

Glossary

accessible—pertaining to physical access to areas and activities for people of different abilities, especially those with physical impairments.

adaptive management—the rigorous application of management, research, and monitoring to gain information and experience necessary to assess and modify management activities. A process that uses feedback, from refuge research and monitoring and evaluation of management actions, to support or modify objectives and strategies at all planning levels.

alternatives—different sets of objectives and strategies or means of achieving refuge purposes and goals, helping fulfill the Refuge System mission and resolving issues.

amphibians—a class of cold-blooded vertebrates including frogs, toads, and salamanders.

APHIS—Animal and Plant Health Inspection Service.

ARPA—Archaeological Resources Protection Act.

ATV—all-terrain vehicle.

bald eagle disturbance—any human-elicited response that induces a behavioral or physiological change in a bald eagle contradictory to those that facilitate survival and reproduction. Disturbance may include elevated heart or respiratory rate, flushing from a perch or events that cause a bald eagle to avoid an area or nest site. (MBEWG 1994)

bald eagle nest—any platform within the breeding area that may have been built or used by a bald eagle, usually as a focus for reproductive behavior and activity. Bald eagle nests are usually built by mated pairs, are made of sticks, and are situated in trees. Nests may be constructed by single eagles or other species and composed exclusively or in part of grass, forbs, or human-constructed material and situated on cliffs, structures (windmills, utility poles), or the ground. (MBEWG 1994)

bald eagle nest site management zone—local geographic areas surrounding active and alternate bald eagle nests in which human activities are likely to disrupt normal breeding activity. Zones involve application of spatial and temporal human activity restrictions, progressively less restrictive with increasing distance from the nest site. (MBEWG 1994)

baseline—a set of critical observations or data used for comparison or a control.

big game—large animals sought for hunting or fishing for sport including white-tailed deer, pronghorn, mule deer, elk, moose, bighorn sheep, black bear, and mountain lion.

biological control, *also* **biocontrol**—reduction in numbers or elimination of unwanted species by the introduction of natural predators, parasites, or diseases.

biological integrity—composition, structure, and function at the genetic, organism, and community levels consistent with natural conditions and the biological processes that shape genomes, organisms, and communities.

biomass—the total amount of living material, plants and animals, above and below the ground in a particular habitat or area.

biotic—pertaining to life or living organisms; caused or produced by or comprising living organisms.

Bonneville Power Administration (BPA)—a federal agency under the U.S. Department of Energy that markets wholesale electrical power and operates and markets transmission services in the Pacific Northwest. The power comes from 31 federal hydro-projects, 1 nonfederal nuclear plant, and several other nonfederal power plants. The hydro-projects and the electrical system are known as the Federal Columbia River Power System. (<http://www.bpa.gov/corporate/kc/home/facts/>).

BPA—*see* Bonneville Power Administration.

Breeding Bird Survey—a cooperative program of the U.S. Fish and Wildlife Service and the Canadian Wildlife Service for monitoring population changes in North American breeding birds by using point counts along roads (Koford et al. 1994).

Cabinet/Yaak ecosystem (CYE)—encompasses about 2,720 square miles of northwestern Montana and northern Idaho. The Cabinet Mountains comprise about 58 percent of the ecosystem and lie south of the Kootenai River, with the Yaak River to the north. Two 7.2-mile-wide corridors link the Yaak with the Cabinet Mountains. (<http://www.r6.fws.gov/endspp/grizzly/cabyaakprogrept2002.pdf>)

CCP—*see* comprehensive conservation plan.

CFR—Code of Federal Regulations.

CFS—cubic feet per second.

climax—a community that has reached a steady state under a particular set of environmental conditions; a relatively stable plant community; the final stage in ecological succession.

cm—centimeter; equivalent to 0.39 inch.

colony—the nests or breeding place of a group of birds (such as herons) occupying a limited area.

compatibility—a wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the refuge manager, will not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge (Draft USFWS Manual 603 FW 3.6). A compatibility determination supports the selection of compatible uses and identified stipulations of limits necessary to ensure compatibility. A use (recreational or nonrecreational) of a refuge is incompatible if, in the sound professional judgment of the director of the Service, it will materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge. Incompatible uses are not allowed to occur on Service areas.

comprehensive conservation plan (CCP)—a document that describes the desired future conditions of the refuge. Provides long-range (15-year) guidance and management direction for the refuge manager to accomplish the purposes of the refuge, contribute to the mission of the Refuge System, maintain and, where appropriate, restore the biological integrity, diversity, and environmental health of each refuge and the Refuge System, and meet other mandates. (602 FW 3). For refuges established after October 8, 1997, CCPs are prepared when the refuge obtains staff and acquires a land base sufficient to achieve refuge purposes, but no later than 15 years after establishment of the refuge. Refuges convert long-range management plans (e.g., master plans and refuge management plans) approved prior to October 9, 1997 into CCPs with appropriate public involvement and NEPA compliance, no later than October 2012.

cool-season grasses—grasses that begin growth earlier in the season and often become dormant in the summer. These grasses will germinate at lower temperatures (65–85° F). Examples of cool-season grasses at refuge are bluebunch wheatgrass, Idaho fescue, and rough fescue.

coordination area—a wildlife management area made available to a state, by “(A) cooperative agreement between the United States Fish and Wildlife Service and the state fish and game agency pursuant to Section 4 of the Fish and Wildlife Coordination Act (16 U.S.C. 664); of (B) by long-term leases or agreements pursuant to the Bankhead–Jones Farm Tenant Act (50 Stat. 525; 7 U.S.C. 1010 et seq.)” States manage coordination

areas, but they are part of the Refuge System. CCPs are not required for coordination areas.

CSKT—Confederated Salish and Kootenai Tribes.

cultural resources—the remains of sites, structures, or objects used by people in the past.

cultural resource inventory—a professionally conducted study designed to locate and evaluate evidence of cultural resources present within a defined area. Inventories may involve various levels including background literature search (class I), sample inventory of project site distribution and density over a larger area (class II), or comprehensive field examination to identify all exposed physical manifestation of cultural resources (class III).

CYE—*see* Cabinet/Yaak ecosystem.

defoliation—the removing of vegetative parts; to strip vegetation of leaves; removal can be caused by weather, mechanical, animals, and fire.

depredation—damage inflicted on agricultural crops or ornamental plants by wildlife. Depredation can also refer to the taking of wildlife, including destruction of nests or dens, and eggs or young.

depredation by wolves—killing or serious maiming by one or wolves of lawfully present domestic livestock or other domestic animals on federally and state-managed lands or private lands, accompanied by the threat that additional livestock or domestic animals will be killed or maimed by wolves.

dm—decimeter; equivalent to 3.94 inches.

DNRC—Montana Department of Natural Resources and Conservation.

DOI—Department of the Interior.

drawdown—the act of manipulating water levels in an impoundment to allow for the natural drying-out cycle of a wetland.

EA—*see* environmental assessment.

ecological diversity—the variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur (USFWS Manual 052 FW 1.12B).

ecosystem—a biological community together with its environment, functioning as a unit. For administrative purposes, the Service has designated 53 ecosystems covering the United States and its possessions. These ecosystems generally correspond with watershed boundaries and their sizes and ecological complexity vary.

EE—environmental education.

EIS—environmental impact statement.

emergent—a plant rooted in shallow water and having most of the vegetative growth above water. Examples are cattail and hardstem bulrush.

endangered species, federal—a plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion or its range.

endangered species, state—a plant or animal species listed under the federal Endangered Species Act that is located in Montana. See listings at: <http://www.fwp.state.mt.us/wildthings/t%26e.asp>

endemic species—plants or animals that occur naturally in a certain region and whose distribution is relatively limited to a particular locality.

environmental assessment (EA)—a concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and the need for an action, alternative to such action. An EA provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 4508.9).

environmental health—natural composition, structure, and functioning of the physical, chemical, and other abiotic elements, and the abiotic processes that shape the physical environment.

ESA—Endangered Species Act.

EVS—education and visitor services.

extinction—the complete disappearance of a species from the earth; no longer existing (Koford et al. 1994).

extirpate—the elimination of a species from an island, local area, or region (Koford et al. 1994); to destroy completely; wipe out.

fauna—all the vertebrate and invertebrate animals of an area; the animals' characteristic of a region, period, or special environment.

fen, also alkaline bog—wetland primarily composed of organic soil material (peat or muck) that took thousands of years to develop.

FERC—Federal Energy Regulatory Commission.

finding of no significant impact (FONSI)—a document prepared in compliance with the National Environmental Policy Act, supported by an environmental assessment, that briefly presents why a federal action will have no significant effects on the human environment and for which an environmental impact statement will not be prepared (40 CFR 1508.13).

fire regime—a description of the frequency, severity, and extent of fire that typically occurs in an area or vegetative type.

flora—all the plant species of an area; plant or bacterial life characteristic of a region, period, or special environment.

FONSI—*see* finding of no significant impact.

forb—a broad-leaved, herbaceous plant; a seed-producing annual, biennial, or perennial plant that does not develop persistent woody tissue but dies down at the end of the growing season.

forest—a group of trees with their crown overlapping (generally forming 60–100 percent cover).

“friends group”—any formal organization whose mission is to support the goals and purposes of its associated refuge and the National Wildlife Refuge System. This includes “friends” organizations and cooperating and interpretive associations.

FTE—full-time equivalent employee.

geographic information system (GIS)—a computer system capable of storing and manipulating spatial data; a set of computer hardware and software for analyzing and displaying spatially referenced features (i.e., points, lines and polygons) with nongeographic attributes such as species and age (Koford et al. 1994).

GIS—*see* geographic information system.

global positioning system (GPS)—a system that, by using satellite telemetry, can pinpoint exact locations of places on the ground.

goal—descriptive, open-ended, and often broad statements of desired future conditions that convey a purpose but do not define measurable units (Draft USFWS Manual 620 FW 1.5).

GPS—*see* global positioning system.

GS—general schedule (pay rate schedule for certain federal positions).

GYA—Greater Yellowstone Area.

habitat—the place or environment where a plant or animal naturally or normally lives and grows.

habitat development plan—a dynamic working document that provides refuge managers a decision-making process; guidance for the management of refuge habitat; and long-term vision, continuity, and consistency for habitat management on refuge lands. Each plan incorporates the role of refuge habitat in international, national, regional, tribal, state, ecosystem, and refuge goals and objectives; guides analysis and selection of specific habitat management strategies to achieve those habitat goals and objectives; and uses key data, scientific literature, expert opinion, and staff expertise. (USFWS Manual 620 FW 1)

habitat fragmentation—the alteration of a large habitat, creating isolated patches of the original habitat that are interspersed with a variety of other habitat types (Koford et al. 1994); the process of reducing the size and connectivity of habitat patches, making movement of individuals or genetic information between parcels difficult or impossible.

herbivore—an animal feeding on plants.

impoundment—a body of water created by collection and confinement within a series of levees or dikes, creating separate management units although not always independent of one another.

Improvement Act—National Wildlife Refuge System Improvement Act of 1997.

indicator species—a species of plant or animal that is assumed to be sensitive to habitat changes and represents the needs of a larger group of species.

integrated pest management (IPM)—the control of pest species (plant or animal) using a practical, economical, and scientifically based combination of biological, mechanical, cultural, or chemical control methods. A balanced approach to controlling pest species' populations.

intermittently flooded—substrate usually exposed, but surface water is present for variable periods without seasonal periodicity.

introduced species—a species present in an area due to deliberate release by humans (including reintroductions, transplants, and restocked species) or due to accidental release through escape or indirect assistance (Koford et al. 1994).

introduction—the intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity.

invasive species—a species that is nonnative to the ecosystem; a species whose introduction causes or is likely to cause environmental or economic harm, or harm to human health.

involute sanctuary—a place of refuge or protection where animals and birds may not be hunted.

IPM—*see* integrated pest management.

issue—any unsettled matter that requires a management decision, e.g., an initiative, opportunity, resource management problem, threat to the resources of the unit, conflict in uses, public concern, or the presence of an undesirable resource condition.

lawfully present livestock—livestock (cattle, sheep, horses, and mules) occurring on private lands or on legal allotments (not trespassing) on federal lands.

Lincoln County tansy ragwort management program—an invasive plant grant program in conjunction with the Montana Department of Agriculture that has a continued focus on containment, control, and eradication of tansy ragwort infestations. Techniques include revegetation of disturbed logging sites, mapping infestations, spot treatment with herbicides, and continued release of biocontrol agents (Montana Department of Natural Resources Biennial Noxious Weed Summary Report FY 01–02).

MAAQS—Montana ambient air quality standards.

maintenance management system (MMS)—a national database that contains the unfunded maintenance needs of each refuge. Projects include those required to maintain existing equipment and buildings and to correct safety deficiencies for the implementation of approved plans, and to meet goals, objectives, and legal mandates.

MBEWG—Montana Bald Eagle Working Group.

MCC—Montana Conservation Corps.

mechanical control—reduction in numbers or elimination of unwanted species through the use of mechanical equipment such as mowers and clippers.

mesic—characterized by, relating to, or requiring a moderate amount of moisture; having a moderate rainfall.

MFWP—Montana Department of Fish, Wildlife and Parks.

migration—regular extensive, seasonal movements of birds between their breeding regions and their wintering regions (Koford et al. 1994); to pass, usually periodically, from one region or climate to another for feeding or breeding.

migratory birds—birds that follow a seasonal movement from their breeding grounds to their winter grounds. Waterfowl, shorebirds, raptors, and songbirds are all migratory birds.

mitigation—measures designed to counteract environmental impacts or to make impacts less severe.

mixed-grass prairie—the transition zone between the tall-grass prairie and the short-grass prairie dominated by grasses of medium height that are approximately 2–4 feet tall. Soils are not as rich as the tall-grass prairie and moisture levels are less.

mm—millimeter; equivalent to 0.04 inch.

MMS—*see* maintenance management system.

MNHP—Montana Natural Heritage Program.

monitoring—the process of collection information to track changes of selected parameters over time.

MOU—memorandum of understanding.

MOYOCO—Upper Missouri, Yellowstone, Upper Columbia River ecosystem.

MPC—Montana Power Company.

MPIF—Montana Partners in Flight.

NAAQS—national ambient air quality standards.

National Bison Range complex—National Wildlife Refuge System land and programs including: National Bison Range, Ninepipe National Wildlife Refuge (NWR), Pablo NWR, Swan River NWR, Lost Trail NWR, and Northwest Montana Wetland Management District (includes 15 waterfowl production areas, as well as a conservation easement program).

national wildlife refuge (NWR)—“A designated area of land, water, or an interest in land or water within the National Wildlife Refuge System, but does not include coordination areas.” Find a complete listing of all units of the Refuge System in the current “Annual Report of Lands Under Control of the U.S. Fish and Wildlife Service.”

National Wildlife Refuge System (Refuge System, NWRS)—various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife including species threatened with extinction; all lands, waters, and interests administered by the Secretary as wildlife refuges; areas for the protection and conservation of fish and wildlife that are threatened with extinction—wildlife ranges, game ranges, wildlife management areas, or waterfowl production areas.

National Wildlife Refuge System mission—“The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”

native species—species that are part of the original plant and animals of an area. In general, meaning from the same continent (Johnson and Larson 1999).

NCDE—*see* northern Continental Divide ecosystem.

NCTC—National Conservation Training Center.

Neotropical migratory bird—a bird species that breeds north of the United States and Mexican border and winters primarily south of this border.

NEPA—National Environmental Policy Act.

nest success—the percentage of nests that hatch successfully (one or more eggs hatch) of the total number of nests initiated in an area.

NGO—*see* nongovernmental organization.

nongovernmental organization (NGO)—any group that is not composed of federal, state, tribal, county, city, town, local, or other governmental entities.

North American Waterfowl Management Plan—the North American Waterfowl Management Plan, signed in 1986, recognizes that the recovery and perpetuation of waterfowl populations depends on restoring wetlands and associated ecosystems throughout the United States and Canada. It established cooperative international efforts and joint ventures composed of individuals; corporations; conservation organizations; and local, state, provincial, and federal agencies drawn together by common conservation objectives. Lost Trail National Wildlife Refuge falls into the “Prairie Pothole Joint Venture.”

northern Continental Divide ecosystem (NCDE)—this is 32,300 square kilometers (8 million acres) of extremely diverse habitats, much of it being heavily forested, mountainous, and a largely roadless wilderness along the Rocky Mountains from the Canadian border south to Lincoln, Montana. (http://www.nrmssc.usgs.gov/research/NCDEbear_dna_detail.htm)

Northern Rocky Mountain Wolf Recovery Plan—a document prepared by a team of individuals with expertise regarding the biological and habitat requirements of the wolf, outlining the tasks and actions necessary to recover the species within parts of its former range in the Rocky Mountain region. Original plan completed in 1980. Revised recovery plan approved August, 3 1987.

NRCS—Natural Resources Conservation Service.

NTMB—*see* Neotropical migratory bird.

NVCS—national vegetation classification standards.

NWI—national wetland inventory.

NWR—*see* national wildlife refuge.

NWRS—*see* National Wildlife Refuge System.

objective—a concise statement of what is to be achieved, when and where it is to be achieved, and who is responsible for the work. Objectives are derived from goals and provide the basis for determining management strategies. Objectives should be attainable, time-specific, and measurable.

Partners in Flight (PIF)—a Western Hemisphere program designed to conserve Neotropical migratory birds and officially endorsed by numerous federal and state agencies and nongovernmental organizations; also known as the Neotropical Migratory Bird Conservation Program (Koford et al. 1994).

PCTC—Plum Creek Timber Company.

perennial—plants that live for 3 years or more (Johnson and Larson 1999).

permanently flooded—surface water is present throughout the year in all years.

PIF—*see* Partners in Flight.

planning team—teams that are interdisciplinary in membership and function. Teams generally consist of a planning team leader; refuge manager and staff biologists; a state natural resource agency representative; and other appropriate program specialists (e.g., social scientist, ecologist, recreation specialist). Other federal and tribal natural resource agencies are asked to provide team members, as appropriate. The planning team prepares the comprehensive conservation plan and appropriate National Environmental Policy Act documentation.

planning team leader—typically a professional planner or natural resource specialist knowledgeable of the requirements of National Environmental Policy Act and who has planning experience. The planning team leader manages the refuge planning process and ensures compliance with applicable regulatory and policy requirements.

planning unit—a single refuge, an ecologically or administratively related refuge complex, or distinct unit of a refuge. The planning unit also may include lands currently outside refuge boundaries.

Pleasant Valley ecosystem—the plants, wildlife, and associated life cycles associated with the land area of the Pleasant Valley watershed.

Pleasant Valley watershed—land area drained by water (rivers, stream, lakes) that flows into the water sources located in Pleasant Valley and its major water sources (Dahl and Lynch lakes, and Pleasant Valley Creek) ending at the confluence of the Pleasant Valley–Fisher River.

predation—a mode of life in which food is primarily obtained by the killing or consuming of animals.

prescribed fire—controlled application of fire to the landscape that allows the fire to be confined to a predetermined area while producing the intensity of heat and rate of spread required to achieve planned management objectives.

priority public uses—six wildlife-dependent recreational public uses authorized by the Improvement Act to have priority and are found to be appropriate for refuges. They are hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation. Compatibility of these uses needs to be determined for each refuge.

problem wolves—wolves that have depredated on lawfully present livestock, domestic animals (pets), or other member of a group; pack of wolves including adults, yearlings, and young-of-the-year that were directly involved in the depredation, or fed upon the remains, of livestock that were a result of the depredation.

proposed action—the alternative proposed by the Service as best achieving the refuge purpose, vision, and goals; contributing to the Refuge System mission and addressing the significant issues; and consistent with principles of sound fish and wildlife management.

purposes of the refuge—“The purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit.”

raptor—a carnivorous bird (such as a hawk, falcon, or vulture) that feeds wholly or chiefly on meat taken by hunting or on carrion (dead carcasses).

refuge operating needs system (RONS)—a national database that contains the unfunded operational needs of each refuge. Projects include those required to implement approved plans and meet goals, objectives, and legal mandates.

resident species—a species inhabiting a given locality throughout the year; nonmigratory species. Examples for Lost Trail National Wildlife Refuge include Columbian ground squirrel, black-capped chickadee, great horned owl, moose, and coyote.

richness, *also* species richness—the absolute number of species in an assemblage or community; the number of species in a given area (Koford et al. 1994).

riparian area *or* zone—the area adjacent to water; the area influenced by water associated with streams or rivers.

RMEF—Rocky Mountain Elk Foundation.

RMP—Rocky Mountain population.

RONS—*see* refuge operating needs system.

scoping—the process of obtaining information from the public for input into the planning process.

seasonally flooded—surface water is present for extended periods in the growing season, but is absent by the end of the season in most years.

sediment—material deposited by water, wind, or glaciers.

semipermanently flooded—surface water is present throughout the growing season in most years.

