco peregrinus**	Peregrine Falcon
Podilymbus podiceps	Pied-billed Grebe
*Dryocopus pileatus**	Pileated Woodpecker
Pinicola enucleator	Pine Grosbeak
Spinus pinus	Pine Siskin
Falco mexicanus	Prairie Falcon
Sitta pygmaea	Pygmy Nuthatch
Loxia curvirostra	Red Crossbill
Sitta canadensis	Red-breasted Nuthatch
Vireo olivaceus	Red-eyed Vireo
Sphyrapicus nuchalis	Red-naped Sapsucker
Podiceps grisegena	Red-necked Grebe
Buteo jamaicensis	Red-tailed Hawk
Agelaius phoeniceus	Red-winged Blackbird
Aythya americana	Redhead
Larus delawarensis	Ring-billed Gull
Aythya collaris	Ring-necked Duck
*Columba livia****	Rock Pigeon
Salpinctes obsoletus	Rock Wren
Buteo lagopus	Rough-legged Hawk
Regulus calendula	Ruby-crowned Kinglet
Oxyura jamaicensis	Ruddy Duck
Bonasa umbellus	Ruffed Grouse
*Selasphorus rufus***	Rufous Hummingbird
Grus canadensis	Sandhill Crane
Passerculus sandwichensis	Savannah Sparrow
Sayornis saya	Say's Phoebe
Accipiter striatus	Sharp-shinned Hawk
*Asio flammeus***	Short-eared Owl
Plectrophenax nivalis	Snow Bunting
Tringa solitaria	Solitary Sandpiper
Vireo solitarius	Solitary Vireo
Melospiza melodia	Song Sparrow

SCIENTIFIC NAME	COMMON NAME
Porzana carolina	Sora
Actitis macularius	Spotted Sandpiper
Pipilo maculatus	Spotted Towhee
Falcipennis canadensis	Spruce Grouse
Cyanocitta stelleri	Steller's Jay
Catharus ustulatus	Swainson's Thrush
*Vermivora peregrina***	Tennessee Warbler
Myadestes townsendi	Townsend's Solitaire
Dendroica townsendi	Townsend's Warbler
Tachycineta bicolor	Tree Swallow
Cathartes aura	Turkey Vulture
Ixoreus naevius	Varied Thrush
Chaetura vauxi	Vaux's Swift
*Catharus fuscescens**	Veery
Pooecetes gramineus	Vesper Sparrow
Tachycineta thalassina	Violet-green Swallow
Vireo gilvus	Warbling Vireo
Tyrannus verticalis	Western Kingbird
Sturnella neglecta	Western Meadowlark
*Megascops kennicottii***	Western Screech-Owl
Piranga ludoviciana	Western Tanager
Contopus sordidulus	Western Wood-Pewee
Sitta carolinensis	White-breasted Nuthatch
Zonotrichia leucophrys	White-crowned Sparrow
*Lagopus leucura**	White-tailed Ptarmigan
Aeronautes saxatalis	White-throated Swift
Loxia leucoptera	White-winged Crossbill
*Meleagris gallopavo****	Wild Turkey
Sphyrapicus thyroideus	Williamson's Sapsucker
Empidonax traillii	Willow Flycatcher
Phalaropus tricolor	Wilson's Phalarope
Gallinago delicata	Wilson's Snipe
Wilsonia pusilla	Wilson's Warbler
*Troglodytes troglodytes**	Winter Wren
Aix sponsa	Wood Duck
Dendroica petechia	Yellow Warbler
Icteria virens	Yellow-breasted Chat
Xanthocephalus xanthocephalus	Yellow-headed Blackbird
Dendroica coronata	Yellow-rumped Warbler

**Species of Concern*
***Potential Species of Concern*
****Exotic Species (not native to Montana)*

REPTILES

SCIENTIFIC NAME	COMMON NAME
Thamnophis sirtalis	Common Garter snake
*Elgaria coerulea**	Northern Alligator Lizard
Chrysemys picta	Painted Turtle
Charina bottae	Rubber Boa
Thamnophis elegans	Terrestrial Garter snake

AMPHIBIANS

SCIENTIFIC NAME	COMMON NAME
Rana luteiventris	Columbia Spotted Frog
Ambystoma macrodactylum	Long-toed Salamander
*Rana pipiens**	Northern Leopard Frog
Ascaphus montanus	Rocky Mountain Tailed Frog
*Bufo boreas**	Western Toad