Service—*see* U.S. Fish and Wildlife Service.

shorebird—any of a suborder (Charadrii) of birds (such as a plover or a snipe) that frequent the seashore or mud flat areas.

SHPO—state historic preservation office.

spatial—relating to, occupying, or having the character of space.

special-use permit—a permit for special authorization from the refuge manager required for any refuge service, facility, privilege, or product of the soil; provided at refuge expense and not usually available to the general public through authorizations in Title 50 Code of Federal Regulations or other public regulations (Refuge Manual 5 RM 17.6).

species of concern, federal—species that (1) are documented or have apparent population declines; (2) are small or restricted populations; or (3) depend on restricted or vulnerable habitats.

step-down management plan—step-down management plans provide the details (strategies and implementation schedules) necessary to meet goals and objectives identified in the comprehensive conservation plan (CCP). CCPs will either incorporate or identify step-down plans required to carry out the CCP. After completion of the CCP, existing step-down plans will be modified as needed to accomplish stated goals and objectives. (602 FW 4).

strategy—a specific action, tool, or technique or combination of actions, tools, and techniques used to meet unit objectives (Draft USFWS Manual 602 FW 1.5).

tansy ragwort—*Senecio jacobaea* is an Eurasian invasive plant in the sunflower family (Asteraceae). It spreads primarily by seed—a single tansy ragwort plant may produce up to 150,000 seeds, which may remain viable for up to 15 years. All parts of this plant are poisonous. It causes liver damage to cattle and horses, while sheep are affected to a lesser extent. (<http://www.oneplan.org/index.htm>)

temporarily flooded—surface water is present for brief periods during the growing season.

THPO—tribal historical preservation office.

threatened species, federal—species listed under the Endangered Species Act that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

threatened species, state—a plant or animal species listed under the federal Endangered Species Act that is located in Montana. See listings at <http://www.fwp.state.mt.us/wildthings/t%26e.asp>

USDA—U.S. Department of Agriculture.

U.S. Fish and Wildlife Service (Service, USFWS)—the principal federal agency responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people. The Service manages the 93-million-acre National Wildlife Refuge System comprised of more than 540 national wildlife refuges and thousands of waterfowl production areas. It also operates 65 national fish hatcheries and 78 ecological service field stations. The agency enforces federal wildlife laws, manages migratory bird populations, restores national significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the federal aid program that distributes millions of dollars in excise taxes on fishing and hunting equipment to state wildlife agencies.

U.S. Fish and Wildlife Service mission—“The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.”

USFW—*see* U.S. Fish and Wildlife Service.

U.S. Geological Survey (USGS)—a federal agency whose mission is to provide reliable scientific information to describe and understand the earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

USGS—*see* U.S. Geological Survey.

vision statement—a concise statement of what the planning unit should be, or what the Service hopes to do, based primarily on the Refuge System mission, specific refuge purposes, and other mandates. In addition, the vision statement is tied to the maintenance and restoration of biological integrity, diversity, and environmental health of each refuge and the Refuge System.

visual obstruction reading (VOR)—a measurement of the density of a plant community; the height of vegetation that blocks the view of predators to a nest.

VOR—*see* visual obstruction reading.

waders, also wading birds—birds having long legs that enable them to wade in shallow water. Includes egrets, great blue herons, black-crowned night-herons, and bitterns.

warm-season grasses—grasses that begin growth later in the season (early June). These grasses require warmer soil temperatures to germinate and actively grow when temperatures range from approximately 85 to 95 degrees F. Examples of warm-season grasses are red threeawn

(*Aristida longisetata*) and mountain brome (*Bromus carinatus*).

waterfowl—a category of birds that includes ducks, geese, and swans.

waterfowl production area (WPA)—prairie wetland with associated upland that is managed to provide nesting areas for waterfowl, which is owned in fee title by the Service. These lands are purchased from willing sellers with funds from Duck Stamp sales. They are open to public hunting, fishing, and trapping according to state and federal regulations.

watershed—the region or area draining into a river, river system, or body of water.

wetland easement—a perpetual agreement entered into by a landowner and the Service. The easement covers only the wetlands specified in the agreement. In return for a single lump-sum payment, the landowner agrees not to drain, burn, level, or fill wetlands covered by the easement.

wetland management district (WMD)—land that the Refuge System acquires (with federal Duck Stamp funds), restores, and manages primarily as prairie wetland habitat critical to waterfowl and other wetland birds. The National Bison Range WMD includes 15 waterfowl production areas and an easement program located in Flathead and Lake counties.

wetland reserve program (WRP)—voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. The Natural Resources Conservation Service provides technical and financial support to help landowners with their wetland restoration efforts. The NRCS goal is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection. (<http://www.nrcs.usda.gov/programs/wrp/>)

wildlife-dependent recreational use—“A use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation.” These are the six priority public uses of the Refuge System as established in the National Wildlife Refuge System Administration Act, as amended. Wildlife-dependent recreational uses, other than the six priority public uses, are those that depend on the presence of wildlife. Other uses will be considered in the preparation of a comprehensive conservation plan; however, the six priority public uses always will take precedence.

WG—wage grade schedule (pay rate schedule for certain federal positions).

WMD—*see* wetland management district.

wolf den—a place where wolves rear their pups, usually for the first six weeks. Dens are often used year after year, but wolves may also dig new dens or use some other type of shelter, such as a cave.

wolf pack—a group of wolves, usually consisting of a male, a female, and their offspring.

wolf recovery team—a designated group working on the recovery of wolves to an area in compliance with the Endangered Species Act.

wolf rendezvous site—a place where wolves gather after the young have left the den site.

woodland—open stands of trees with crowns not usually touching (generally forming 25–60 percent cover).

WPA—*see* waterfowl production area.

WRP—*see* wetland reserve program.



Appendices

Appendix A—Background Information

This appendix includes background information related to the refuge and its management, as follows:

- key legislation and policy
- refuge establishment history
- public use
- water rights
- species of concern
- cultural resources

KEY LEGISLATION AND POLICY

Americans with Disabilities Act (1992): Prohibits discrimination in public accommodations and services.

Architectural Barriers Act (1968): Requires federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

Clean Water Act (1977): Requires consultation with the U.S. Army Corps of Engineers for major wetland modifications.

Criminal Code of Provisions of 1940, as amended, (18 U.S.C. 41): States the intent of Congress to protect all wildlife within federal sanctuaries, refuges, fish hatcheries, and breeding grounds. Provides that anyone (except in compliance with rules and regulations promulgated by authority of law) who hunts, traps, or willfully disturbs any such wildlife, or willfully injures, molests, or destroys any property of the United States on such land or water, shall be fined up to \$500 or imprisoned for not more than 6 months or both.

Emergency Wetland Resources Act of 1986: Authorizes the purchase of wetlands from Land and Water Conservation Fund moneys, removing a prior prohibition on such acquisitions. The Act also requires the Secretary to establish a national wetlands priority conservation plan, requires the states to include wetlands in their comprehensive outdoor recreation plans, and transfers to the Migratory Bird Conservation Fund amount equal to import duties on arms and ammunition.

Endangered Species Act of 1973 and recent amendments (16 U.S.C. 1531–1543; 87 Stat. 884), as amended (establishing legislation): Provides for conservation of threatened and endangered species of fish, wildlife, and plants by federal action and by encouraging state programs. Specific provisions include:

- the listing and determination of critical habitat for endangered and threatened species and consultation with the Service on any federally funded or licensed project that could affect any of these agencies;
- prohibition of unauthorized taking, possession, sale, transport, etc., of endangered species;
- an expanded program of habitat acquisition;
- establishment of cooperative agreements and grants-in-aid to states that establish and maintain an active, adequate program for endangered and threatened species;
- assessment of civil and criminal penalties for violating the Act or regulations.

Environmental Education Act of 1990 (20 U.S.C. 5501–5510; 104 Stat. 3325): Public Law 101-619, signed November 16, 1990, established the Office of Environmental Education within the U.S. Environmental Protection Agency (EPA) to develop and administer a federal environmental education program. Responsibilities of the office include developing and supporting programs to improve understanding of the natural and developed environment, and the relationships between humans and their environment; supporting the dissemination of educational materials; developing and supporting training programs and environmental education seminars; managing a federal grant program; and administering an environmental internship and fellowship program. The office is required to develop and support environmental programs in consultation with other federal natural resource management agencies, including the Service.

Executive Order 11988—Floodplain Management: This executive order, signed May 24, 1977, prevents federal agencies from contributing to the “adverse impacts associated with occupancy and modification of floodplains” and the “direct or indirect support of floodplain development.” In the course of fulfilling their respective authorities, federal agencies “shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains.”

Executive Order 12996—Management and General Public Use of the National Wildlife Refuge System (1996): Defines the mission, purpose, and priority public uses of the National Wildlife Refuge System. It also presents four principles to guide management of the system.

Executive Order 13007—Indian Sacred Sites (1996):

Directs federal land management agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and where appropriate, maintain the confidentiality of sacred sites.

Federal Noxious Weed Act (1990): Requires the use of integrated management systems to control or contain undesirable plant species, and an interdisciplinary approach with the cooperation of other federal and state agencies.

Fish and Wildlife Act of 1956 (70 Stat. 1119; 16 U.S.C. 742a–742j), as amended: Establishes a comprehensive fish and wildlife policy and directs the Secretary of the Interior to provide continuing research; and extension and conservation of fish and wildlife resources.

Fish and Wildlife Improvement Act of 1978: Improves the administration of fish and wildlife programs and amends several earlier laws including the Refuge Recreation Act, the National Wildlife Refuge Administration Act, and the Fish and Wildlife Act of 1956. It authorizes the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. It also authorizes the use of volunteers on Service projects and appropriations to carry out volunteer programs.

Land and Water Conservation Fund Act of 1965: Provides funds from leasing bonuses, production royalties and rental revenues for offshore oil, gas, and sulphur extraction to the Bureau of Land Management, the USDA Forest Service, the U.S. Fish and Wildlife Service, and state and local agencies for purchase of lands for parks, open space, and outdoor recreation.

Migratory Bird Conservation Act of 1929 (16 U.S.C. 715–715d, 715e, 715f–715r): Establishes the Migratory Bird Conservation Commission, which consists of the Secretaries of the Interior (chair), Agriculture, and Transportation; two members from the House of Representatives; and an ex-officio member from the state in which a project is located. The commission approves acquisition of land and water, or interests therein, and sets the priorities for acquisition of lands by the Secretary of the Interior for sanctuaries or for other management purposes. Under this Act, to acquire lands or interests therein, the state concerned must consent to such acquisition by legislation. Such legislation has been enacted by most states.

Migratory Bird Conservation Act of 1929 (16 U.S.C. 715s, 45 Stat. 1222), as amended: Authorizes acquisition, development, and maintenance of migratory bird refuges; cooperation with other agencies in conservation; and investigations and publications on North American birds. Authorizes

payment of 25 percent of net receipts from administration of national wildlife refuges to the country or counties in which such refuges are located.

Migratory Bird Hunting and Conservation Stamp Act of 1934 (16 U.S.C. 718–718h; 48 Stat. 51), as amended:

The “Duck Stamp Act,” as this March 16, 1934 authority is commonly called, requires each waterfowl hunter 16 years of age or older to possess a valid federal hunting stamp. The Act authorized the requirement of an annual stamp for the hunting of waterfowl. Proceeds go towards the purchase of habitat for waterfowl and other wildlife. Duck stamps are also purchased: (1) for entry into some refuges; (2) by conservationists; and (3) for stamp collections. Receipts from the sale of the stamp are deposited in a special Treasury account known as the Migratory Bird Conservation Fund and are not subject to appropriations.

Migratory Bird Treaty Act of 1918 (16 U.S.C. 703–711; 50 CFR subchapter B), as amended:

Implements treaties with Great Britain (for Canada) and Mexico for protection of migratory birds whose welfare is a federal responsibility. The act provides for regulations to control taking, possession, selling, transporting, and importing of migratory birds and provides penalties for violations. This Act enables the setting of seasons and other regulations (including the closing of areas, federal or nonfederal) related to the hunting of migratory birds.

National and Community Service Act of 1990 (42 U.S.C. 12401; 104 Stat. 3127):

Public Law 101-610, signed November 16, 1990, authorizes several programs to engage citizens of the United States in full and part-time projects designed to combat illiteracy and poverty, provide job skills, enhance educational skills, and fulfill environmental needs. The Act will make grants to states for the creation of programs for citizens over 17 years of age. Programs must be designed to fill unmet educational, human, environmental, and public safety needs. Initially, participants will receive postemployment benefits of up to \$1000 per year for part-time and \$2,500 for full-time participants.

Several provisions are of particular interest to the Service:

American Conservation and Youth Service Corps: As a federal grant program established under subtitle C of the law, the corps offers an opportunity for young adults between the ages of 16 and 25, or in the case of summer programs, between 15 and 21, to engage in approved human and natural resources projects that benefit the public or are carried out on federal or Indian lands. To be eligible for assistance, natural resources programs will focus on improvement of wildlife habitat and recreational areas, fish culture, fishery assistance, erosion, wetlands

protection, pollution control, and similar projects. A stipend of not more than 100 percent of the poverty level will be paid to participants. A commission established to administer the Youth Service Corps will make grants to states, the Secretaries of Agriculture and Interior, and the Director of ACTION to carry out these responsibilities.

Thousand Points of Light: Creates a nonprofit Points of Light Foundation to administer programs to encourage citizens and institutions to volunteer to solve critical social issues, discover new leaders, and develop institutions committed to serving others.

National Historic Preservation Act of 1966 (16 U.S.C. 470–470b, 470c–470n): Public Law 89-665, approved October 15, 1966 (80 Stat. 915), and repeatedly amended, provides for preservation of significant historical features (buildings, objects, and sites) through a grants-in-aid program to the states. It establishes the National Register of Historic Places and a program of matching grants under the existing National Trust for Historic Preservation (16 U.S.C. 468–468d). The Act establishes the Advisory Council on Historic Preservation, which was made a permanent independent agency in Public Law 94-422, approved September 28, 1976 (90 Stat. 1319). That Act also creates the Historic Preservation Fund. Federal agencies are directed to take into account the effects of their actions on items or sites listed or eligible for listing in the National Register. As of January 1989, 91 historic sites on national wildlife refuges have been placed on the National Register.

There are various laws for the preservation of historic sites and objects.

Antiquities Act (16 U.S.C. 431–433): The Act of June 8, 1906 (34 Stat. 225) authorizes the President to designate as national monuments objects or areas of historic or scientific interest on lands owned or controlled by the United States. The Act required that a permit be obtained for examination of ruins, excavation of archaeological sites, and the gathering of objects of antiquity on lands under the jurisdiction of the Secretaries of Interior, Agriculture, and Army, and provided penalties for violations.

Archeological and Historic Preservation Act (16 U.S.C. 469–469c): Public Law 86-523, approved June 27, 1960 (74 Stat. 220) as amended by Public Law 93-291, approved May 24, 1974 (88 Stat. 174) to carry out the policy established by the “Historic Sites Act” (see below), directed federal agencies to notify the Secretary of the Interior whenever they find a federal or federally assisted, licensed, or permitted project may cause loss or destruction of significant scientific, prehistoric, or archaeological data. The Act authorizes use of

appropriated, donated, and transferred funds for the recovery, protection, and preservation of such data.

Archaeological Resources Protection Act (16 U.S.C. 470aa–470ll): Public Law 96-95, approved October 31, 1979 (93 Stat. 721): Largely supplants the resource protection provisions of the Antiquities Act for archaeological items. This Act establishes detailed requirements for issuance of permits for any excavation for or removal of archaeological resources from federal or Indian lands. It also establishes civil and criminal penalties for the unauthorized excavation, removal, or damage of any such resources; for any trafficking in such resources removed from federal or Indian land in violation of any provision of federal law; and for interstate and foreign commerce in such resources acquired, transported, or received in violation of any state or local law.

Historic Sites, Buildings and Antiquities Act (16 U.S.C. 461–462, 464–467): The Act of August 21, 1935 (49 Stat. 666), popularly known as the “Historic Sites Act,” as amended by Public Law 89-249, approved October 9, 1965 (79 Stat. 971), declares it a national policy to preserve historic sites and objects of national significance, including those located on refuges. It provides procedures for designation, acquisition, administration, and protection of such sites. Among other things, National Historic and Natural Landmarks are designated under authority of this Act. As of January 1989, 31 national wildlife refuges contained such sites.

Public Law 100-588, approved November 3, 1988 (102 Stat. 2983): Lowers the threshold value of artifacts triggering the felony provisions of the Act from \$5,000 to \$500; makes attempting to commit an action prohibited by the Act a violation; and requires the land managing agencies to establish public awareness programs regarding the value of archaeological resources to the Nation.

National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321–4347, January 1, 1970, 83 Stat. 852) as amended by P.L. 94-52, July 3, 1975, 89 Stat. 258, and P.L. 94-83, August 9, 1975, 89 Stat. 424:

Requires all agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and the implementation of all actions, federal agencies must integrate the Act with other planning requirements, and to prepare appropriate documents to facilitate better environmental decision making (40 CFR 1500). The Act declares national policy to encourage a productive and enjoyable harmony between humans and their environment. Section 102 of that Act directs that “to the fullest extent possible:

- the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act, and
- all agencies of the Federal Government shall...insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision making along with economic technical considerations...”

Section 102(2)c of NEPA requires all federal agencies, with respect to major federal actions significantly affecting the quality of the human environment, to submit to the Council on Environmental Quality a detailed statement of:

- the environmental impact of the proposed action;
- any adverse environmental effect that cannot be avoided should the proposal be implemented;
- alternatives to the proposed action;
- the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity;
- any irreversible and irretrievable commitments of resources that would be involved in the proposed action, should it be implemented.

National Wildlife Refuge System Administration Act of 1966 (Public Law 89-669; 80 Stat. 929; 16 U.S.C. 668dd–668ee), as amended: This Act defines the National Wildlife Refuge System as including wildlife refuges, areas for protection and conservation of fish and wildlife that are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, and WPAs. The Secretary is authorized to permit any use of an area provided such use is compatible with the major purposes for which such area was established. The purchase considerations for rights-of-way go into the Migratory Bird Conservation Fund for the acquisition of lands. By regulation, up to 40 percent of an area acquired for a migratory bird sanctuary may be opened to migratory bird hunting unless the Secretary finds that the taking of any species of migratory game birds in more than 40 percent of such area would be beneficial to the species. The Act requires an Act of Congress for the divestiture of lands in the system, except for (1) lands acquired with Migratory Bird Conservation Commission funds, and (2) lands that can be removed from the system by land exchange, or if brought into the system by a cooperative agreement, then pursuant to the terms of the agreement.

National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57, October 9, 1997, Amendment to the National Wildlife Refuge System Administration Act of 1966): Sets the mission and the administrative policy for all refuges in the National Wildlife Refuge System. Clearly defines a unifying mission for the Refuge System; establishes the

legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation); establishes a formal process for determining appropriateness and compatibility; establishes the responsibilities of the Secretary of the Interior for managing and protecting the Refuge System; and requires a CCP for each refuge by the year 2012. This Act amended portions of the Refuge Recreation Act and the National Wildlife Refuge System Administration Act of 1966.

Key provisions include the following:

- a requirement that the Secretary of the Interior ensures maintenance of the biological integrity, diversity, and environmental health of the National Wildlife Refuge System
- the definition of compatible wildlife-dependent recreation as “legitimate and appropriate general public use of the [National Wildlife Refuge] System”
- the establishment of hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation as “priority public uses” where compatible with the mission and purpose of individual national wildlife refuges
- the refuge managers’ authority to use sound professional judgment in determining which public uses are compatible on national wildlife refuges and whether or not they will be allowed (a formal process for determining “compatible use” is currently being developed)
- the requirement of open public involvement in decisions to allow new uses of national wildlife refuges and renew existing ones, as well as in the development of CCPs for national wildlife refuges

National Wildlife Refuge System Volunteer and Community Partnership Enhancement Act of 1998:

The purposes of this Act are: (1) to encourage the use of volunteers to assist the Service in the management of refuges within the Refuge System; (2) to facilitate partnerships between the Refuge System and nonfederal entities to promote public awareness of the resources of the Refuge System and public participation in the conservation of those resources; and (3) to encourage donations and other contributions by persons and organizations to the Refuge System. (Public Law 105-242; 112 Stat. 1575)

North American Wetlands Conservation Act (103 Stat. 1968; 16 U.S.C. 4401–4412): Public Law 101-233, enacted December 13, 1989: An act to conserve North American wetland ecosystems, waterfowl and other migratory birds, fish, and wildlife that depend on such habitats. The Act established a council to review project proposals and provided funding for the projects. The Act provides funding and administrative direction for implementation of the North American Waterfowl Management Plan and

the Tripartite Agreement on wetlands between Canada, United States, and Mexico. The Act converts the Pittman–Robertson account into a trust fund, with the interest available without appropriation through the year 2006 to carry out the programs authorized by the Act, along with an authorization for annual appropriation of \$15 million plus an amount equal to the fines and forfeitures collected under the Migratory Bird Treaty Act. Available funds may be expended, upon approval of the Migratory Bird Conservation Commission, for payment of not to exceed 50 percent of the United States share of the cost of wetlands conservation projects in Canada, Mexico, or the United States (or 100 percent of the cost of projects on federal lands). At least 50 percent and no more than 70 percent of the funds received are to go to Canada and Mexico each year.

Refuge Recreation Act of 1962: Authorizes the Secretary of the Interior to administer refuges, hatcheries, and other conservation areas for recreational use, when such uses do not interfere with the areas' primary purposes. It authorizes construction and maintenance of recreational facilities and the acquisition of land for incidental fish and wildlife oriented recreational development or protection of natural resources. It also authorizes the charging of fees for public uses.

Refuge Recreation Act of 1966 (Public Law 87-714; 76 Stat. 653–654; 16 U.S.C. 460k et seq.): Authorizes appropriate, incidental, or secondary recreational use on conservation areas administered by the Secretary of the Interior for fish and wildlife purposes.

Refuge Revenue Sharing Act (16 U.S.C. 715s): Section 401 of the Act of June 15, 1935 (49 Stat. 383) provides for payments to counties in lieu of taxes, using revenues derived from the sale of products from refuges.

Public Law 88-523, approved August 30, 1964 (78 Stat. 701): Makes major revisions by requiring that all revenues received from refuge products such as animals, timber and minerals, or from leases or other privileges, be deposited in a special Treasury account and net receipts distributed to counties for public schools and roads.

Public Law 93-509, approved December 3, 1974 (88 Stat. 1603): Requires that moneys remaining in the fund after payments be transferred to the Migratory Bird Conservation Fund for land acquisition under provisions of the Migratory Bird Conservation Act.

Public Law 95-469, approved October 17, 1978 (92 Stat. 1319): Expands the revenue-sharing system to include national fish hatcheries and Service research stations. It also includes in the Refuge Revenue Sharing Fund receipts from the

sale of salmonid carcasses. Payments to counties were established as follows:

- On acquired land, the greatest amount calculated on the basis of 75 cents per acre, $\frac{3}{4}$ of 1 percent of the appraised value, or 25 percent of the net receipts produced from the land
- On land withdrawn from the public domain, 25 percent of net receipts and basic payments under Public Law 94-565 (31 U.S.C. 1601–1607, 90 Stat. 2662), payment in lieu of taxes on public lands

This amendment also authorizes appropriations to make up any difference between the amount in the Fund and the amount scheduled for payment in any year. The stipulation that payments be used for schools and roads was removed, but counties were required to pass payments along to other units of local government within the county that suffer losses in revenues due to the establishment of Service areas.

Refuge Trespass Act of June 28, 1906 (18 U.S.C. 41; 43 Stat. 98, 18 U.S.C. 145): Provides the first federal protection for wildlife on national wildlife refuges. This Act makes it unlawful to hunt, trap, capture, willfully disturb, or kill any bird or wild animal, or take or destroy the eggs of any such birds, on any lands of the United States set apart or reserved as refuges or breeding grounds for such birds or animals by any law, proclamation, or executive order, except under rules and regulations of the Secretary. The Act also protects government property on such lands.

Refuge Trespass Act of June 25, 1948 (18 U.S.C. 41. Stat 686), section 41 of the Criminal Code, title 18: Consolidates the penalty provisions of various acts from January 24, 1905 (16 U.S.C. 684–687; 33 Stat. 614), through March 10, 1934 (16 U.S.C. 694–694b; 48 Stat. 400) and restates the intent of Congress to protect all wildlife within federal sanctuaries, refuges, fish hatcheries, and breeding grounds. The Act provides that anyone (except in compliance with rules and regulations promulgated by authority of law) who hunts, traps, or willfully disturbs any wildlife on such areas, or willfully injures, molests, or destroys any property of the United States on such lands or waters, shall be fined, imprisoned, or both.

Rehabilitation Act of 1973 (29 U.S.C. 794), as amended: Title 5 of P.L. 93-112 (87 Stat. 355), signed October 1, 1973, prohibits discrimination on the basis of handicap under any program or activity receiving federal financial assistance.

Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948: Provides that, upon determination by the Administrator of the General Services Administration, real property no

longer needed by a federal agency can be transferred without reimbursement to the Secretary of the Interior if the land has particular value for migratory birds, or to a state agency for other wildlife conservation purposes.

Wilderness Act of 1964: Public Law 88-577, approved September 3, 1964, directs the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within National Wildlife Refuge System and National Park Service for inclusion in the National Wilderness Preservation System.

NATIONAL WILDLIFE REFUGE SYSTEM

Administration of national wildlife refuges is governed by bills passed by the United States Congress and signed into law by the President of the United States, and by regulations promulgated by the various branches of the government. Following is a brief description of some of the most pertinent laws and statues establishing legal parameters and policy direction for the National Wildlife Refuge System.

Fish and Wildlife Conservation Act of 1980 (Public Law 96-366, September 29, 1980, 16 U.S.C. 2901–2911, as amended 1986, 1988, 1990, and 1992): Creates a mechanism for federal matching funding of the development of state conservation plans for nongame fish and wildlife. Subsequent amendments to this law require that the Secretary monitor and assess migratory nongame birds, determine the effects of environmental changes and human activities, identify birds likely to be candidates for endangered species listing, and identify conservation actions that would prevent this from being necessary. In 1989, Congress also directed the Secretary to identify lands and waters in the Western Hemisphere, the protection, management, or acquisition of which would foster conservation of migratory nongame birds. All of these activities are intended to assist the Secretary in fulfilling the Secretary's responsibilities under the Migratory Bird Treaty Act and the Migratory Bird Conservation Act, and provisions of the ESA implementing the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere.

Refuge Revenue Sharing Act of 1978 [Public Law 95-469, October 17, 1978, (amended 16 U.S.C. 715s); 50 CFR, part 34]: Changes the provisions for sharing revenues with counties in a number of ways. It makes revenue sharing applicable to all lands administered by the Service, whereas previously it was applicable only to areas in the National Wildlife Refuge System. The new law makes payments available for any governmental purpose, whereas

the old law restricted the use of payments to roads and schools. For lands acquired in fee simple, the new law provides a payment of 75 cents per acre, $\frac{3}{4}$ of 1 percent of fair market value or 25 percent of net receipts, whichever is greatest, whereas the old law provided a payment of $\frac{3}{4}$ of 1 percent adjustment cost or 25 percent of net receipts, whichever was greater. The new law makes reserve (public domain) lands entitlement lands under Public Law 94-565 (16 U.S.C. 1601–1607, and provides for a payment of 25 percent of net receipts. The new law authorizes appropriations to make up any shortfall in net receipts, to make payments in the full amount for which counties are eligible. The old law provided that if net receipts were insufficient to make full payment, payment to each county would be reduced proportionality.

Section 401 of the Federal Water Pollution Control Act of 1972 (Public Law 92-500; 86 Stat. 816, 33 U.S.C. 1411): Requires any applicant for a federal license or permit to conduct any activity that may result in a discharge into navigable waters to obtain a certification from the state in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over navigable waters at the point where the discharge originates or will originate, that the discharge will comply with applicable effluent limitations and water quality standards. A certification obtained for construction of any facility must also pertain to subsequent operation of the facility.

Section 404 of the Federal Water Pollution Control Act of 1972 (Public Law 92-500, 86 Stat. 816): Authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits, after notice and opportunity for public hearing, for discharge of dredged or fill material into navigable waters of the United States, including wetlands, at specified disposal sites. Selection of disposal sites will be in accordance with guidelines developed by the Administrator of the Environmental Protection Agency in conjunction with the Secretary of the Army. Furthermore, the Administrator can prohibit or restrict use of any defined area as a disposal site whenever she/he determines, after notice and opportunity for public hearings, that discharge of such materials into such areas will have an unacceptable adverse effect on municipal water supplies, shellfish beds, fishery areas, wildlife, or recreational areas.

National Wildlife Refuge Regulations for the most recent fiscal year (50 CFR 25-35, 43 CFR 3103.2 and 3120.3–3): Provides regulations for administration and management of national wildlife refuges including mineral leasing, exploration, and development.

Rights-of-way General Regulations (50 CFR 29.21; 34 FR 19907, December 19, 1969): Provides for procedures for filing applications. Provides terms and conditions under which rights-of-way over, above, and across lands administered by the Service may be granted.

Use of Off-road Vehicles on Public Lands (Executive Order 11644, Federal Reg. Vol. 37, No. 27, February 9, 1972): Provides policy and procedures for regulating off-road vehicles.

RECREATIONAL USE

The following are laws and executive orders that regulate recreational use on Refuge System lands.

Alaska National Interest Lands Conservation Act of 1980 (16 U.S.C. 410 hh3233 and 43 U.S.C. 1602–1784)

Alaska Native Claims Settlement Act (43 U.S.C. 1601–1624)

Antiques Act of 1906 (16 U.S.C. 431–433)

Archaeological and Historic Preservation Act of 1960 (16 U.S.C. 469–469c), as amended

Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa–470mm)

Comprehensive Environmental Responses, Compensation and Liability Act of 1980

Endangered Species Act of 1973 (16 U.S.C. 1531–1544), as amended

The Fish and Wildlife Act of 1956 (16 U.S.C. 742f (a) (4), as amended

Fish and Wildlife Conservation Act (16 U.S.C. 2901–2911), as amended

The Fish and Wildlife Coordination Act [16 U.S.C. 661(1)–662(c)]

Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 7421)

Historic Sites, Building and Antiquities Act of 1935 (16 U.S.C. 461–462, 464–467)

Land and Water Conservation Fund [16 U.S.C. 460(l–4)–(l–11)], as amended.

Migratory Bird Conservation Act of 1929 (16 U.S.C. 715–715d, 715e, 715f–715r), as amended

National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd–669ee), as amended

National Wildlife Refuge System Improvement Act of 1997

Natural Historic Preservation Act of 1966 (16 U.S.C. 470–470b, 470c–470n), as amended

Refuge Recreation Act of 1962 (16 U.S.C. 460k–460k4), as amended

Refuge Recreation Act of 1969 (16 U.S.C. 460k–460k4), as amended

Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970, as amended

Wild and Scenic Rivers Act (16 U.S.C. 1271–1287), as amended

Wilderness Act of 1964 (16 U.S.C. 1131–1136)

Executive Order 11593—Protection and Enhancement of the Cultural Environment

Executive Order 11593—Protection of Historical, Archaeological and Scientific Properties

Executive Order 11644—Use of Off-road Vehicles on Public Lands

Executive Order 11988—Floodplain Management

Executive Order 11990—Protection of Wetlands

Executive Order 12372—Intergovernmental Review of Federal Program

Executive Order 12962—Recreational Fisheries

Executive Order 12996—Management and General Public Use of the National Wildlife Refuge System

Executive Order 13006—Locating Federal Facilities On Historic Properties In Our Nation's Central Cities

Executive Order 13007—Indian Sacred Sites

Executive Order 13287—Preserve America

REFUGE ESTABLISHMENT HISTORY

The MPC owned and operated Kerr Dam, a hydro-generating facility located on the Flathead River approximately 2.5 miles southwest of the southern end of Flathead Lake. In 1976, the MPC filed an application with the FERC for a new license to operate the Kerr project. Kerr Dam is located within the exterior boundaries of the Flathead Indian Reservation (CSKT). Subsequent to the MPC re-license application, the CSKT filed a competing application for operation of the dam. From 1980 to 1985, the MPC operated the Kerr project under

successive annual operating licenses, pending resolution of a number of legal and environmental issues and studies.

In 1985, FERC issued an EA that evaluated the environmental effects of issuing a license for the Kerr Project. The EA further identified hydro-project impacts to aquatic and wildlife resources and wildlife habitat on the Flathead WPA located at the north end of Flathead Lake. These impacts included severe wave action erosion of wildlife habitats on the WPA due to seasonal increases in lake levels. The WPA is administered as an entity of the National Wildlife Refuge System, thus national wildlife trust

resources were impacted by hydro-operations that began in 1938.

After a period of review, biological studies, assessments, and subsequent litigation; the MPC, CSKT, and Department of Interior (DOI) ultimately reached a settlement in 1985 that was approved by FERC and incorporated into a new 50-year license issued jointly to the MPC and the CSKT. Article 47 of the new license required the MPC to study and develop mitigation and management measures for the loss of wildlife habitat on the Flathead WPA. In May 1990, after consultation with the CSKT and the Service, the MPC issued a mitigation and management plan. Subsequent to review of this plan, and determination that the MPC's plan would constitute a major federal action, FERC issued an environmental impact statement (EIS). In 1994, under authority of the Federal Power Act, the DOI submitted 4e conditions, which would provide for adequate protection and use of the Flathead Indian Reservation and the Flathead WPA. In 1997, FERC issued an "Order Approving Settlement" that required the MPC to acquire 3,911 acres of suitable replacement habitat as partial mitigation for wildlife losses and impacts on the WPA. This replacement habitat acreage was to be conveyed to the Service in fee title.

In 1985, the Service identified the need to evaluate the future of land acquisition in Flathead and Lake counties, Montana. This need resulted from pending MPC mitigation due to identified habitat losses and wildlife impacts on the Flathead WPA. In 1986, the Service prepared a land acquisition and development plan. This document delineated over 11,000 acres of potential wetland and upland tracts in the Flathead Valley that would be suitable for wetland-dependent wildlife production and management. The 160-acre Dahl Lake and surrounding habitats, located in the Pleasant Valley, were identified in the document.

Establishment of the Lost Trail National Wildlife Refuge began in June of 1996 when the MPC purchased the Lost Trail Ranch with the intent of conveying 3,112 acres to the Service per the FERC order requiring replacement of lost habitat. Two separate parcels of the ranch were identified as mitigative replacement habitat:

- 160-acre Dahl Lake with 2,452 acres of surrounding habitat
- 500 acres of restorable wetlands located on the west end of the ranch

After review of the proposed conveyed parcels and in consideration of additional wildlife needs within the area, the Service proposed acquisition of the remaining ranch tracts for establishment of a national wildlife refuge. The MPC readily agreed to this concept. In early 1998, a preliminary project proposal, conceptual management plan, and

acquisition EA were prepared. The acquisition EA listed several alternatives:

- No action—acceptance of the two mitigation parcels (3,112 acres) to be managed as a WPA
- Acceptance of the mitigation parcels to be managed as a national wildlife refuge
- Mitigation and fee-title acquisition of lands as a national wildlife refuge

Alternative C was the preferred alternative. A scoping meeting was held in Kalispell, Montana, on May 20, 1998, to solicit public comment concerning Service acquisition of Lost Trail Ranch. The concept of establishment of a national wildlife refuge received little opposition.

After considerable efforts by the Service's realty division (Denver), acquisition of the Lost Trail National Wildlife Refuge was completed on August 24, 1999.

During the interim acquisition period (1998–1999), the NRCS, in conjunction with the MPC, acquired a WRP easement on 1,770 acres of the ranch. This easement allows for the restoration of the hydrology of the area. Restoration efforts will be federally funded through NRCS in coordination with the Service.

PUBLIC USE

The Improvement Act of 1997, the organic legislation of the Refuge System, recognizes six wildlife-dependent "priority public uses" that are most appropriate for national wildlife refuges. These are hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation. National refuge policy encourages refuges to offer these opportunities and to seek out additional resources when needed to do so. There is a special focus on these activities because they help foster an appreciation and understanding of wildlife and the outdoors.

Wildlife conservation is always the top obligation of national wildlife refuges, and refuges must go through several steps when evaluating a public use. If a use is not one of the priority public uses, the first step is to evaluate it against several criteria to determine whether the use is appropriate for a specific national wildlife refuge. All uses must also be determined to be compatible—meaning that they will not materially detract from or interfere with the refuge's establishing purpose or Service mission. The third step is to determine whether the refuge has the resources to administer the use safely and responsibly. If a priority public use is appropriate and compatible, but the refuge staff lacks the resources to administer the use, refuge managers are encouraged to seek additional resources from outside sources, such as nonprofit partner organizations and state natural resource agencies.

The priority uses are first in line for the refuge's available public use staff and financial resources. If conflicts arise between priority uses and other uses, refuge managers must eliminate the nonpriority use or modify that use to reduce conflict.

Refuge managers may allow (with written justification) other compatible public uses. When considering other uses, the refuge manager will prepare a compatibility determination when necessary. Non-wildlife-dependent activities can be allowed when needed to provide access to, help implement, or sustain a priority use when no other way is practicable. Refuge managers must determine the appropriateness as well as compatibility of such uses before allowing them to occur on Refuge System lands. For example, camping may be necessary to facilitate hunting on large remote refuges but may not be necessary to facilitate hunting on refuges near developed areas where camping or other lodging is available.

Refuge managers may establish use limits and/or zones for specific activities, disperse or restrict use, or use other means to minimize or eliminate conflict between uses that occur at refuges. Nonpriority uses, if allowed, must not interfere with or diminish the opportunity for, or quality of, priority wildlife-dependent recreational uses. Using zones or the establishment of limits, the Service can generally provide a balanced recreation program and avoid favoring one priority recreational opportunity over another when both are compatible.

It is recognized, however, that some refuges may not support public use. Many refuges only support limited public use and not every priority use can be accommodated on every refuge. If it is determined that a refuge can support one or more of these uses, the priority wildlife-dependent recreational use must receive preferential consideration in refuge planning and management before the refuge manager analyzes other appropriate recreational opportunities.

The "appropriate use" test for nonpriority public uses occurs before the refuge manager begins a compatibility determination. The appropriate use test is designed to screen out uses that are not among the priority public uses and which are clearly not related to the refuge's wildlife conservation mission. Compatibility reviews determine whether any use will detract from the refuge's ability to meet its conservation obligations. If an existing or proposed use is determined to be appropriate, then the use must still be reviewed for compatibility before it may be allowed or continued to be allowed. If a use is not appropriate, then a compatibility determination is not necessary. A use should not be allowed simply because it is a historical use but should go through this process to determine appropriateness and compatibility.

An appropriate use of a refuge is a proposed or existing use that meets at least one of the following three conditions:

1. The use is a priority public use or is necessary for the safe, practical, and effective conduct of a priority public use on a refuge.
2. The use contributes to the Refuge System mission, or the refuge purposes, goals, or objectives as described in a refuge management plan (such as this CCP) approved after the passage of the refuge Improvement Act.
3. The refuge manager has determined the use to be appropriate after evaluating 11 factors designed to screen out uses that could conflict with stewardship responsibilities for the wildlife conservation mission of the Refuge System, interfere with priority public uses, or which do not contribute to an overall understanding and appreciation of wildlife resources.

The 11 factors a refuge manager would use to determine if a use is appropriate follow.

1. Does the use comply with applicable laws and regulations?
2. Is the use consistent with applicable executive orders and Department and Service policies?
3. Is the use consistent with refuge goals and objectives documented in an approved refuge management plan?
4. Has an earlier documented analysis not denied the use?
5. Is the use consistent with public safety?
6. Is the use manageable within available budget and staff?
7. Is the use consistent with other resource or management objectives?
8. Will the use be easy to control in the future?
9. Is the refuge the only place where this activity can reasonably occur?
10. Does the use contribute to the public's understanding and appreciation of the refuge's wildlife or cultural resources, or is the use beneficial to the refuge's wildlife or cultural resources?
11. Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality wildlife-dependent recreation into the future?

If the answer is "no" to any of these questions, the Service will generally not allow the use. If the answers are consistently "yes" to these questions, or if there are compelling reasons why the refuge

manager believes the use is appropriate on the refuge, the refuge manager then prepares written justification, and obtains concurrence from his/her supervisor.

Refuge managers, with assistance from regional offices as well as the public, must adequately monitor recreational activities on the Refuge System lands. Monitoring programs must focus on the impacts of recreational activities on wildlife, habitat, and the quality of experience for the public. By implementing successful monitoring techniques, the Service can evaluate and adaptively manage to meet established standards and ensure that activities continue to be appropriate, compatible, and of high quality.

The following general criteria (from the “Draft Wildlife-dependent Recreational Uses Policy Pursuant to the Improvement Act”) will help refuge managers decide what recreational activities to allow, encourage, or develop, and at what level. Refuge managers must eliminate—with adequate consultation, documentation, and cooperation with affected federal, state, tribal, local authorities, and groups—programs that do not meet these criteria.