FISH

SCIENTIFIC NAME	COMMON NAME
*Culaea inconstans***	Brook Stickleback
Catostomus catostomus	Longnose Sucker
Cottus bairdi	Mottled Sculpin
Ptychocheilus oregonensis	Northern Pikeminnow
Cottus cognatus	Slimy Sculpin

INVERTEBRATES

SCIENTIFIC NAME	COMMON NAME
Hydropsyche confusa	A Caddisfly
Lepidostoma unicolor	A Caddisfly
Dicosmoecus gilvipes	A Caddisfly
Arctopsyche grandis	A Caddisfly
Neophylax rickeri	A Caddisfly
Neophylax splendens	A Caddisfly
Micrasema bactro	A Caddisfly
Brachycentrus americanus	A Caddisfly
Serratella tibialis	A Mayfly
Ephemerella excrucians	A Mayfly
Baetis tricaudatus	A Mayfly
Epeorus longimanus	A Mayfly
Drunella coloradensis	A Mayfly
Drunella spinifera	A Mayfly
Ergodesmus compactus	A Millipede
*Endopus parvipes**	A Millipede
Rhyacophila narvae	A Rhyacophilan Caddisfly

SCIENTIFIC NAME	COMMON NAME
Zaitzevia parvula	A Riffle Beetle
Heterlimnius corpulentus	A Riffle Beetle
Cleptelmis addenda	A Riffle Beetle
Lara avara	A Riffle Beetle
Narpus concolor	A Riffle Beetle
Optioservus quadrimaculatus	A Riffle Beetle
Ordobrevia nubifera	A Riffle Beetle
Zapada cinctipes	A Stonefly
Zapada oregonensis	A Stonefly
Doroneuria theodora	A Stonefly
Hesperoperla pacifica	A Stonefly
Erynnis afranius	Afranius Duskywing
*Rhyacophila alexanderi**	Alexander's Rhyacophilan Caddisfly
*Oreohelix alpina**	Alpine Mountainsnail
Nesovitrea electrina	Amber Glass
Cordulia shurtleffii	American Emerald
*Agapetus montanus***	An Agapetus Caddisfly
Plebejus glandon	Arctic Blue
Anguispira kochi	Banded Tigersnail
Nesovitrea binneyana	Blue Glass
Euconulus fulvus	Brown Hive
Aeshna canadensis	Canada Darner
*Oreohelix elrodi**	Carinate Mountainsnail
*Ladona julia***	Chalk-fronted Corporal
Sympetrum internum	Cherry-faced Meadowhawk
Arion rufus	Chocolate Arion
Cryptomastix mullani	Coeur d'Alene Oregonian
Plathemis lydia	Common Whitetail
Vertigo modesta	Cross Vertigo
Oreohelix strigosa depressa	Depressed Rocky Mountainsnail
Leucorrhinia intacta	Dot-tailed Whiteface
Eubranchipus serratus	Ethologist Fairy Shrimp
*Radiodiscus abietum***	Fir Pinwheel
Discus whitneyi	Forest Disc
Libellula quadrimaculata	Four-spotted Skimmer
Polygonia faunus	Green Comma
Diphetor hageni	Hagen's Small Minnow Mayfly
*Discus brunsoni**	Lake Disc
Limenitis lorquini	Lorquin's Admiral
*Somatochlora semicircularis***	Mountain Emerald
Nymphalis antiopa	Mourning Cloak
Chlosyne palla	Northern Checkerspot
*Goereilla baumanni**	Northern Rocky Mountains Refugium Caddisfly

SCIENTIFIC NAME	COMMON NAME
*Caudatella edmundsi***	Northern Rocky Mountains Refugium Mayfly
*Arion fasciatus****	Orange-banded Arion
Cordulegaster dorsalis	Pacific Spiketail
Aeshna palmata	Paddle-tailed Darner
Zonitoides arboreus	Quick Gloss
Platyprepia virginalis	Ranchman's Tiger Moth
Punctum californicum	Ribbed Spot
Calopteryx aequabilis	River Jewelwing
Oreohelix strigosa	Rocky Mountainsnail
Polites sabuleti	Sandhill Skipper
*Pristiloma wascoense**	Shiny Tightcoil
Pacifastacus leniusculus	Signal Crayfish
Vallonia cyclophorella	Silky Vallonia
*Ophiogomphus occidentis***	Sinuous Snaketail
*Prophysaon humile**	Smoky Taildropper
Microphysula ingersolli	Spruce Snail
*Discus shimekii**	Striate Disc
Oreohelix subrudis	Subalpine Mountainsnail
Vertigo elatior	Tapered Vertigo
Libellula pulchella	Twelve-spotted Skimmer
Aeshna interrupta	Variable Darner
Vitrina pellucida	Western Glass-snail
*Margaritifera falcata**	Western Pearlshell