- *Ensure appropriateness.* Refuge managers, in consultation with regional offices when deemed necessary, must first consider if a use is appropriate on Refuge System lands. Refuge managers must be able to show why the requested use supports the Refuge System mission and the purpose of the refuge before investing additional resources for a compatibility determination.
- *Ensure compatibility.* Refuge managers must:
 - exercise sound professional judgment (compatibility determinations are inherently complex and require the refuge manager to consider their field experiences and knowledge of a refuge's resources, particularly its biological resources, and make conclusions that are consistent with principles of sound fish and wildlife management and administration, available scientific information, and applicable laws);
 - consider the extent to which available resources (funding, personnel, and facilities) are adequate to develop, manage, and maintain the proposed use to ensure compatibility (the refuge manager must make reasonable efforts to ensure that the lack of resources is not an obstacle to permitting otherwise compatible wildlife-dependent recreational uses—hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation);
 - under no circumstances (except emergency provisions necessary to protect the health and safety of the public or any fish or wildlife population), authorize any use not determined to be compatible.
- *Focus on wildlife.* Wildlife conservation is the first priority of the Refuge System, and new and ongoing recreational use programs should help visitors focus on wildlife and other natural resources. Activities should make visitors aware of the most important resource issues at the refuge, be supportive of management plans that address those issues, and show how the refuge contributes to the mission of the Refuge System.
- *Tailor programs to refuge needs and ability to administer the program.* Refuge managers will determine and document:
 - the design and scope of a refuge recreational use program after evaluating the wildlife-dependent uses that are appropriate, compatible, and practical at that refuge; the amount and type of visitation; constraints of the location; traditions/viewpoints of the local populace; legal commitments; other opportunities in the area; public interest; resource management concerns; and other criteria;
 - a realistic demand for the activity (this is important because activities generally are harder to curtail or stop than to begin; refuge managers must have an eye to the future and be ready for possible changes in staffing, funding, or other program elements that may occur).
- *Follow an approved plan.* Before administering priority uses or identifying and allowing mandated or nonpriority uses at a refuge, the refuge manager should consult the refuge's CCP, visitor-service management plan, and other applicable step-down plans. The documents will outline program objectives and other specific information that will provide the guidance needed to manage these activities.
- *Ensure adequate resources.* Refuge managers will:
 - offer wildlife-dependent recreational use programs only to the extent that staff and funds are sufficient to develop, operate, and maintain the program to safe, quality standards (refuge managers should remember that, in general, the greater the scope and complexity of a program, the greater the need for staff and money; where wildlife-dependent recreational uses cannot occur at a refuge due to insufficient resources, refuge managers will try to facilitate these programs through user fee programs and cooperative efforts, including memorandums of understanding, cost-share agreements, sharing personnel with nearby refuges, and others; conservation partnerships or other groups can help refuge managers more effectively finance and administer recreational use programs on refuges by providing labor, funds, or other types of support; where available and appropriate, refuge managers should work with cooperating associations, volunteers, contractors, businesses,

local communities, educational institutions, state and tribal governments, other federal agencies, conservation groups, other organizations, and the public to minimize or reduce the costs of conducting recreational use programs; the community relations benefits of such an approach are effective and far-reaching);

- seek opportunities to develop formal agreements, contracts, cooperative ventures, and community sponsorships to fund equipment and supplies, maintain facilities, conduct training, provide technical assistance, and help with other aspects of a quality recreational use program (refuge managers should not enter into agreements that unnecessarily encumber lands and facilities or hinder meeting the resource management objectives).

HUNTING

The Service recognizes hunting as a healthy, traditional outdoor pastime, deeply rooted in American heritage, and when managed appropriately, can instill a unique understanding and appreciation of wildlife, their behavior, and their habitat needs. Hunting also is an important wildlife management tool on refuges. The Service relies on close cooperation and coordination with state fish and wildlife management agencies in managing hunting opportunities on refuges and in setting management goals and objectives for refuge populations. Regulations permitting hunting of resident wildlife within the Refuge System shall be, to the extent practicable, consistent with state fish and wildlife laws, regulations, and management plans. The Service encourages refuge staff to develop and take full advantage of opportunities to work with other partners who have an interest in helping promote quality hunting programs on refuges.

The Service defines a quality hunting experience as one that:

- maximizes safety for hunters and other visitors;
- encourages the highest standards of ethical behavior in taking or attempting to take wildlife;
- is available to a broad spectrum of the hunting public;
- contributes positively to or has no adverse effect on population management of resident or migratory species;
- reflects positively on the individual refuge, the Refuge System, and the Service;
- provides hunters uncrowded conditions by minimizing conflicts and competition among hunters;
- provides reasonable challenges and opportunities for taking targeted species under the described harvest objective established by the hunting

program; it also minimizes the reliance on motorized vehicles and technology designed to increase the advantage of the hunter over wildlife;

- minimizes habitat impacts;
- creates minimal conflict with other priority wildlife-dependent recreational uses or refuge operations;
- incorporates a message of stewardship and conservation in hunting opportunities.

Prior to establishment as a national wildlife refuge, Lost Trail had always been in private ownership. Although ranch owners and invited guests hunted the area, public hunting was not permitted. Opening the refuge to hunting and other public uses may negatively affect large mammal populations on the refuge and in the Pleasant Valley ecosystem. Monitoring will help managers assess the impacts of public use and other management decisions.

Hunt Environmental Assessment

The refuge developed a hunt EA and hunt plan during 2001. In summary, the 2001 hunt EA contained six alternatives. Alternative A (limited hunting) provided for archery-only hunting of elk and deer, as well as turkey and mountain grouse hunting, within designated areas. Alternative B (designated areas) was selected as the preferred alternative and provides for archery and rifle hunting of deer and elk, as well as turkey and mountain grouse, within designated areas. Alternative C (maximum allowable hunting) would have allowed hunting throughout the refuge for big game (elk, deer, moose, bear, lion), turkey, and upland game birds as well as predators. Alternative D (special permit hunting) provided for deer and elk hunting throughout the refuge under a permit season, as well as allowing turkey and grouse hunting. Alternative E (MFWP proposal) was suggested by the MFWP and would have allowed gun and archery hunting of deer and elk, waterfowl hunting on 40 percent of the refuge, turkey and grouse hunting, and rifle/shotgun hunting of furbearers. Alternative F (no action) would have continued the closure of the refuge to any form of hunting. These alternatives are explained in detail in the EA. Copies are available at the National Bison Range (406/644 2211) or at <http://bisonrange.fws.gov/losttrail/lastea.pdf>.

The preferred alternative selected from the hunt EA released in 2001 is alternative B (designated areas) with modifications. This alternative allows for hunting of elk, deer, mountain grouse (ruffed, spruce, and blue) and turkey following MFWP regulations and seasons except for designated closed areas (appendix F). No hunting would be allowed between the county road (Pleasant Valley Road) and the South Pleasant Valley Road. Hunting would be permitted on refuge lands south or east of the South Pleasant Valley Road (southeast pond area) and

north of the county road. Shotgun hunting for turkey and mountain grouse would be limited to nontoxic shot. Hunting of moose, mountain lion, black bear, coyote, ground squirrels, furbearers and waterfowl would not be allowed. Vehicle access would be permitted on roads currently open to the public including the north 1019 road and the county road. Hunters would be required to park in designated parking areas to access areas open to hunting (appendix F).

Special youth hunting and access for hunters with disabilities would be encouraged and accommodated following MFWP regulations. Youth hunting will be further encouraged by limiting the first week of archery deer and elk season and the first week of the general deer and elk season to youths 12–14 years of age accompanied by an adult or guardian who is at least 21 years of age. Hunters with disabilities in possession of a MFWP permit to hunt from a vehicle will be provided limited access to refuge management roads and trails.

All or any part of the refuge may be closed to hunting by the refuge manager whenever necessary to protect the resources of the area or in the event of an emergency endangering life or property. In addition, according to refuge policy (SRM 5.3B, 5.3F, and 5.5N), yearly evaluation and monitoring for impacts from the hunt program will occur to determine if modifications to the hunt plan are necessary.

One step-down management plan has already been completed for the refuge—the hunt plan. During the acquisition process and in the acquisition EA, the Service stated that hunting would be evaluated and potentially allowed within 1 year after purchase. The Service missed that deadline but the development of a hunt EA and hunt plan were then accelerated to open the refuge to hunting for the fall 2002 season, concurrently with the development of the CCP. The approved preferred alternative in the hunt EA served as the guideline for the development of the step-down hunt plan. It outlines the specific details of how the hunt program is carried out. The hunt EA and hunt step-down plan can be viewed online at <http://bisonrange.fws.gov/losttrail/> or a copy can be obtained by writing to the refuge.

FISHING

The Service recognizes fishing as a traditional outdoor pastime that is deeply rooted in America's natural heritage. The objectives of the Refuge System's fishing program are to: effectively maintain healthy and diverse fish population resources through the use of scientific management techniques; to promote public understanding of, and increase public appreciation for, America's natural resources and the Service's role in managing the Refuge System; to provide opportunities for quality recreational and educational experiences; and to

minimize conflicts between anglers and other visitors.

A quality fishing experience is one that contributes to management objectives and accomplishes the following:

1. maximizes safety for anglers and other visitors;
2. causes no adverse impact on populations of resident or migratory species, native species, threatened and endangered species, or habitat;
3. encourages the highest standards of ethical behavior in regard to catching, attempting to catch, and releasing fish;
4. is available to a broad spectrum of the public that visits, or potentially would visit, the refuge;
5. provides reasonable accommodations for individuals with disabilities to participate in refuge fishing activities;
6. reflects positively on the Refuge System;
7. provides uncrowded conditions;
8. creates minimal conflict with other priority wildlife-dependent recreational uses or refuge operation;
9. provides reasonable challenges and harvest opportunities;
10. increases the visitors' understanding and appreciation for the fishery's resource.

WILDLIFE PHOTOGRAPHY AND OBSERVATION

Wildlife photography and observation are legitimate and appropriate public uses of the Refuge System, and along with the other priority public uses in the Improvement Act, will receive enhanced consideration over other uses. The objectives of the Refuge System's wildlife photography and observation program are to promote public understanding of and increase public appreciation for America's natural resources and the Refuge System by providing safe, enjoyable, attractive, and accessible wildlife-viewing and photographic opportunities and facilities.

Essential elements of a quality wildlife photographic or observation experience include the following:

- Opportunities occur in places with the least amount of disturbance to wildlife.
- Opportunities occur in a primitive setting or use safe facilities and provide an opportunity to photograph and view wildlife and its habitat in a natural environment.
- Facilities or programs maximize opportunities to photograph and view the spectrum of wildlife species and habitats of the refuge.

- Photographic and viewing opportunities, in conjunction with interpretive and educational opportunities, promote public understanding of and increase public appreciation for America's natural resources and the role of the Refuge System in managing and protecting these resources.
- Viewing and photographic opportunities are tied to interpretive and educational messages related to stewardship and key resource issues.
- If provided, most facilities blend with the natural setting, station architectural style, and provide viewing and photographic opportunities for all visitors, including persons with disabilities.
- Design of observation facilities minimizes disturbance to wildlife while facilitating the visitor's views and photographic opportunities of the spectrum of species found on the refuge.
- Photographers and observers understand and follow procedures that encourage the highest standards of ethical behavior.
- Viewing and photographic opportunities exist for a broad spectrum of the public.
- Observers and photographers have minimal conflict with other priority wildlife-dependent recreational uses or refuge operations.

INTERPRETATION

Refuges will promote public awareness and advocacy of resources and management activities that conserve the region's natural, cultural, and historical resources through interpretive products. Service objectives for interpretive programs are to develop and maintain interpretive programs on refuges to:

1. increase public understanding and support for the Refuge System;
2. develop a sense of stewardship leading to actions and attitudes that reflect concern and respect for wildlife resources, cultural resources, and the environment;
3. provide an understanding of the management of our natural and cultural resources;
4. provide safe, enjoyable, accessible, meaningful, and quality experiences for visitors increasing their awareness, understanding, and appreciation of fish, wildlife, plants, and their habitats.

Well-designed interpretive services can be our most effective and inexpensive resource management tool. For many visitors, taking part in one or more interpretive activities is their primary contact with refuge staff, their chance to find out about refuge messages, and could be their first contact with the refuge, conservation, and wildlife. Through these contacts, the Service has the opportunity to

influence visitor's attitudes toward the Service and their behaviors when visiting units of the Refuge System. Interpretive planning and subsequent activities and products can:

1. help visitors understand the impacts of their actions, minimizing unintentional resource damage and wildlife disturbance;
2. communicate rules and regulations so they relate to visitors, solving or preventing potential management problems;
3. help us make management decisions and build public support by providing insight into management practices.

There are two broad categories of interpretive activities: self-guided and personal services. Self-guided interpretation includes brochures, exhibits, kiosks, audiovisual media (including computer programs), and self-guided trails. Personal services interpretation includes information desk duty, group presentations, guided talks and tours, and special events. Variety in interpretive experiences will appeal to a broad spectrum of interests and learning styles. Refuges should strive for:

- quality, self-guided services, since they reach a larger audience, are more readily available, and visitors can use them at their own pace;
- quality personal contact to initiate conversation and answer questions;
- a variety of interpretive experiences that appeal to varying visitor interests.

ENVIRONMENTAL EDUCATION

The refuge's goal for environmental education is to teach awareness, understanding, and appreciation of our trust resources and develop a sense of stewardship for natural and cultural resources and their management at the refuge, in the ecosystem and on other lands in the Refuge System.

To advance and support the National Wildlife Refuge System mission and goals, refuges will develop programs based on the following guidelines.

1. Connect people's lives to the health of the environment.
2. Advance science literacy through an interdisciplinary educational approach.
3. Strengthen the Refuge System through science learning.
4. Help participants experience the wonder of fish, wildlife, plants, and cultural and historical resources.
5. Stress the role and importance of refuges and emphasize the relationship between wildlife and associated ecosystems.

6. Be outcome-based, going beyond attending a program to resulting in something of value for both refuge resources and participants.
7. Pursue outreach and partnership opportunities enhancing programs on and off refuges and expanding our levels of educational expertise and staffing.
8. Include lesson plans and refuge activity guides that incorporate, complement, and focus on local school curricula allowing participants to use refuges as living laboratories.
9. Train educators, volunteers, and partners in resource issues in order to multiply Service efforts across a broader spectrum of students.
10. Establish, maintain, and promote environmental study sites and outdoor classrooms where they are compatible with refuge purpose(s), goals, and objectives.
11. Involve underserved populations like urban or rural schools, Native Americans, non-English-speaking populations, senior citizens, people with disabilities, and groups in the educational community other than K–12 such as colleges and universities.
12. Expand the Service’s capability through technology such as web pages and electronic field trips.
13. Use appropriate formats for visitors with disabilities (learning, visual, hearing).

Refuge environmental education programs will:

- provide appropriate materials, equipment, facilities, and study locations to support environmental education, where compatible;
- allow program participants to demonstrate learning through refuge-specific stewardship tasks as well as projects that they can carry over into their everyday lives;
- establish partnerships to support environmental education on refuges open to the public;
- incorporate local, state, and national educational standards in our programs with an emphasis on wildlife conservation;
- assist refuge staff and volunteers to attain the knowledge, skills, and abilities to support environmental education at a minimum level;
- teach awareness, understanding and appreciation of our trust resources;
- serve as a means by which refuge employees are seen as role models for environmental stewardship through a continually developing positive relationship with the community.

While reference materials provide good background to the refuge, the Refuge System and the Service, nothing is more effective in fostering appreciation

and understanding of the resource that hands-on experiences. The EPA recommends moving away from textbook-driven instruction by using “hands-on, learner-centered, and cooperative learning” approaches where students are actively engaged in the learning process (EPA 1999). Involving students in some simple monitoring projects would instill a sense of ownership and stewardship to the resources. This is a good way to advance science literacy through an interdisciplinary educational approach.

For refuges that have staffs of less than 5 full-time equivalent (FTE) employees and do not have any positions solely dedicated to public use activities, the Service recommends that field station environmental education programs, at a minimum, should include:

- creating or providing a lending library of materials and resources for teachers and other educators;
- designating a trained staff contact person for environmental education;
- designating a study site and providing stewardship opportunities;
- helping local educators identify refuge resources and develop programs;
- forming partnerships or recruiting and training volunteers including senior citizens and people with disabilities to conduct environmental education activities.

For refuges that have staffs of approximately 5–9 FTEs, do not have any positions solely dedicated to public use, and have a refuge manager position at the GS-11 to GS-12 level, the Service recommends field stations to:

- conduct and/or host teacher training workshops;
- provide educators with refuge-specific curriculum, activities, and lesson plans;
- develop accessible outdoor classrooms;
- establish formal partnerships with school districts and community groups to assist with development and implementation of refuge environmental education programming;
- recruit and train volunteers to assist in developing and presenting environmental education programming;
- conduct regular environmental education program evaluation;
- provide opportunities to contribute to refuge management goals through learning and stewardship activities;
- establish a lending library of educational materials including but not limited to book, trunk, and multimedia resources;

- conduct some on-site and occasional off-site environmental education programming;
- employ key staff who has acquired the skills to develop and conduct environmental education activities.

For refuges that have staffs of approximately 10–14 FTEs with 1 position solely dedicated to public use, and have a refuge manager at the GS-12 to GS-13 level. At the enhanced level, the Service encourages field stations to:

- develop a multidisciplinary environmental education program with integrated curricula meeting national and state educational standards;
- adapt the refuge's program to increase participant learning and connect environmental health with quality of life;
- develop multiple facilities or study sites, with materials and equipment, that support refuge goals and objectives;
- seek to hire professionally trained refuge environmental education staff;
- conduct refuge-specific workshops, special events, and symposia, including day camps, after-school and off-site programs, elder hostels, and extended learning opportunities;
- provide environmental education training and mentoring opportunities for educators, Service staff, and others;
- have an environmental education program that demonstrates student learning through measurable objectives;
- create an extensive environmental education outreach program for reaching participants outside the local area;
- allow the environmental education staff to continue to develop professionally by attending training;
- use technology to interface with off-site participants through the Internet, distance learning, and websites;
- establish partnerships beyond local communities.

Field stations will establish educational program priorities based on their objectives and mandates, as well as local, state, and national priorities. As part of refuge planning, the Service evaluates educational programs and offer differing levels of environmental education based in part on the number of staff with public use duties as well as other available resources. Other factors that determine the level of involvement include demand for educational programs, the number of schools near a refuge, and their willingness to participate.

WATER RIGHTS

The refuge is nestled near the headwaters of Pleasant Valley Creek, a tributary to the Fisher River, which is a tributary to the Columbia River. The earliest stock water and irrigation claims for the ranch date back to 1890 and 1899, respectively. The amended ranch irrigation claims describe 1,572 acres irrigated with 10,930 acre-feet per annum. The combined irrigation diversion rate at the western edge of the ranch is 20 cubic feet per second (cfs). This flow value does not include areas that are subirrigated by check structures with no flow rate claimed on the water right. The largest irrigation claim is on Dahl Lake. Historically, the lake was backed up, causing the small valley to flood and, after a short time, the water was released downstream in Pleasant Valley Creek. It is also important to note that the irrigated acreage figure does not include a number of the ranch's natural wetlands (see figure 8). Filing on naturally subirrigated pasture and wetlands was not required under the statute establishing the adjudication. For the last several years, the refuge staff has been monitoring streamflows and pond elevations to understand better the available water. However, it has been very dry during this period.

The Temporary Preliminary Decree for the Fisher River Basin (76C) was issued in 1985. Some of the water rights were not accurately described in the preliminary decree. When the MPC negotiated transfer of the property to the Service, a water rights specialist was retained to review and amend the ranch's water rights. The water rights were verified through field checks and interviews with a number of local water users. The validity of the water rights was documented, but a few errors were found. The clerical errors were corrected with DNRC, but the process of change for the larger issues is still before the water court.

WATER AVAILABILITY

Jerry Cundall managed the property from 1993 to 1999. He says that water availability has not been a problem since he has managed the ranch. His tenure does include at least one dry year, 1994. In addition, the claims filed by the Lost Trail Ranch received no objections from any other users during the adjudication of the basin that occurred in the 1980s, which is an indication that the ranch and general area experience few water conflicts.

The Service is starting a process to predict water availability. Outlined on the topographic maps are three basin drainage areas for the ranch (see figure 8). These three drainage areas are only a presumption of points that might be useful to predict runoff. These drainage areas will be used to predict stream runoff. The closest sites in this drainage that have had USGS continuous stream gauges are Fisher

River at Jennings and Libby. Their drainage sizes are 780 and 838 square miles respectively, or 14–15 times larger than Lost Trail Ranch's drainage area.

Therefore, these sites would be difficult to use to predict what occurs in a small, headwater drainage.

Summary of Water Rights on Lost Trail National Wildlife Refuge, Montana

Source Name	Rate or Storage*	Administrative No.	Appropriation Date
Dahl Lake	0.06 cfs	76CW109542	09/27/1890
Dahl Lake	8.75 cfs/2,911 af	76CW109536	09/27/1890
Dahl Lake	30 gpd/au	76DC109532	09/27/1890
Dahl Lake	3.7 cfs/1,832 af	76CW109540	11/21/1899
Dahl Lake	30 gpd/au	76CW109531	11/21/1899
Pleasant Valley Creek	3.1 cfs/1,031 af	76CW007495	06/29/1886
Pleasant Valley Creek	30 gpd/au	76CW109534	11/16/1901
Pleasant Valley Creek	1.3 cfs/432 af	76CW109537	11/16/1901
Pleasant Valley Creek	3.5 cfs/1,733 af	76CC109538	12/31/1910
Pleasant Valley Creek	321 af	76CB214633	06/30/1949
Pleasant Valley Creek	1,866 af	76CW109541	06/11/1954
Pleasant Valley Creek	220 af	76CG141573	08/31/1956
Pleasant Valley Creek	5 gpm	76CW109544	08/30/1961
Pleasant Valley Creek	585 af	76CW109539	08/30/1961
Pleasant Valley Creek	30 gpd/au	76CW109535	08/30/1961
Pleasant Valley Creek	0.06 cfs	76CW109543	08/30/1961
Pleasant Valley Creek	30 gpd/au	76CW109530	08/12/1964
Pleasant Valley Creek	—	76CP103961	03/03/1998
Well	7 gpm/9.5 af	76CC076531	12/17/1990
Well	12 gpm/4.22 af	76CC076900	01/15/1991

*af=acre-feet

au=animal unit

cfs=cubic feet per second

gpd=gallons per day

gpm=gallon per minute

SPECIES OF CONCERN

Background and biological information is described below for species of concern that may occur within the refuge.

GRIZZLY BEAR

Grizzly bears (*Ursus arctos horribilis*) are a part of America's rich wildlife heritage with an estimated 50,000 grizzly bears inhabiting the western United States prior to European settlement (USFWS 1993). Loss of habitat, livestock depredation control, commercial trapping, unregulated hunting, and protection of human life have eliminated the grizzly bear from all but approximately 2 percent of its historical range in the lower 48 states (USFWS 1993). Today, only 800–1,000 grizzly bears remain in a few fragmented populations in Montana, Idaho, Wyoming, and Washington. Approximately 75 percent of the population of grizzly bears in the lower 48 states occurs in Montana.

Where grizzly bears once roamed throughout the entire Rocky Mountain ecosystem, human settlement and development has fragmented habitat resulting in isolated island populations. Today, there are six distinct recovery areas (ecosystems) in the

conterminous United States. These are areas where grizzly bears were known to reside in 1975 and where adequate space and habitat remains to maintain viable self-sustaining populations. These recovery areas include the northern Cascades in Washington; the Selkirk, the CYE and NCDE in Montana; the Bitterroot in Idaho and Montana; and the Greater Yellowstone in Montana, Wyoming, and Idaho.

The grizzly bear was listed as a threatened species in the lower 48 states under the ESA in 1975 (Federal Register, V.40, No.14, Part IV-3173-4). The Service is mandated by Congress to conserve listed species and the ecosystems upon which they depend. The Revised Grizzly Bear Plan (USFWS 1993) identified actions necessary for the conservation and recovery of the species. Recovery criteria was developed for each recovery zone. The criteria were based on the number of females with cubs observed annually, distribution of family groups within the recovery zone, and a limit on human-caused mortality. The species will be delisted when the populations in all established recovery zones have obtained their goals.

Populations that are dramatically reduced in size and isolated from one another have an increased risk of extinction. Small populations are less able to

absorb losses caused by random environmental, genetic, and demographic changes (Serveen et al. 2001). Linkage zones are areas between separated populations that provide adequate habitat for low densities of individuals to exist and move between isolated populations. The resulting exchange of genetic material helps maintain demographic vigor and diversity, increasing the viability of individual populations. For the grizzly bear, preserving the linkage between populations is as critical to long-term conservation of the species as managing the individual populations.

For recovery and management purposes, all habitats within each of the recovery areas were classified into one of three management situations. Management situation I contains grizzly bear population centers and/or habitat that is needed for the survival and recovery of the species. The needs of grizzlies are given priority. Land uses that affect grizzly bears and their habitat must be compatible with the needs of the species. Management situation II lands are comprised of less suitable habitat where grizzly bears may occur but population centers do not exist. In these areas, the needs of the grizzly bear are weighed against other uses and they will be accommodated when feasible but may not be given the highest priority to the exclusion of other uses. Human–bear conflict minimization will be given high priority. Management situation III contains lands that are unsuitable for grizzly bears such as residential and high recreation areas. Grizzly use of these areas is rare and will be discouraged.

Grizzly Bear Biology

Grizzly bears are a long-lived species of up to 40 years and they exhibit one of the lowest reproductive rates among terrestrial mammals. The limited reproductive capacity prevents a rapid increase in the population. Females first age of breeding is between 3.5 and 8.5 years of age and averages 5.5 years. Breeding occurs on an average of every 3 years after the first litter with from one to four cubs produced. Average litter size is two. Age of first reproduction and litter size varies and may be related to nutritional state (Herrero 1978). Males sexually mature at age 4½. Mating appears to occur from late May through mid-July, peaking in mid-June.

Adult bears lead a solitary existence with social affiliations generally restricted to family groups of mother and offspring, siblings that may stay together for several years after being weaned, and an occasional alliance of subadults or several females and their offspring. Mating season is the only time that adult males and females tolerate one another. The home ranges of adult bears frequently overlap. Home ranges also appear to be smaller while cubs are present, but expand when the cubs are yearlings in order to meet increased foraging demands (Kemp 1972, Pearson 1975, Russell et al. 1978). Home range

sizes vary in relation to food availability, weather conditions, and interactions with other bears.

Humans are the only major cause of mortality to bears both directly and indirectly through habitat destruction. Bears will occasionally kill one another or be killed by other large predators such as wolves. Parasites and diseases are not a significant factor in limiting grizzly bear populations.

Grizzly bears are omnivores consuming both vegetation and animal matter. Vegetation tends to dominate the diet in all areas. However, animal matter (fish, mammals, and insects) can serve as an important supplement to the grizzly bear diet. When bears emerge from their dens in the spring, they tend to forage on immature green vegetation or animal matter. Bears select habitats of specific elevation, aspect, and moisture gradients to obtain these emergent foods. Plants that generally appear early in the growing season, such as grasses, sedges, horsetail, and clover tend to be important foods until more nutritious foods become available. Green vegetation has also been documented as important during late seasons. Selection of vegetation at this time coincides with the use of mesic habitats such as stream bottoms and receding snow-bed communities. Succulent vegetation in these mesic habitats has higher protein content than similar plant species in exposed areas.

The underground roots, corms, and bulbs of foods such as *Herdysarum* spp., *Claytonia* spp., *Erythronium* spp. (glacier lily), *Lomatium* spp. or *Perieridia* spp. (yampah) are also selected at a specific time or in a specific habitat when nutrient quality is high and fiber content is low. Equisetum is selected in all regions of North America and during all seasons. *Heraclium lanatum* (cow parsnip), *Trifolium* spp. and *Taraxacum* spp. are important in the NCDE early and midseason.

Fruit and berries are vital mid- and late-season as they provide bears with an abundant source of sugar prior to denning. During the period of fruit availability, bears must not only gain sufficient weight to survive denning, but must also store energy for the following spring. This is especially true for adult males that tend to forsake spring foraging opportunities to seek and mate with females (Sizemore 1980). In northwestern Montana *Vaccinium* spp. (huckleberry), and *Shepherdia* (buffalo berry) are important natural sources of berries. Overwintering berries of *Arctostaphylos* spp. (bearberry) are also consumed during the spring in some areas (Hamer et al. 1977, Hechtel 1985, Mace and Jonkel 1980) and may have higher sugar content than during the previous autumn (Hamer et al. 1977).

Because it is highly digestible and high in protein, meat is often preferred over vegetal foods. Local

concentrations of large ungulates constitute an important source of protein when available.

Rodents, primarily ground squirrels and microtines may be either a dietary supplement (Hamer et al. 1978, Stelmock 1981, Mace and Jonkel 1980) or may constitute a major protein source prior to denning (Nagy et al. 1983, Hechtel 1985). The restricted availability of animal protein may limit grizzly populations.

The search for food has a prime influence on movement. Upon emergence from the den, grizzly bears seek the lower elevation, drainage bottoms, avalanche chutes, and ungulate winter ranges where their food requirements can be met. Throughout late spring and early summer, they follow plant phenology back to higher elevations. In late summer and fall, there is a transition to fruits and nut sources, as well as herbaceous materials. This is a generalized pattern though and it should be kept in mind that bears are individuals trying to survive and will go where their food requirements are met.

Grizzly bears are occasionally sighted in the Pleasant Valley area. PCTC biologists report that a male grizzly bear resided in the Pleasant Valley–Lost Prairie area in 1994 and 1995. In the fall of 2001, a grizzly bear was observed at Island Lake and Coniff Creek approximately 2 miles from the refuge. The bear was frequently observed in an area being actively logged on PCTC land throughout the fall (Laurie Woods, PCTC Forest Unit Manager, personal communication). According to grizzly bear recovery biologists, the refuge could serve as a linkage area between the NCDE and the CYE.

Livestock grazing can have a significant impact on grizzly bears. In the NCDE, livestock depredation was the most common offense for which a bear was relocated (Thier and Sizemore 1981). Furthermore, these relocations were much less successful than relocations for other offenses (success being no return and no further conflict). Knight et al. (1985) reported that depredations (livestock and property) were the leading cause of nonhunting mortality in the NCDE from 1975 to 1984. Unreported grizzly bear mortality related to livestock operations may be a significant part of the overall mortality. Jorgensen (1979) reported that only 41 percent and 17 percent of known bear kills in 1976 and 1977, respectively, were ever reported.

Several studies have addressed the question of whether grizzly bears can coexist with livestock without depredation. Knight and Judd (1983) reported that all radio-tracked bears (except one orphaned cub) that came into contact with sheep killed them. However, Claar et al. (1999) found that only 2 out of 20 marked grizzly bears in the Mission Mountains (NCDE) were involved in sheep depredations although almost all were in proximity to livestock during spring and fall. Several

investigations observed that depredation behavior was apparently a learned process (Johnson and Griffel 1982, Jorgensen 1983, Knight and Judd 1983). Regional differences in depredation may be related to learned behavior and previous levels of control on depredating bears (Johnson and Griffel 1982).

Livestock can also affect grizzly bears through direct competition for early spring browse and by degradation of quality habitat by trampling and grazing. Livestock grazing can affect bears by displacing them off quality habitat as they avoid areas of human activity.

Recreational activities can directly or indirectly affect the survival of grizzly bears. Grizzly bears can be directly taken in the defense of human life and through mistaken identity during black bear hunting seasons. In the Swan Range in northwestern Montana, out of 19 known human-caused grizzly bear deaths, mistaken identity was the cause of 6 deaths and self defense was the cause 3 deaths. Indirectly, recreationists can displace bears off quality habitat onto less desirable habitat. This may result in reduced reproduction by displaced bears, higher mortality rates due to food stress or lower security, and smaller bear populations due to reduced carrying capacity of remaining habitat (Serveen et al. 2001).

Conversely, grizzlies may become habituated to humans. Habituation generally leads to mortality of the bear as these bears are more likely to come in conflict with humans, are more vulnerable to hunters and poachers, and have an increased chance of becoming involved in a collision with a motor vehicle (Claar et al. 1999). The greatest impact of roads on grizzly bears is an increase in human access into grizzly habitat. Bears react differently to roads depending on habituation and security cover. Roads bring people into contact with bears, may cause bears to avoid habitats, or may habituate bears to humans.

Habitat fragmentation is usually accompanied by habitat loss, increased disturbance and increased human–wildlife conflicts. The primary causes of fragmentation in grizzly habitat are human activities such as road building and residential, recreational, and commercial development.

The grizzly bear has an increased risk of extinction because the population consists of a limited number of individuals that live in several distinct populations geographically isolated from one another. Small populations are less able to absorb losses caused by random environmental, genetic, and demographic changes (Serveen et al. 2001).

Linkage zones are areas between separated populations that provide adequate habitat for low densities of individuals to exist and move between isolated populations. The resulting exchange of

genetic material helps maintain demographic vigor and diversity, increasing the viability of individual populations.

Gaining support and confidence of people who live in or near grizzly habitat is one of the greatest challenges to grizzly bear recovery. Efforts that address the attitudes and concerns of the local public serve to foster tolerance and positive attitudes toward grizzly bears in communities throughout grizzly bear habitat. These efforts include intensive education programs, proactive livestock and garbage management projects that reduce bear attractants on private land, and the maintenance of personal contact between citizens and state and federal wildlife biologists who live and work together in local communities and rural areas near grizzly habitat.

GRAY WOLF

Prior to European settlement, the gray wolf existed across most of North America. Early settlers perceived the gray wolf as a threat to human life and property, especially livestock. Wolves also competed for deer and elk upon which many early settlers were dependant for food. By the 1930s, poisoning, trapping and shooting, spurred in part by government bounties, extirpated the gray wolf from 95 percent of its range in the conterminous United States. Gray wolf populations were eliminated from Montana, Idaho, and Wyoming, as well as adjacent southwestern Canada.

After human-caused mortality of wolves in southwestern Canada began to be regulated in the 1960s, the population began expanding southward (Carbyn 1983). Dispersing individuals occasionally reached the northern Rocky Mountains of the United States (Ream and Mattson 1982, Nowak 1983), but were not protected and soon disappeared. The ESA of 1973 provided the needed protection and recolonization became possible.

In 1986, wolves which had migrated from Canada successfully raised a litter of pups in Glacier National Park, Montana, and a small population was soon established (Ream et al. 1991). The third pack of wolves to naturally recolonize into Montana from Canada formed in Pleasant Valley in 1988. The wolves denned on private land within ¼ mile of what is now the refuge. In 1989, there were three adults and three pups in the pack. Unfortunately, they started to prey on livestock and were controlled both lethally and through relocation.

A second pack formed in 1996 in Pleasant Valley and had pups again in 1997 and 1998. Once again, they started to prey on livestock and were removed in 1999. All control actions were either carried out prior to the establishment of the refuge or conducted off the refuge after establishment. After the removal of the Pleasant Valley Pack in 1999, the “Little Wolf

Pack” moved down from the north and began killing cattle in the Pleasant Valley area. Four wolves from the “Little Wolf Pack” were killed in two control actions in 2000.

In 1998, the Lost Trail Ranch was purchased by the MPC and eventually became Lost Trail National Wildlife Refuge. At the same time, the NRCS, working with neighboring landowners, purchased WRP easements on 5,765 acres of former grazing lands. The formation of the refuge and the purchase of these WRP easements will greatly reduce the number of cattle being grazed in this area and should decrease wolf–livestock conflicts.

Much controversy has surrounded wolf recovery in Montana and throughout the northern Rockies. Although wolves primarily feed on deer and elk, they will occasionally prey on livestock. Once a wolf has identified livestock as a source of food, it may continue to prey on livestock and teach other wolves in the pack to do the same. A private program compensates ranchers fair-market-value for confirmed losses and about one-half fair market value for probable wolf kills of livestock and livestock guard animals. However, livestock carcasses are often eaten or decomposed when located, making it difficult to confirm wolf depredation. On open range, carcasses may never be found, resulting in actual losses much higher than what can be confirmed.

Sometimes livestock producers who have confirmed livestock losses caused by wolves may also discover some other livestock missing after the fall roundup. This leads ranchers to infer that wolves were responsible for the missing livestock even if there are no signs of depredation. This perceived human–wildlife conflict creates a climate of mistrust for the Service’s mandate to protect and recover wolves.

The Service strives to maintain good relations with adjacent landowners, including coordination efforts and addressing the concerns of private property owners. These efforts are geared towards the recovery and conservation of this listed species as required by the ESA. The refuge is part of the historical range of the gray wolf and is geographically situated between areas designated for recovery. Thus, this refuge is in a position to contribute to the overall recovery and maintenance of this species by acting as a corridor or as a possible site for wolf recolonization.

On April 1, 2003, the Service issued “take” regulations under section 4d of the ESA detailing the context and designated personnel that may take gray wolves. These regulations replaced those found in the 1999 control plan. Some of the reasons why a gray wolf may be lethally taken include scientific research, protecting human safety, and proven depredation of domestic cattle. In this last case, before any wolf control action is initiated, an

investigation must be conducted to confirm that a depredation has occurred and that wolves were indeed responsible for the depredation.

Wolves may not necessarily be determined problem wolves if depredations occur on livestock that are lawfully present on federal lands or in areas or at times, which are critically important to wolves. Under such conditions, control of wolves will occur only if all other options for resolution of the conflict have been exhausted. This criterion applies only to the refuge and other federal lands in northwestern Montana. Areas or habitat components important to wolves include areas within 1 mile of known or highly suspected wolf dens or rendezvous sites from March 15 to July 1, ungulate calving/fawning areas from May 1 to July 1, and ungulate winter ranges from December 1 to April 15 (USFWS 1999c). Refuge personnel would apply these conservation measures.

Most of the controversy surrounding wolf conservation revolves around wolves that feed on domestic cattle and sheep. It is the Service's intention to manage wolves in northwestern Montana in a way that allows nondepredating wolves to be the "building blocks" of the population. Nondepredating wolves should cause little or no conflict with humans. It is these animals that the Service intends to build its recovery program around. Animals that habitually depredate on livestock are not desirable for use in establishing or bolstering wolf populations. Therefore, wolves that are chronic problem wolves and direct their hunting behavior toward livestock will be removed from the population. While already recovered in this area, the recovery plan indicates that, if necessary, the state of Montana and the Service may use lethal control methods to stop depredations. No control efforts will be conducted on the refuge; however, problem wolves may den on the refuge or seek refuge there and be taken when on private land.

The recovery plan for the wolf in the northern Rockies of the United States (USFWS 1987) identified northwestern Montana, central Idaho, and the Greater Yellowstone Area (GYA) as recovery areas. The biological goal for delisting is greater than or equal to 10 breeding pairs of wolves in each of these three areas for 3 consecutive years.

Monitoring data indicates that this goal was attained in 2000 with 30 breeding pairs of wolves successfully raising two or more young to December 2000. Preliminary data indicates that at least 30 breeding pairs were also successful in 2001. Thus, if 30 breeding pairs are again documented in December 2002, the Service could propose to delist wolves from the ESA. Wolves cannot be removed from federal protection until the states in which they reside develop approved conservation and management plans. The state of Montana drafted a conservation and management plan in January of 2002. This

document has been submitted for review and can be obtained from MFWP.

Gray Wolf Biology

Wolves are social animals, normally living in packs of 2–10 members. Packs are primarily family groups consisting of a breeding pair, their pups from the current year, offspring from the previous year, and occasionally an unrelated wolf.

Packs occupy and defend from other packs and individual wolves a territory of 20–210 square miles. In the northern Rocky Mountains, territories tend to be larger, typically 200–400 square miles. Normally only the top-ranking male and female in each pack breed and produce pups.

Litters are born from early April into May and can consist of 1–11 pups, but generally consist of 4–6 pups. In late April until September, pups are moved to rendezvous sites where they remain while the adults hunt and return with food. Rendezvous sites are located in meadows or forest openings generally near the den, but they can be several miles away. Pups travel and hunt with the pack by September. Yearling wolves frequently disperse from their natal packs. Dispersers may become nomadic and cover large areas as lone animals, or they may locate suitable unoccupied habitat and a member of the opposite sex and begin their own territorial pack.

When the wolf recovery plan was written, it was believed that wolves would occupy higher elevation public lands far from the presence of humans (Fritts et al. in press). However, wolves demonstrated a much greater tolerance of human activity than anticipated. While some packs have established territories in protected areas such as national parks and wilderness, most prefer lower elevations where prey is more abundant (Boyd-Heger 1997).

Several studies on wolf and their prey have been initiated since the wolf recovery plan has been in place. Wolves in the GYA are preying primarily on elk (90 percent of all wolf kills) (Smith et al. 2000), and kill rates are slightly higher (12–15 ungulates/wolf/year) than predicted (12 ungulates/wolf/year) in the EIS. In the Gros Ventre River drainage in Wyoming, of 51 located kills, 48 were elk, 2 were coyotes, and 1 was a beaver. In a study west of Salmon, Idaho, elk was again the preferred prey with a kill on average every 3.45–4.98 days.

Researchers believe these kill rates may be underestimated due to loss of contact with the pack for various lengths of time. Studies in the River of No Return Wilderness in central Idaho also indicated elk as the primary prey followed by mule deer (Mack and Laudon 1998). In the north fork of the Flathead River drainage, white-tailed deer comprised 87 percent of the wolf kills examined from 1992 to 1995 (Kunkel et al. 1999). Researchers concluded that ungulate species compose different

proportions of wolf diets, depending on the relative abundance and distribution of available prey within the territory. Wolves will also prey on smaller species such as rabbits and ground squirrels, as well as on carrion, vegetation, and insects. Wolves may also kill and feed on domestic livestock such as cattle, horses, and sheep.