VASCULAR PLANTS

SCIENTIFIC NAME	COMMON NAME
*Ophioglossum pusillum**	Adder's Tongue
*Eleocharis rostellata**	Beaked Spikerush
*Bidens beckii**	Beck Water-marigold
*Potamogeton obtusifolius**	Blunt-leaved Pondweed
*Cardamine rupicola**	Cliff Toothwort
*Cypripedium fasciculatum**	Clustered Lady's-slipper
*Dryopteris cristata**	Crested Shieldfern
*Drosera anglica**	English Sundew
*Epipactis gigantea**	Giant Helleborine
*Carex rostrata**	Glaucus Beaked Sedge
*Grindelia howellii**	Howell's Gumweed
*Carex lacustris**	Lake-bank Sedge
*Botrychium lineare**	Linearleaf Moonwort
*Liparis loeselii**	Loesel's Twayblade
Phacelia lyallii	Lyall Phacelia
*Botrychium minganense***	Mingan Island Moonwort
*Synthyris canbyi**	Mission Mountain kittentails

SCIENTIFIC NAME	COMMON NAME
*Botrychium lunaria***	Moonwort Grape-fern
*Botrychium montanum**	Mountain Moonwort
*Lycopodium inundatum**	Northern Bog Clubmoss
*Botrychium pinnatum*****	Northern Moonwort
*Carex livida***	Pale Sedge
*Scheuchzeria palustris**	Pod Grass
*Amerorchis rotundifolia**	Round-leaved Orchis
*Mimulus breviflorus**	Short-flowered Monkeyflower
*Eriophorum gracile**	Slender Cottongrass
*Cypripedium parviflorum***	Small Yellow Lady's-slipper
*Cypripedium passerinum**	Sparrow's-egg Lady's-slipper
*Botrychium spathulatum**	Spoon-leaf Moonwort
*Mimulus ampliatus**	Stalk-leaved Monkeyflower
*Botrychium pedunculosum**	Stalked Moonwort
*Mimulus hymenophyllus*****	Thinsepal monkeyflower
*Trichophorum cespitosum**	Tufted Club-rush
*Botrychium ascendens**	Upward-lobed Moonwort
*Schoenoplectus subterminalis**	Water Bulrush
*Howellia aquatilis**	Water Howellia
*Botrychium crenulatum**	Wavy Moonwort
*Botrychium hesperium**	Western Moonwort

NONVASCULAR PLANTS

SCIENTIFIC NAME	COMMON NAME
Eurhynchium pulchellum var. *barnesii*****	Barnes' eurhynchium moss
*Brigantiaea praetermissa***	Brick-spored Firedot Lichen
Bryum calobryoides	Bryum moss
*Solorina bispora**	Chocolate Chip Lichen
*Neckera douglasii**	Douglas' neckera moss
*Lobaria hallii**	Gray Lungwort Lichen
*Ramalina obtusata**	Hooded Ramalina Lichen
*Collema curtisporum**	Jelly Lichen
*Parmeliella triptophylla**	Lead Lichen
*Sphagnum magellanicum**	Magellan's Peatmoss
*Evernia divaricata***	Mountain Oakmoss Lichen
*Pseudocyphellaria anomala**	Netted Specklebelly Lichen
*Ramalina pollinaria**	Powdery Twig Lichen
*Verrucaria kootenaica**	Speck Lichen

**Species of Concern*
***Potential Species of Concern*
****Exotic Species (not native to Montana)*
*****Status Under Review*

Appendix C

List of Endangered and Threatened Species

MAMMALS

SCIENTIFIC NAME	COMMON NAME
Lynx canadensis (T)	Canada lynx
Urus acrctos horribilis (T)	Grizzly bear

FISH

SCIENTIFIC NAME	COMMON NAME
Salvelinus confluentus (T)	Bull trout

PLANTS

SCIENTIFIC NAME	COMMON NAME
Howellia aquatilis (T)	Water howellia

(E) Endangered—listed in the Federal Register as being in danger of extinction
(T) Threatened—listed in the Federal Register as likely to become endangered within the foreseeable futur

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