There are no wild animals that habitually prey on gray wolves. Occasionally wolves will be killed by large prey such as deer or moose or by a competing predator such as a mountain lion. Other wolves are the largest cause of natural predation among wolves. Other causes of natural mortality include old age, disease, starvation or accidents. In northwestern Montana, natural mortality probably does not regulate populations (USFWS 2001).

Humans are the largest cause of wolf mortality and the only cause that can significantly affect populations at recovery levels (USFWS 2001). Human-caused mortality consists of authorized control actions, legal killing in defense of life or property, illegal killing and car/train collisions. Control actions accounted for most human-caused mortalities in Montana.

In the studies of wolves in Montana, Idaho, and Wyoming to date, disease and parasites have not appeared to be a significant factor affecting wolf population dynamics. Just like wolves in all other parts of North America, wolves in the northern Rocky Mountains will occasionally die from a wide variety of canid diseases. However, it is doubtful that wolf populations in the northern Rocky Mountains would be significantly impacted, because wolf exposure to these diseases has been occurring for decades.

A demonstration of the importance of an abundant natural prey base to wolf survival can be found in the examination of wolf–prey relationships in northwestern Montana. White-tailed deer populations started to increase in the 1970s and remained high until the winter of 1996–97. Wolf numbers and distribution also expanded during this period. Record hunter harvest in the fall of 1996 followed by one of the most severe winters on record significantly decreased ungulate populations. This was followed by a corresponding increase in wolf depredation on livestock and subsequent wolf control. Conflicts between wolves and livestock during 1997 represented nearly 50 percent of all confirmed livestock depredations and lethal wolf control in northwestern Montana since 1987 (Bangs et al. 1998).

Evaluation of wolf management in the northern Rocky Mountains has shown that successful wolf recovery does not depend upon land use restrictions on private land due to the wolves' ability to thrive in a variety of land uses. There is little, if any, need for land use restrictions to protect wolves in most

situations, with the possible exception of temporary restrictions around active den sites on federal lands. Additionally, the public is much more tolerant of wolf recolonization if the presence of wolves does not result in restrictive government regulations.

There are nonlethal management techniques to discourage wolves from preying on livestock (e.g., electronic training collars). However, none of the techniques tested to date has proven 100 percent effective and none of the existing techniques has worked for extended periods.

Hunting success and regulations for large ungulates are directly related to prey populations. One of the greatest concerns the public had with wolf reintroduction was the effect that wolves would have on deer, elk and moose populations (USFWS 2001). Thus, human attitudes and tolerance, which vary widely across different stakeholders, is probably the most important factor to long-term gray wolf survival and conservation (Sime 2002).

CANADA LYNX

The Canada lynx (*Lynx canadensis*) was listed as a threatened species in the contiguous United States under the ESA in 2000. According to the Service, the factor threatening the lynx in the contiguous United States is the lack of guidance to conserve lynx and its habitat in federal land management plans.

Lynx inhabit marginally suitable habitat in the contiguous United States that decreases in quality and availability the further south the habitat occurs. Historical reports from western Montana indicate that lynx were numerous in recent times. MFWP records indicate trappers statewide took 990 lynx from 1959 to 1967 (Hoffman et al. 1969). Since 1977, Montana's largest lynx harvest was 62 lynx trapped in 1979 and again in 1984 (McKelvey et al. 1999, Giddings 1995). Quotas were established in 1982 and lynx trapping was closed in Montana in 1999. Lynx are most common in the northwestern areas of the state.

Canada Lynx Biology

Snowshoe hare are the primary food of lynx comprising from 35 to 97 percent of their diet throughout the year (McCord and Cardoza 1984). Lynx also feed on mice, squirrels, grouse and ptarmigan, especially during the summer months (McCord and Cardoza 1984). There have been several observations of lynx hunting Columbian ground squirrels including a report by Barash (1971) of two adult and one juvenile lynx cooperatively hunting ground squirrels in Glacier National Park.

Lynx habitat is composed of Englemann spruce (*P. englemannii*), subalpine fir (*Abies lasiocarpa*), lodgepole pine (*Pinus contorta*) and aspen forests (*Populus tremuloides*) above 1,400 meters. In the

western mountains, the management of habitat for snowshoe hares is an important component of lynx conservation efforts due to the relatively low hare densities in boreal forest habitats of western mountains, and because of the importance of hare availability for successful lynx reproduction.

Snowshoe hare habitat consists of coniferous forests with dense understory (Berrie 1973, Koehler 1990, Ruggiero et al. 1999). These conditions are usually found in early successional stands with high stem densities. For denning, lynx require mature forests that contain large woody debris such as fallen trees or upturned stumps. Thus, high quality lynx habitat in the western mountains consists of a mosaic of early successional habitats with high hare densities, and late-successional stands with downed woody debris for thermal and security cover for denning.

The refuge contains only marginally suitable Canada lynx habitat. Northwestern Montana is at the southern range of the lynx and thus lynx only exists at the highest elevations. Lynx in Montana are generally found in forest communities between 1,200 and 2,100 meters. Douglas-fir, western larch, and lodgepole pine dominate on lower elevations with subalpine fir, whitebark pine, and Engelmann spruce at higher elevations. Maximum elevation on the refuge is 1,280 meters and only 4,121 acres of forest habitat exists. Further, open grasslands across the valley floor are a barrier to lynx movement across the refuge. Snowshoe hare populations are unknown for the refuge, but hares have frequently been observed in forested areas of the refuge and surrounding PCTC lands.

Canada lynx are specialized predators adapted to northern latitude and high elevation habitats with abundant winter snows. Conclusions from the "Ecology and conservation of lynx in the United States" (Ruggiero et al. 1999), are that a snowshoe hare density greater than 0.5 hares/hectare is required for lynx.

BALD EAGLE

Historically, bald eagles were present across North America from Alaska and Canada south to northern Mexico. Persecution of bald eagles and golden eagles in livestock producing areas of the west prompted passage of the Bald Eagle Protection Act of 1940 (16 U.S.C. 668). Further protection was afforded in 1972 with inclusion of raptors under the Migratory Bird Treaty Act (16 U.S.C. 703, 1918). The effects of the pesticide DDT decimated populations during the 1960s and, by the early 1970s, bald eagle breeding range was limited to remote forested areas. DDT was banned in 1973 and bald eagle populations started to recover. Because of severe population declines induced by pesticide residues, the northern subspecies of the bald eagle was afforded protection under the ESA in 1978.

The bald eagle was classified as endangered in Montana in 1978. The ESA of 1973 mandated the formation of regional recovery teams charged with preparation of plans that outline specific conservation and management actions to achieve and maintain recovery of endangered species in specific recovery areas. Montana includes seven recovery zones (in the Pacific States recovery area) (MBEWG 1994b).

Surveys indicate that the population of nesting bald eagles in Montana is increasing. From 1978 to 1995, the number of breeding pairs increased from 12 to 166, surpassing the recovery goal of 99 breeding pairs cited in the 1986 Bald Eagle Recovery Plan. As of July 1994, Montana contained the seventh largest breeding bald eagle population and largest concentration of autumn migrants in the lower 48 conterminous states. On July 12, 1995, the bald eagle was reclassified from endangered to threatened in Montana (MFWP 2002).

The management goal for Montana is to facilitate population growth until the number of viable bald eagle breeding areas peaks. Thereafter, the goal is to provide secure habitat for bald eagles to maintain a viable, healthy, self-sustaining population as close to peak level as possible in perpetuity (MBEWG 1994b).

Within the context of the management goal, the habitat objective is to provide sufficient habitat to maintain peak numbers of viable bald eagle breeding areas in Montana. The population objective is to maintain at least 68 percent of the peak number of viable breeding areas as active (MBEWG 1994b).

Bald Eagle Biology

Bald eagles are associated with aquatic environments although they may forage in uplands. Bald eagles are opportunistic with prey consisting of fish, ground squirrels, waterfowl, carrion, and rabbits (Snow 1973, Todd et al. 1982, Stalmaster 1987, Watson et al. 1991, Mersmann et al. 1992).

In Montana, bald eagles typically nest within one mile of the shore of lakes larger than 80 acres or major rivers. Nest sites are generally in older trees of large diameter in stands greater than three acres (MBEWG 1994b).

Bald eagles can be sensitive to human disturbances such as recreation, research, and development. Response varies from temporary avoidance of an area to total reproductive failure and abandonment of the breeding site. Bald eagles can also tolerate what appear to be significant disturbances. Relationships of human activity and eagle responses are highly complex, difficult to quantify, and often site specific. Responses vary depending on type, intensity, duration, timing, predictability, and location of the human activity. Some bald eagles are more tolerant of human activity than others are.

Tolerance threshold is usually site, pair, and activity specific and a function of type, intensity, and proximity of disturbance over time (MBEWG 1994b).

A pair of bald eagles has nested in an aspen stand on the north shore of Dahl Lake since 1995. This pair has fledged average of two young per year. The eagle nest was blown out of the tree in a severe windstorm during the summer of 2000. Two adult eagles constructed a nest in the same vicinity in 2001 but no young were produced.

Bald eagles are highly sensitive to disturbance from the nest building stage until hatching. After hatching, eagles are less sensitive to disturbance and are less likely to abandon or neglect young.

The management goal for Montana is to facilitate population growth until the number of breeding pairs peaks. After that, the management goal is to provide secure habitat to maintain a healthy self-sustaining population as close to peak levels as possible (MBEWG 1994b).

TRUMPETER SWAN

The trumpeter swan is considered a threatened species and of special concern by MPIF (Casey 2000). Although this species was petitioned to be listed under the ESA, the Service determined the petition did not contain substantial information.

Trumpeter swans were once common in the United States but were decimated by commercial harvest for feathers and skins and by loss of habitat. A small population of swans managed to survive in the tri-state area of Montana, Wyoming, and Idaho due to the areas remoteness and geothermal activity that kept water open over the winter months. In 1935 only 69 trumpeter swans were known to exist; however, it was later discovered that unrecorded flocks also inhabited parts of Alaska and Canada. Although populations have increased, the trumpeter swan is still at risk from continued loss of wintering habitat, over population and concentration of swans on remaining wintering areas, and lack of migration in several wild and restored flocks (Mitchell 1994).

A priority of the Service's Trumpeter Swan Working Group is to restore nesting trumpeter swans to unoccupied historic breeding habitat and encourage broader winter distribution. Winter habitat seems to be the limiting factor for the United States portion of the Rocky Mountain population (RMP). A congregation of approximately 30 percent of the population in a small area at Harriman State Park and large congregations at Red Rock Lakes National Wildlife Refuge and other wintering areas within the tri-state area leave the trumpeters vulnerable to disease. (Federal Register/Vol. 55, No. 81/Thursday, April 26, 1990/Proposed Rules).

The Service recognizes the need to continue to expand winter range of the RMP trumpeter swans.

It also indicated there was a need to maintain viable segments, or subpopulations, of the RMP in order to expand the species to where it is sufficiently widespread that a catastrophic event in any one part of the population's range will not threaten the existence of the population. With new breeding areas occupied, new migratory paths may be established. The "pioneering spirit" results in young traveling to and from specific breeding and wintering areas with their parents, which may foster a wintering migratory path different from into the tri-state management area, where there have been problems with lack of adequate wintering habitat.

Trumpeter Swan Biology

Trumpeter swan habitat needs are not well defined, but suggest shallow interconnected wetland complexes, irregular shorelines, and water depths of less than 1.2 meters with dense stands of emergent vegetation. Swans need muskrat mounds, abandoned beaver lodges, or sedge hummocks for nest sites. (Casey 2000)

Preferred forage species listed under the Targee National Forest Plan (1997) include sego pondweed (*Potamogeton rectinatis*) and waterweed (*Elodea canadensis*). However, trumpeters readily adapt to new food sources and virtually all available species are consumed. In Yellowstone, dominant food consisted of *Chara* spp., *Elodea canadensis*, and *Potamogeton* spp. (Squires and Anderson 1997). Cygnets feed mainly on aquatic insects and invertebrates from 2 to 5 weeks of age (Mitchell 1994). This protein rich food source is important to the cygnets' rapid growth.

The Wisconsin Department of Natural Resources developed a habitat suitability index for trumpeter swans during restoration efforts in the state. Criteria developed for trumpeter swan restoration to an area included: abundant and diverse submergent and emergent aquatic plant food (especially *Elodea*, *Sagittaria*, *Najas*, *Nitella*, *Potamogeton*, *Zizania*, *Sparganium*); presence of shrubby or emergent plants suitable for escape cover; loafing sites; absence of utility lines along potential flight paths; minimal waterfowl-hunting history during years when lead shot was legal; and limited access and minimal uncontrolled human use. Breeding habitat required suitable nesting substrate, especially rich submergent and emergent food supply, and more escape cover, more isolation from human contact, and more protected shallow water and shoreline feeding areas (for broods) than nonbreeding sites, which could include more open water.

The only trumpeter swans that have been recently documented in the Pleasant Valley area are two swans that attempted to nest at Island Lake. They were observed throughout the summer by a neighboring landowner.

Trumpeter swans are long-lived, social birds that are highly dependant upon strong family bonds and traditional patterns of habitat use that are passed down through generations (USFWS 1995a). Severe losses could occur from disease outbreaks, severe winter weather, and lack of forage. In 1989, more than 100 swans died in the tri-state area when a blizzard swept through a major wintering area. Since then winters have been mild, but the possibility of another hard winter always exists.

As the swan population increases, the limited resources in the area are taxed and may not recover to provide forage for the next year. It is important to the survival of the RMP to relearn and rebuild migratory patterns that were lost when swans were exterminated from much of their range. The ultimate goal is to reacquaint trumpeter swans with wintering grounds, breeding areas, and migratory routes that were lost when the population neared extinction in the early 1900s. This will be accomplished through natural pioneering and through transplant of swans to suitable habitat.

Nesting trumpeter swans have been shown to be sensitive to human disturbance during the nesting season. Birdwatching, photography, research, and other activities in or near nesting areas may cause nest failure or cygnet loss by disturbing adults (Mitchell 1994). In Yellowstone National Park, human intrusion was the most significant known cause of egg failure in trumpeter nests (Banko 1960).

Important requirements for successful breeding of trumpeter swans includes: room for take off (approximately 100 meters); accessible forage; shallow, stable levels of unpolluted, fresh water; emergent vegetation, muskrat island, or other structure for nest site; low human disturbance, highly irregular shorelines; water depth of less than 1.2 meters; abundant and diverse communities of aquatic plants; and abundant invertebrate populations (Mitchell 1994, Hansen et al. 1971, Maj 1983, Squires 1991, Lockman et al. 1987).

BLACK TERN

Black terns are listed as a Service nongame bird of management concern (USFWS 1995b). They were listed as a candidate 2 species for review under the ESA, however they were removed from ESA consideration when the category 2 list was discontinued. Statewide they are listed as a species of special concern with a ranking of vulnerable under the Natural Heritage Program classification system (Shuford 1999). Black tern populations have been declining since the 1960s across North America. Declines are thought to be related to a loss of wetlands, and a decrease in food supply caused by insect control and over fishing in the winter range (Dunn and Agro 1995).

Dahl Lake was surveyed for black tern by MFWP in 1999. Approximately 50–60 adults were observed. Nesting was confirmed by the presence of juveniles. Nests were located in Alkali bulrush (Ryan Rauscher, MFWP, personal communication).

Black Tern Biology

Black terns nest in biologically rich shallow freshwater marshes with abundant emergent vegetation. They prefer marshes or marsh complexes comprised of semipermanent ponds greater than 20 hectares in size. Ponds can be located in open or forested country up to 1,540 meters in elevation (Dunn and Agro 1995, Shuford 1999). Black terns feed on insects and fresh water fishes.

Black terns arrive on the breeding grounds mid- to late May initiating nesting in late May or early June. Most hatching is completed by late June or early July, with fledging occurring mid- to late July. Black terns leave the breeding grounds for foraging sites by early August.

Black terns are semicolonial nesters. Generally, nests are located in still water from 25 to 134 centimeters deep in marshes with from 25 to 75 percent emergent vegetation (Gould 1974, Stern 1987, Shuford 1999). Nest site selection is correlated more to the density of emergent vegetation than to the type of plant or water depth. Vegetation is not usually so dense as to prevent a canoe from being forced through it (Dunn and Agro 1995).

Nests are built on floating substrate comprised of matted dead marsh vegetation, detached root masses, boards, or muskrat-built feeding platforms of fresh-cut vegetation. Occasionally nests are located on nonfloating material such as muskrat lodges, small mud patches of rooted but flattened vegetation, or abandoned nests of other marsh birds. (Dunn and Agro 1995). Nests are often flimsy, and are easily destroyed by wind or changing water levels. If the nest is destroyed, renesting may occur at the same site or at another site up to 42 kilometers away.

Predominant emergent vegetation is usually cattails (*Typha* spp.), bulrush (*Scirpus* spp.), or less often burreed (*Sparganium* spp). Nests have also been located in sedge (*Carex* spp.), reed canarygrass (*Phalaris arundinacea*), marsh horsetail (*Equisetum fluviatile*), rushes (*Juncus* spp.) hairgrass (*Deschampsia* spp.), and spatterdock (*Nuphar* spp.). Emergent vegetation is <0.25–0.5 meter high when the nests are initiated and often grows to 1 meter before hatching occurs. Snags and posts are used for copulation, resting, and feeding fledglings (Dunn and Agro 1995).

Black terns nest in shallow, freshwater wetlands in emergent vegetation. They prefer wetland complexes greater than 20 hectares, in areas with

25–75 percent surface covered with emergent vegetation, water depths between 0.5 and 1.2 meters, and nesting substrate within 0.52 meters of open water (Dunn and Agro 1995). Nests are often lost to bad weather, effects of winds and waves and changing water levels. Known predators include great horned owl, mink, northern harrier, ring-billed gull, American crow, common raven, raccoon, muskrat, long-tailed weasel, otter, and snapping turtle (Gerson 1988, Novak 1992, Dunn and Agro 1995). Nest success will be monitored to document production.

Degradation of lake habitat may occur by succession, raising or lowering water levels, introducing exotic species, and reductions in water quality (Novak 1992). Nest platforms can be flooded out by rising water levels. Low water levels may increase likelihood of nest predation by mammals. Black terns may shift breeding sites from year to year in response to changes in hydrologic cycles and emergent vegetation (Shuford 1999). In most cases, WPA managers can provide suitable nesting habitat for black terns without any major changes to their water management (Casey 2000).

SPALDING'S CATCHFLY

Spalding's catchfly (*Silene spaldingii*) is a long-lived perennial herb that reproduces by seed only. It is a natural component of native Palouse prairie from 1,750 to 5,100 feet in elevation. Palouse prairie has been reduced by 98 percent of its historic levels due to conversion to crop, hay and pasture land, and urbanization.

Today, there are only 53 known populations of Spalding's catchfly located in remnant Palouse prairie habitat in Washington, Idaho, Oregon, and Montana. Nine of these populations are located in western Montana (Flathead, Lincoln, Sanders, and Lake counties). Threats to these remaining populations include continued habitat destruction and fragmentation, grazing and trampling by domestic livestock and native herbivores, herbicide treatment, competition from nonnative plants, altered fire regimes, and competition for pollinators.

Grazing affects Spalding's catchfly directly through trampling and consumption of seed heads and indirectly by altering species composition of available habitat. Soil disturbance associated with grazing gives biennial plants and nonnatives that are adapted to disturbance a competitive advantage over Spalding's catchfly (Benner 1995). If grazing is heavy enough, Spalding's catchfly will likely disappear from an area. Grazing of inflorescence by livestock and native herbivores has been observed and is considered a significant threat to the species (Federal Register/Vol. 66 No. 196. 50 CFR 17 RIN 1018AF79 10/02). Grazing by rodents has also been found to be significant factor influencing the survival of Spalding's catchfly. In eastern Washington, plants

that were marked as part of a monitoring project were found broken or missing when examined at a latter date. Damage was attributed to rodents (Benner 1999).

Spalding's catchfly is predominantly found at sites free of nonnative plant species. Nonnative invasive plant species such as St. John's-wort (*Hypericum perforatum*), Yellow starthistle, Canada Thistle (*Cirsium arvense*), sulfur cinquefoil (*Potentilla recta*), and cheatgrass (*Bromus tectorum*) outcompete Spalding's catchfly for water, nutrients, light, and pollinators. At one site in Montana, the number of plants decreased from 30 in 1983 to only 11 in 1990 after an invasion of spotted knapweed. The survival of Spalding's catchfly is further threatened by efforts to control nonnative invasive plant species. Chemicals used to control most invasive plants will also kill catchfly plants.

Spalding's catchfly requires a pollinator such as the bumblebee (*Bombus fervidus*) to reproduce successfully. When other flowers such as St. John's-wort are abundant in a habitat where catchfly is also present completion for the limited number or pollinators may adversely affect the fecundity of the plant. Conversely, in areas where Palouse prairie has been converted to agricultural production, pollinators such as the bumblebee may not be present because of the scarcity of flowering plants in the area. The presence of pollinators is considered critical for the persistence of Spalding's catchfly (Federal Register/Vol. 66 No. 196. 50 CFR 17 RIN 1018AF79 10/02). Populations of Spalding's catchfly that occupy small areas surrounded by cropland that does not support bumblebees are not likely to persist over the long term (Federal Register/Vol. 66 No. 196. 50 CFR 17 RIN 1018AF79 10/02).

Spalding's catchfly populations have also been influenced by traditional fire suppression philosophies that have promoted an increase in woody vegetation and the build up of litter and duff. Competition from woody plants often reduces the recruitment of native prairie species (Menges 1995).

Spalding's catchfly is found in mesic sites that are neither extremely wet nor extremely dry. Flowers are produced from mid- to late July which is after most other forbs in these habitats are finished flowering.

Threats to Spalding's catchfly that may occur on the refuge include, grazing and trampling by domestic livestock and native herbivores, herbicide treatment, competition from nonnative plants, and competition for pollinators. Prescribed fire may have a positive effect on Spalding's catchfly by removing litter or duff layers and woody plants, improving natural propagation of the plant. Recruitment of Spalding's catchfly was enhanced following prescribed fire in Montana (Lesica 1992, 1999). The effects of fire will vary depending on fuel moisture, species

composition, season, and intensity of burning (Lesica 1997). Prescribed fire may also increase invasive nonnative plant populations, which may negatively affect Spalding's catchfly. Therefore, prescribed fire may enhance catchfly survival and recruitment but must be thoroughly evaluated prior to use.

Invasive plants displace the plant and compete with it for water, nutrients, light, and pollinators (Lesica and Heidel 1996 in Delphey and Rey-Zizgirdas 2001; Montana Natural Heritage Program 1998). Many locations of catchfly on the refuge are at risk of being displaced by nearby populations of invasive plants, especially spotted knapweed and sulfur cinquefoil. Herbicide use to control nonnative plants may also harm Spalding's catchfly. An integrated pest management program should be evaluated including hand pulling, hand spraying, and biological control to reduce encroaching invasive plants while not harming the catchfly.

Management tools such as prescribed fire and federal control will benefit the catchfly as long as careful attention is given to their implementation. Management tools such as grazing, prescribed fire, and spraying may adversely affect Spalding's catchfly populations, even though they could also be critical to its continued existence. A burning program at the wrong time of year or in an area subject to more invasive plant encroachment could create a disadvantage for the catchfly.

Invasive plant control alone is important due to invasive plants displacing and in competition with the catchfly (Lesica and Heidel 1996, Montana Natural Heritage Program 1998). However, herbicide application has to be carefully applied at the right time of year and not in the location of plants to not damage the catchfly. Federal law

prohibits modification of critical habitat, and any act that may jeopardize the continued existence of a listed species.

Prior to implementation of any management actions that may affect Spalding's catchfly, a survey must be conducted to determine if this species is in the management area. If the species is located, refuge staff will evaluate the affect that implementing the management action would have on the plant and develop the best management practice.

CULTURAL RESOURCES

According to the National Historical Preservation Act, the historical and cultural foundation of the Nation should be preserved as a living part of community life and development to give a sense of orientation to the American people.

The Archaeological Resources Protection Act requires the land-managing agencies to establish public awareness programs regarding the value of archaeological resources to the Nation; however, cultural sites are sensitive, and allowing uncontrolled access by the public to them is unacceptable. These resources are increasingly endangered because of their commercial attractiveness and education is a way to encourage compliance with rules and regulations and increase protection.

In accordance with Executive Order No. 13006, issued May 21, 1996 (61 Fed. Reg. 26071), federal agencies shall, prior to acquiring, constructing, or leasing buildings for purposes of carrying out agency responsibilities, use historic properties available.

Appendix B—Draft Compatibility Determinations

The below information and rationale was used to determine the type and level of public use that would be compatible with the purposes of the Lost Trail National Wildlife Refuge.

PUBLIC USE

Detailed descriptions of the public use activities that would be allowed on the refuge (below) are stated in alternative A of the environmental assessment for the CCP for Lost Trail National Wildlife Refuge.

- Wildlife observation and photography throughout refuge including use of scenic drive, wildlife-viewing areas, and nature trails.
- Recreational hunting of deer, elk, mountain grouse, and turkey in accordance with state of Montana regulations.
- One recreational fishing event per year for youth, in accordance with state of Montana regulations.
- Wildlife-dependent environmental education and interpretation activities with on-site field trips, day use area, and accessible campground for overnight use by educational groups.

REFUGE ESTABLISHMENT

Lost Trail National Wildlife Refuge was established in August 1999. The purposes of the refuge are described in the following establishment and acquisition authorities:

- Migratory Bird Conservation Act (16 U.S.C. 715-751r)
...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.
- Fish and Wildlife Conservation Act [16 U.S.C. 661(1)-662(c)]
...for the conservation and enhancement of fish and wildlife.

REFUGE GUIDANCE

As part of the National Wildlife Refuge System, the management and use of Lost Trail National Wildlife Refuge is guided by various federal laws and guidance.

Laws, Regulations, and Policy

- National Wildlife Refuge System Improvement Act of 1997
- National Wildlife Refuge System Administration Act of 1966
- Refuge Recreation Act of 1962
- Code of Federal Regulations, Title 50
- U.S. Fish and Wildlife Service Manual

- Endangered Species Act of 1973
- Migratory Bird Hunting and Conservation Stamp Act
- Migratory Bird Treaty Act of 1918
- National Environmental Policy Act of 1969

National Wildlife Refuge System Mission

The mission of the System is to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Goals of the National Wildlife Refuge System

- Preserve, restore, and enhance in their natural ecosystems (when practicable) all species of animals and plants that are endangered or threatened with becoming endangered.
- Perpetuate the migratory bird resource.
- Preserve a natural diversity and abundance of fauna and flora on refuge lands.
- Provide an understanding and appreciation of fish and wildlife ecology and man's role in his environment and to provide refuge visitors with high quality, safe, wholesome, and enjoyable recreational experiences oriented toward wildlife to the extent these activities are compatible with the purposes for which the refuge was established.

REFUGE GOALS

A goal is a descriptive statement of desired future conditions that conveys a purpose.

Riparian Habitat Goal

Restore, enhance, and maintain a mixed deciduous and coniferous riparian habitat to support indigenous wildlife species and perpetuate the ecological integrity of the Fisher River watershed.

Wetland Habitat Goal

Provide breeding, resting, and feeding habitat for wetland-dependent species of northwestern Montana by restoring, maintaining, and enhancing a mosaic of lake, semipermanent, seasonal, temporary, and saturated wetlands.

Grassland Habitat Goal

Restore, enhance, and maintain Intermountain grasslands, with an emphasis on native bunchgrass prairie to provide habitat for migratory birds, species of concern, and associated wildlife species.

Forested Habitat Goal

Enhance and maintain Douglas-fir, ponderosa pine, aspen, and cottonwood forested habitats within the context of the Fisher River watershed for migratory birds, species of concern, and other associated wildlife species.

Invasive Plant Goal

Native plant communities, composition, occurrence, and density exist without degradation by invasive plants, and support associated wildlife.

Migratory Birds Goal

Preserve, restore, and enhance the ecological diversity and abundance of migratory birds of the Intermountain West forest, wetland complexes, riparian habitat, and bunchgrass prairie.

Other Wildlife Goal

Restore and maintain resident and endemic wildlife populations of northwestern Montana to maintain and enhance species diversity of Lost Trail National Wildlife Refuge and Pleasant Valley.

Species of Concern Goal

Contribute to the conservation, enhancement, and recovery of endangered, threatened, and species-of-concern populations in Lost Trail National Wildlife Refuge and Fisher River watershed.

Cultural Resources Goal

Protect, manage, and interpret archaeological, cultural, and historical resources present at Lost Trail National Wildlife Refuge for the benefit of present and future generations.

Public Use Goal

Provide quality wildlife-dependent recreational and educational opportunities for persons of all abilities to learn, understand, and enjoy the Intermountain ecosystem of northwestern Montana; its associated fish, wildlife, and plants of Lost Trail National Wildlife Refuge; and the National Wildlife Refuge System in a safe and compatible manner.

Administration Goal

Provide staffing, funding, and facilities to maintain the long-term integrity of habitats and wildlife resources of Lost Trail National Wildlife Refuge in supporting the achievement of ecosystem and National Wildlife Refuge System goals.

Partnership Goal

Promote and develop partnerships with adjacent landowners, public and private organizations, and other interested individuals to preserve, restore, and enhance a diverse and productive ecosystem of which Lost Trail National Wildlife Refuge is an integral part.

AVAILABILITY OF RESOURCES

Current resources and those unmet funding needs defined as RONS projects for alternative A (appendix I) will be available to administer the CCP, in association with assistance from the MFWP to conduct the hunt program, and partnerships for various refuge projects as defined in alternative A.

ANTICIPATED IMPACTS

Since this refuge is new, there is not much biological or public use information available. It is unknown how fast and to what extent the public use opportunities will be used. Wildlife-dependent public use is generally encouraged on national wildlife refuges as long as it is compatible with the purposes for which the refuge was established. Implementation of a CCP has biological and public use monitoring integrated throughout to determine if management activities or public use need to be modified to keep uses within the compatibility threshold.

Following is a short description of the estimated level of wildlife-dependent recreational activities. For a further evaluation of impacts, please see chapter 5 of the EA, titled "Environmental Consequences."

Wildlife Observation and Photography

Wildlife observation and photography are minimal at this time, but anticipated to increase. These activities might result in some disturbance to wildlife especially if visitors venture too close to sensitive areas (e.g., migratory bird nests, elk calving, and moose foraging). Disturbance is expected to be minimal and have an insignificant effect when properly managed (e.g., access limited to trails at times, nest buffer zones, and closures).

Hunting

Please see the compatibility determination completed for the hunt program on the refuge in December 2001. Hunting was considered compatible and had the regional director's signature for concurrence.

Fishing

A single youth fishing event per year is the only fishing that might be allowed under alternative A (proposed action). This level of fishing is so minimal there should be very limited, short-lived disturbance to certain species of wildlife and is not expected to negatively impact the refuge. If it is determined that fish population levels cannot provide a quality event, staff will work with partners such as MFWP to sponsor an event off refuge such as at a nearby WPA. Allowing the public youth to fish will provide environmental education, foster positive public opinion, and help build support for the Service and its natural resource conservation agenda.

Environmental Education and Interpretation

A day use area and an accessible campground for environmental education groups will create localized disturbance and removal of vegetation. However, the benefit of educating visitors to the importance of natural resource conservation and learning about wildlife biology outweigh the minimal impact of site development.

PUBLIC REVIEW AND COMMENT

The draft compatibility determination was provided for intergovernmental review May 2004 and for public review July 2005.

DETERMINATION (CHECK ONE BELOW)

Uses ARE NOT Compatible

Uses ARE Compatible with the following stipulations

Stipulations Necessary to Ensure Compatibility

Visitors will need to comply with refuge brochures and tear sheets for refuge closures, time of year access limited to trails, and be in accordance with state of Montana regulations and licensing requirements.

Justification for Compatibility Determination

The U.S. Fish and Wildlife Service's current policy is to expand and enhance opportunities for high-quality wildlife-dependent public use, with emphasis on hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation.

These uses are generally considered to be appropriate with the purposes of the refuge and meet the refuge public use goal to provide for compatible wildlife-dependent recreation. Monitoring of biological and public use impacts is stipulated to maintain within the comparability threshold.

Signatures

Ray Washtak, Refuge Manager
Lost Trail National Wildlife Refuge

Date

Steve Kallin, Project Leader
National Bison Range complex

Date

Concurrence

Steve Berendzen, Refuge Supervisor (MT, UT, WY)
U.S. Fish and Wildlife Service, Region 6

Date

Richard A. Coleman, Ph.D., Asst. Regional Director
National Wildlife Refuge System
U.S. Fish and Wildlife Service, Region 6

Date

Mandatory 10- or 15-year Reevaluation Date: 2020

Appendix C—List of Preparers

This document is the result of the extensive, collaborative, and enthusiastic efforts by the members of the planning team:

<i>Team Member</i>		<i>Current Work Unit</i>
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Besides Mr. Grant and Mr. Williams, the Service acknowledges and expresses gratitude to the MFWP for the relevance of the role played by their members in the CCP planning process.

Additionally, the following staffs of region 6 of the Service were of enormous help through their review and input on the drafts of this document:

- Steve Berendzen, refuge supervisor, MT, WY, UT
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- Rick Coleman, assistant regional director
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- Sheri Fetherman, chief of education and visitor services
- Jaymee Fojtik, *former* GIS specialist
- Galen Green, fire ecologist
- Toni Griffin, refuge planner
- Linda Kelly, chief of CCP branch
- Ken Kerr, fire management officer
- Laura King, refuge planner
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- Greg Langer, *former* refuge supervisor, MT, WY, UT
- Adam Misztal, *former* refuge planner
- Ralph D. Morgenweck, regional director
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Appendix D—Consultation and Coordination

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The following individuals were consulted during the development of this document:

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PUBLIC INVOLVEMENT

Public scoping was initiated for Lost Trail National Wildlife Refuge in January 1998. At this time, issue workbooks were mailed and open houses were held for public input on management to be dealt with in the CCPs for all the refuges of the National Bison Range complex. Lost Trail National Wildlife Refuge was in the preliminary stages of being considered for acquisition, yet the Service requested comments on its management as well. Many of the public comments from the open houses and issue workbooks were general comments for all units of the complex being managed as part of the Refuge System. They are included here for Lost Trail National Wildlife Refuge as well.

Another scoping meeting was held only for Lost Trail National Wildlife Refuge in May 1998 to request input from the public regarding the acquisition and management of the refuge. Twenty-two people attended the Kalispell, Montana, meeting, and approximately 48 written comments were received during the entire comment period. Comments received identified biological, social, and economic concerns regarding management.

During the acquisition process and in the acquisition EA, the Service stated that hunting would be evaluated and potentially allowed within 1 year after purchase. The Service missed that deadline, and the development of the EA for hunting and hunt step-down plan were accelerated to open the refuge to hunting for the fall 2002 season, concurrently with the development of the CCP.

A public open house was held at the refuge to request public comment on hunting on March 1, 2001. Forty-five people came to the open house and public comments were received in the mail. Most of the input was requesting the refuge to be open to big game and waterfowl hunting.

An analysis of six alternatives for hunting were evaluated in the EA. The EA and draft hunt plan were released to the public October 30, 2001, for a 30-day comment period. An open house specifically for the public to ask questions and provide input regarding the EA and draft plan was held November 15, 2001. The public provided comments during the open house and by mailing them to the refuge. A large number of comments this time were to keep the Refuge closed to hunting. The approved preferred alternative in the hunt EA served as the guideline for the development of the step-down hunt plan. It outlines the specific details of how the hunt program is carried out.

Development of the CCP continued with an EA with four alternatives. The EA was reviewed during an internal review of the draft CCP and EA in April and May 2004. This draft CCP and EA is being released to the public in July 2005 and there will be open house meetings in Libby (July 27) and Kalispell (July 28) to provide an overview of the resources in the refuge and of the draft CCP and EA. Service staff will entertain questions and receive comments from the attending public. These open house meetings have been advertised in the local media in Montana. During the entire development of the draft CCP and its EA, the refuge staff has discussed the planning process with local county commissioners, sportsmen and women's groups, and other interested groups. In addition, the refuge staff has invited the local tribal and state agencies to participate in the development of this draft CCP and EA.

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Kalispell, MT

Flathead County Weed Department
Jed Fisher
Kalispell, MT

Flathead Resource Development Office
Tom Jentz
Kalispell, MT

Kalispell Chamber of Commerce
Kalispell, MT

Marion Volunteer Fire Department
Bob Lanning, Fire Chief
Marion, MT

AAA Weed and Pasture
Wayne Ferrullo
Columbia Falls, MT

Alliance for the Wild Rockies
Mike Bader
Missoula, MT

American Public Lands Exchange
Bruce Bugbee
Missoula, MT

American Wildlands–Northern Rockies Office
Bozeman, MT

Animal Protection Institute
Chris Tapouchis
Sacramento, CA

Audubon Society
Gretchen Muller
Washington, D.C.

Big Meadows Grazing Association
Terry Prongue
Marion, MT

Chain of Lakes Homeowners Association
Lyle Brist
Libby, MT

Citizens for a Better Flathead
Kalispell, MT

Defenders of Wildlife
Noah Matson
Washington, D.C.

Defenders of Wildlife
Tom Uniack
Washington, D.C.

FCCC President
Kalispell, MT

Five Valley Audubon Society
Missoula, MT

Flathead Audubon Society
Kalispell, MT

Flathead Audubon Society
Leslie Kehoe
Bigfork, MT

Ducks Unlimited–Flathead Valley Chapter
Dick Barron
Kalispell, MT

Flathead Wildlife
Bob Cole
Kalispell, MT

Fund for Animals
Jeff Leitner
Silver Spring, MD

Glacier Fur Dressing
Kalispell, MT

Glacier Natural History Association
West Glacier, MT

Grizzly Bear Recovery Office
Missoula, MT

KRA Corpotation/F&W
Paul E. Wilson, Project Manager
Bethesda, MD

Land and Water
Susan Anderson
Missoula, MT

McGregor Lake Resort
Marion, MT

McGinnis Meadows Guest Ranch
Shayne Jackson
Libby, MT

Mission Mountain Audubon
Jim Rogers
Polson, MT

The Wildlife Society–Montana Chapter
Bozeman, MT

Montana Conservation Corps
Kalispell, MT

Montana Land Reliance
Amy Eaton
Bigfork, MT

Montana Power Company
Jon Jourdannais
Butte, MT

Montana Stockgrowers Association
Joyce Lancey
Helena, MT

Montana Wildlife Federation
Great Falls, MT

National Trappers Association, Inc.
Scott Hartman, Director
New Martinsville, WV

National Wildlife Refuge Association
Brent Giezentanner, Regional Representative
Colorado Springs, CO

PCTC
Lorrie Woods
Kalispell, MT

PCTC
Columbia Falls, MT

RMEF
Missoula, MT

The Nature Conservancy (TNC)
John Humke
Boulder, CO

TNC—Western Montana Field Office
Marilyn Wood
Bigfork, MT

The Wilderness Society
Washington, DC

Wildlife Management Institute
Len Carpenter, Section Representative
Fort Collins, CO

Wildlife Management Institute
Bob Bryne, Cooperative Alliance for Refuge
Enhancement
Washington, DC

Wildlife Management Institute
Rob Manes, Midwest Regional Representative
Pratt, KS

Wildlife Management Institute
Bend, OR

The Wildlife Society—Central Mountain and Plains
Section
Len Carpenter, Section Representative
Fort Collins, CO

Montana Academy
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University of Montana
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Marion, MT

University of Montana—Cooperative Wildlife
Research
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Missoula, MT

Field Director
Jan Metzmaker
Kalispell, MT

Manager Roadside Vegetation Program
Marcy Williams
Bigfork, MT

Flathead County Library
Kalispell, MT

Columbia Falls Library
Columbia Falls, MT

Whitefish City Library
Whitefish, MT

Lincoln County Library
Libby, MT

Hungry Horse News
Chris Peterson
Columbia Falls, MT

Daily Interlake
Dave Reese
Kalispell, MT

166 individuals

Appendix E—List of Animal and Plant Species

This appendix presents a list of animal species present in the Pleasant Valley ecosystem. In addition, plant species mentioned in the CCP are listed.

Species with confirmed sightings on Lost Trail National Wildlife Refuge are followed by an asterisk (*).

ANIMALS

BIRDS

Loons

Common loon (*Gavia immer*)

Grebes

Pied-billed grebe (*Podilymbus podiceps*)*
Horned grebe (*Podiceps autitus*)*
Eared grebe (*P. nigricollis*)*
Red-necked grebe (*P. grisegena*)*
Western grebe (*Aechmophorus occidentalis*)
Clark's grebe (*A. clarkii*)

Cormorants

Double-crested cormorant (*Phalacrocorax auritus*)

Hérons and Bitterns

Great blue heron (*Ardea herodias*)*
Black-crowned night-heron (*Nycticorax nycticorax*)
American bittern (*Botaurus lentiginosus*)*

Swans, Geese, and Ducks

Tundra swan (*Cygnus columbianus*)
Trumpeter swan (*C. buccinator*)
Ross' goose (*Chen rossii*)
Canada goose (*Branta canadensis*)*
Snow goose (*Chen caerulescens*)
Gadwall (*Anas strepera*)*
Mallard (*A. platyrhynchos*)
Northern pintail (*A. acuta*)
American wigeon (*A. americana*)*
Eurasian wigeon (*A. penelope*)
Wood duck (*Aix sponsa*)*
Northern shoveler (*Anas clypeata*)*
Blue-winged teal (*A. discors*)*
Green-winged teal (*A. crecca*)*
Cinnamon teal (*A. cyanoptera*)*
Canvasback (*Aythya valisineria*)*
Redhead (*A. americana*)*
Ring-necked duck (*A. collaris*)*
Greater scaup (*A. marila*)
Lesser scaup (*A. affinis*)*
Common goldeneye (*Bucephala clangula*)*
Barrow's goldeneye (*B. islandica*)*
Bufflehead (*B. albeola*)*
Ruddy duck (*Oxyura jamaicensis*)*

Common merganser (*Mergus merganser*)*
Red-breasted merganser (*M. serrator*)
Hooded merganser (*Lophodytes cucullatus*)*

New World Vultures

Turkey vulture (*Cathartes aura*)

Osprey, Hawks, and Eagles

Osprey (*Pandion haliaetus*)*
Northern harrier (*Circus cyaneus*)*
Golden eagle (*Aquila chrysaetos*)*
Bald eagle (*Haliaeetus leucocephalus*)*
Sharp-shinned hawk (*Accipiter striatus*)
Cooper's hawk (*A. cooperii*)
Northern goshawk (*A. gentiles*)
Red-tailed hawk (*Buteo jamaicensis*)
Swainson's hawk (*B. swainsoni*)
Rough-legged hawk (*B. lagopus*)
Ferruginous hawk (*B. regalis*)

Falcons

American kestrel (*Falco sparverius*)*
Merlin (*F. columbarius*)
Prairie falcon (*F. mexicanus*)*
Peregrine falcon (*F. peregrinus*)*
Gyr Falcon (*F. rusticolus*)

Gallinaceous Birds

Gray partridge (*Perdix perdix*)
Wild turkey (*Meleagris gallopavo*)*
Ruffed grouse (*Bonasa umbellus*)*
Spruce grouse (*Falcapennis Canadensis*)*
Blue grouse (*Dendragapus obscurus*)*
White-tailed ptarmigan (*Lagopus leucurus*)

Rails and Coots

Virginia rail (*Rallus limicola*)
Sora (*Porzana carolina*)*
American coot (*Fulica americana*)*

Cranes

Sandhill crane (*Grus canadensis*)*

Plovers

Killdeer (*Charadrius vociferus*)*

Avocets and Stilts

American avocet (*Recurvirostra americana*)*
 Black-necked stilt (*Himantopus mexicanus*)

Sandpipers and Phalaropes

Greater yellowlegs (*Tringa melanoleuca*)*
 Lesser yellowlegs (*T. flavipes*)
 Solitary sandpiper (*T. solitaria*)
 Spotted sandpiper (*Actitis macularia*)*
 Long-billed curlew (*Numenius americanus*)
 Sanderling (*Calidris alba*)
 Semipalmated sandpiper (*C. pusilla*)
 Western sandpiper (*C. mauri*)
 Least sandpiper (*C. minutilla*)
 Baird's sandpiper (*C. bairdii*)
 Pectoral sandpiper (*C. melanotos*)
 Long-billed dowitcher (*Limnodromus scolopaceus*)*
 Common snipe (*Gallinago gallinago*)*
 Wilson's phalarope (*Phalaropus tricolor*)*
 Red-necked phalarope (*P. lobatus*)

Gulls and Terns

Franklin's gull (*L. pipixcan*)
 Bonaparte's gull (*L. philadelphia*)
 Ring-billed gull (*L. delawarensis*)
 California gull (*L. californicus*)
 Herring gull (*L. argentatus*)
 Forster's tern (*Sterna forsteri*)
 Common tern (*S. hirundo*)
 Black tern (*Chlidonias niger*)*

Pigeons and Doves

Band-tailed pigeon (*Columba fasciata*)
 Mourning dove (*Zenaidura macroura*)*

Cuckoos

Yellow-billed cuckoo (*Coccyzus americanus*)

Typical Owls

Barn owl (*Tyto alba*)
 Great horned owl (*Bubo virginianus*)*
 Barred owl (*Strix varia*)
 Great gray owl (*S. nebulosa*)*
 Snowy owl (*Nyctea scandiaca*)
 Western screech-owl (*Otus kennicotti*)
 Flammulated owl (*O. flammeolus*)
 Northern pygmy-owl (*Glaucidium gnoma*)
 Northern saw-whet owl (*Aegolius acadicus*)
 Boreal owl (*A. funereus*)
 Burrowing owl (*Athene cunicularia*)

Nightjars

Common nighthawk (*Chordeiles minor*)*

Swifts

Black swift (*Cypseloides niger*)
 Vaux's swift (*Chaetura vauxi*)
 White-throated swift (*Aeronautes saxatalis*)

Hummingbirds

Black-chinned hummingbird (*Archilochus alexandri*)

Broad-tailed hummingbird (*Selasphorus platycercus*)
 Calliope hummingbird (*Stellula calliope*)*
 Rufous hummingbird (*Selasphorus rufus*)

Kingfishers

Belted kingfisher (*Ceryle alcyon*)*

Woodpeckers

Lewis's woodpecker (*Melanerpes lewis*)*
 Northern flicker (*Colaptes auratus*)*
 Williamson's sapsucker (*Sphyrapicus thyroideus*)
 Red-naped sapsucker (*S. nuchalis*)*
 Downy woodpecker (*Picoides pubescens*)*
 Hairy woodpecker (*P. villosus*)*
 Three-toed woodpecker (*Picoides tridactylus*)*
 Black-backed woodpecker (*P. arcticus*)*
 Pileated woodpecker (*Dryocopus pileatus*)*

Tyrant Flycatchers

Olive-sided flycatcher (*Contopus cooperi*)*
 Western wood-pewee (*Contopus virens*)*
 Willow flycatcher (*Empidonax traillii*)*
 Least flycatcher (*E. minimus*)*
 Hammond's flycatcher (*Amphidonas hammondi*)*
 Dusky flycatcher (*E. oberholseri*)*
 Cordilleran flycatcher (*E. occidentalis*)
 Say's phoebe (*Sayornis saya*)
 Eastern kingbird (*Tyrannus tyrannus*)*
 Western kingbird (*T. verticalis*)

Shrikes

Loggerhead shrike (*Lanius ludovicianus*)
 Northern shrike (*L. excubitor*)

Vireos

Blue-headed vireo (*Vireo solitarius*)*
 Red-eyed vireo (*V. olivaceus*)
 Warbling vireo (*V. gilvus*)*

Jays, Magpies, and Crows

Blue jay (*Cyanocitta cristata*)
 Stellar's jay (*C. stelleri*)
 Gray jay (*Perisoreus canadensis*)
 Clark's nutcracker (*Nucifraga columbiana*)*
 Black-billed magpie (*Pica hudsonia*)*
 American crow (*Corvus brachyrhynchos*)*
 Common raven (*C. corax*)*

Larks

Horned lark (*Eremophila alpestris*)

Swallows

Tree swallow (*Tachycineta bicolor*)*
 Violet-green swallow (*T. thalassina*)*
 Bank swallow (*Riparia riparia*)*
 Cliff swallow (*Hirundo pyrrhonota*)*
 Northern rough-winged swallow (*Stelgidopteryx serripennis*)*
 Barn swallow (*H. rustica*)*

Chickadees

- Black-capped chickadee (*Parus atricapillus*)*
- Mountain chickadee (*P. sclateri*)*
- Chestnut-backed chickadee (*P. rufescens*)
- Boreal chickadee (*P. hudsonicus*)

Nuthatches

- White-breasted nuthatch (*Sitta carolinensis*)*
- Red-breasted nuthatch (*S. canadensis*)*
- Pygmy nuthatch (*S. pygmaea*)

Creepers

- Brown creeper (*Certhia americana*)

Wrens

- House wren (*Troglodytes aedon*)*
- Winter wren (*T. troglodytes*)
- Rock wren (*Salpinctes obsoletus*)
- Canyon wren (*Catherpes mexicanus*)
- Marsh wren (*Cistothorus palustris*)*

Dippers

- American dipper (*Cinclus mexicanus*)

Kinglets

- Golden-crowned kinglet (*Regulus satrapa*)*
- Ruby-crowned kinglet (*R. calendula*)*

Thrushes

- Western bluebird (*Sialia mexicana*)
- Mountain bluebird (*S. currucoides*)*
- Townsend's solitaire (*Myadestes townsendi*)*
- Veery (*Catharus fuscescens*)
- Swainson's thrush (*C. ustulatus*)*
- Hermit thrush (*C. guttatus*)
- Varied thrush (*Ixoreus naevius*)
- American robin (*Turdus migratorius*)*

Mimic Thrushes

- Gray catbird (*Dumetella carolinensis*)*
- Sage thrasher (*Areoscoptes montanus*)

Starlings

- European starling (*Sturnus vulgaris*)*

Pipits

- American (water) pipit (*Anthus rubescens*)

Waxwings

- Bohemian waxwing (*Bombycilla garrulus*)
- Cedar waxwing (*B. cedrorum*)

Wood-warblers

- Tennessee warbler (*Vermivora peregrine*)*
- Orange-crowned warbler (*Ermivora celata*)*
- Nashville warbler (*V. ruficapilla*)
- Yellow-rumped warbler (*Dendroica coronata*)*
- Townsend's warbler (*D. townsendi*)*
- Yellow warbler (*D. petechia*)*
- MacGillivray's warbler (*Oporornis tolmiei*)*
- Wilson's warbler (*Wilsonia pusilla*)*
- Northern waterthrush (*Seiurus noveboracensis*)
- Common yellowthroat (*Geothlypis trichas*)*

- Yellow-breasted chat (*Icteria virens*)
- American redstart (*Setophaga ruticilla*)

Tanagers

- Western tanager (*Piranga ludocviciana*)*

Sparrows and Towhees

- Spotted towhee (*Pipilo maculatus*)*
- American tree sparrow (*Spizella arborea*)
- Chipping sparrow (*S. passerina*)*
- Clay-colored sparrow (*S. pallida*)
- Brewer's sparrow (*S. pallida*)
- Lark sparrow (*Chondestes grammacus*)
- Grasshopper sparrow (*Ammodramus savannarum*)*
- Le Conte's sparrow (*A. lecontei*)
- Fox sparrow (*Passerella iliaca*)
- Savannah sparrow (*Passerculus sandwichensis*)*
- Lincoln's sparrow (*Melospiza lincolni*)
- Song sparrow (*M. melodia*)*
- Vesper sparrow (*Pooecetes gramineus*)*
- Harris' sparrow (*Zonotrichia querula*)
- White-throated sparrow (*Z. albicollis*)
- White-crowned sparrow (*Z. leucophrys*)
- Dark-eyed junco (*Junco hyemalis*)*
- Lapland longspur (*Calcarius lapponicus*)

Grosbeaks and Allies

- Snow bunting (*Plectrophenax nivalis*)*
- Rose-breasted grosbeak (*Phaeucticus ludovicianus*)
- Black-headed grosbeak (*P. melanocephalus*)*
- Lazuli bunting (*Passerina amoena*)*

Blackbirds and Orioles

- Western meadowlark (*Sturnella neglecta*)*
- Yellow-headed blackbird (*Xanthocephalus xanthocephalus*)*
- Red-winged blackbird (*Agelaius phoeniceus*)*
- Common grackle (*Quiscalus quiscula*)
- Brewer's blackbird (*Euphagus cyanocephalus*)*
- Brown-headed cowbird (*Molothrus ater*)*
- Northern oriole (*Icterus galbula*)*

Finches

- Cassin's finch (*Carpodacus cassinii*)
- Red crossbill (*Loxia curvirostra*)*
- White-winged crossbill (*L. leucoptera*)
- Pine grosbeak (*Pinicola enucleator*)
- Pine siskin (*Carduelis pinus*)*
- American goldfinch (*C. tristis*)*
- Common redpoll (*C. flammea*)
- Hoary redpoll (*C. hornemanni*)
- Evening grosbeak (*Coccothraustes vespertinus*)*

Old World Sparrows

- House sparrow (*Passer domesticus*)*

MAMMALS

- Badger (*Taxidea taxus*)*
- Beaver (*Castor canadensis*)*
- Big brown bat (*Eptesicus fuscus*)

Black bear (*Ursus americanus*)*
 Bobcat (*Lynx rufus*)
 Bushy-tailed woodrat (*Neotoma cinerea*)
 California myotis (*Myotis californicus*)
 Canada lynx (*Lynx canadensis*)*
 Columbian ground squirrel (*Spermophilus columbianus*)*
 Coyote (*Canis latrans*)*
 Deer mouse (*P. maniculatus*)*
 Elk (*Cervus elaphus*)*
 Fisher (*Martes pennanti*)
 Golden-mantled ground squirrel (*Spermophilus lateralis*)
 Gray wolf (*Canis lupus*)*
 Grizzly bear (*Ursus arctos*)
 Hoary bat (*Lasiurus cinereus*)
 Hoary marmot (*Marmota caligata*)
 House mouse (*Mus musculus*)
 Little brown myotis (*Myotis lucifungus*)*
 Ling-eared myotis (*M. keenii*)
 Long-legged myotis (*M. volans*)
 Long-tailed vole (*Microtus longicaudus*)
 Long-tailed weasel (*Mustela frenata*)
 Marten (*Martes americana*)
 Masked shrew (*Sorex cinereus*)
 Meadow vole (*Microtus pennsylvanicus*)*
 Merriam's shrew (*Sorex merriami*)
 Mink (*Mustela vison*)
 Moose (*Alces alces*)*
 Mountain cottontail (*Sylvilagus nuttallii*)
 Mountain lion (*Puma concolor*)*
 Mule deer (*Odocoileus hermionus*)*
 Muskrat (*Ondatra zibethicus*)*
 Northern bog lemming (*Synaptomys borealis*)
 Northern flying squirrel (*Glaucomys sabrinus*)
 Northern pocket gopher (*Spermophilus richardsonii*)
 Northern river otter (*Lontra canadensis*)*
 Norway rat (*Rattus norvegicus*)
 Pika (*Ochotona princeps*)
 Porcupine (*Erethizon dorsatum*)
 Preble's shrew (*Sorex preblei*)
 Pygmy shrew (*Blarina brevicauda*)
 Raccoon (*Procyon lotor*)
 Red fox (*Vulpes vulpes*)
 Red squirrel (*Tamiasciurus hudsonicus*)
 Red-tailed chipmunk (*Tamias ruficaudus*)
 Short-tailed weasel (*Mustela erminea*)
 Silver-haired bat (*Lasiorycteris noctivagans*)
 Snowshoe hare (*Lepus americanus*)*
 Southern red-backed vole (*Clethrionomys gapperi*)
 Striped skunk (*Mephitis mephitis*)
 Townsend's big-eared bat (*Plecotus townsendii*)
 Vagrant shrew (*Sorex vagrans*)
 Water shrew (*S. palustris*)
 Water vole (*Microtus richardsonii*)
 Western heather vole (*Phenacomys intermedius*)
 Western jumping mouse (*Zapus princeps*)
 White-tailed deer (*Odocoileus virginianus*)*
 White-tailed jackrabbit (*Lepus townsendii*)
 Wolverine (*Gulo gulo*)*
 Yellow-bellied marmot (*Marmota flaviventris*)

Yellow-pine chipmunk (*Tamias amoenus*)
 Yuma myotis (*Myotis yumanensis*)

AMPHIBIANS AND REPTILES

Amphibians

Boreal toad (*Bufo boreas*)*
 Bullfrog (*Rana catesbeiana*)
 Coeur D'Alene salamander (*Plethodon idahoensis*)
 Idaho giant salamander (*Dicamptodon aterrimus*)
 Long-toed salamander (*Ambystoma macrodactylum*)*
 Northern leopard frog (*Rana pipiens*)
 Pacific chorus frog (*Pseudacris regilla*)*
 Roughskin newt (*Taricha granulose*)
 Spotted frog (*Rana pretiosa*)*
 Tailed frog (*Ascaphus truei*)
 Tiger salamander (*Ambystoma tigrinum*)
 Wood frog (*Rana sylvatica*)

Reptiles

Common garter snake (*Thamnophis sirtalis*)*
 Northern alligator izard (*Elgaria coerulea*)
 Painted turtle (*Chrysemys picta*)*
 Racer (*Coluber constrictor*)
 Rubber boa (*Charina bottae*)
 Western rattlesnake (*Crotalus viridis*)
 Western skink (*Eumeces skiltonianus*)
 Western terrestrial garter snake (*Thamnophis elegans*)*

FISH

Northern pike minnow (*Ptychocheilus oregonensis*)
 Pumpkinseed (*Lepomis gibbosus*)
 Redside shiner (*Richardsonius balteatus*)
 Yellow perch (*Perca flavescens*)

PLANTS

GRASSES AND SEDGES

Alkali cordgrass (*Spartina gracilis*)
 Alkaligrass (*Puccinellia nuttalliana*)
 Basin wildrye (*Elymus cinereus*)
 Blue wildrye (*Elymus glaucus*)
 Bluebunch wheatgrass (*Pseudoregneria spicata*)
 Bulrush (*Scirpus acutus*)
 Cheatgrass (*Bromus tectorum*)
 Columbia needlegrass (*Stipa columbiana*)
 Crested wheatgrass (*Agropyron desertorum*)
 Elk sedge (*Carex geyeri*)
 Foxtail barley (*Hordeum jubatum*)
 Idaho fescue (*Festuca idahoensis*)
 Intermediate wheatgrass (*Agropyron intermedium*)
 Kentucky bluegrass (*Poa pratensis*)
 Lily pad (*Nuphar* spp.)
 Mountain brome (*Bromus carinatus*)

Needle and thread (*Stipa comata*)
 Orchard grass (*Dactylis glomerata*)
 Pine grass (*Calamagrostis rubescens*)
 Prairie junegrass (*Koeleria cristata*)
 Quack grass (*Agropyron repens*)
 Red threeawn (*Aristida longiseta*)
 Red top (*Agrostis stolonifera*)
 Reed canarygrass (*Phalaris arundinacea*)
 Richardson needlegrass (*Stipa richardsonii*)
 Rough fescue (*Festuca scabrella*)
 Sandberg bluegrass (*Poa secunda*)
 Sedge (*Carex* spp.)
 Slender wheatgrass (*Agropyron trachycaulum*)
 Smooth brome (*Bromus inermis*)
 Timothy (*Phleum pratense*)
 Tufted hairgrass (*Deschampsia caespitosa*)
 Western fescue (*Festuca occidentalis*)
 Western wheatgrass (*Agropyron smithii*)
 Wild oat (*Avena fatua*)

FORBS

Alberta penstemon (*Penstemon albertinus*)
 Alumroot (*Heuchera richardsonii*)
 Black medic (*Medicago lupulina*)
 Buckwheat (*Eriogonum* spp.)
 Canada thistle (*Cirsium arvense*)
 Common toadflax (*Linaria vulgaris*)
 Cudweed sagewort (*Artemisia ludoviciana*)
 Dogwood (*Cornus sericea*)
 Elk thistle (*Cirsium scariosum*)
 Fringed sage (*Artemisia frigida*)
 Glacier lily (*Erythronium grandiflorum*)
 Orange hawkweed (*Hieracium aurantiacum*)
 Meadow hawkweed (*H. pratense*)
 Heartleaf arnica (*Arnica cordifolia*)
 Horsetail (*Equisetum arvense*)
 Littleleaf penstemon (*Penstemon procerus*)
 Owl clover (*Orthocarpus tenuifolius*)
 Prairie smoke (*Geum triflorum*)
 Purple aster (*Symphotrichum patens*)
 Purple mariposa (*Calochortus nitidus*)
 Pussy toes (*Antemana neglecta*)
 Round alumroot (*Heuchera cylindrical*)
 Sage buttercup (*Ranunculus glaberrimus*)
 Shrubby cinquefoil (*Pentaphragmoides florib*)
 (*Potentilla fruticosa*)
 Silky lupine (*Hupinus sericeus*)

Silver sage (*Artemisia cana*)
 Solomon's seal (*Polygonatum odoratum*)
 Spotted knapweed (*Centaurea maculosa*)
 St. Johns-wort (*Hypericum perforatum*)
 Sticky geranium (*Geranium viscosissimum*)
 Stinging nettle (*Urtica dioica*)
 Stoneseed (*Lithospermum tuberosum*)
 Sulphur cinquefoil (*Potentilla recta*)
 Tansy ragwort (*Senecio jacobaea*)
 Twinflower (*Linnaea borealis*)
 Umbrella plant (*Cyperus alternifolia*)
 Veiny meadowrue (*Thalictrum venulosum*)
 Velvet lupine (*Lupinus leucophyllus*)
 Western gromwell (*Lithospermum ruderales*)
 White vetch (*Vicia grandiflora*)
 Wild strawberry (*Fragaria virginiana*)
 Yarrow (*Achillea millefolium*)
 Yellow cinquefoil (*Potentilla megalantha*)
 Yellow penstemon (*Penstemon confertus*)

SHRUBS

Chokecherry (*Prunus virginiana*)
 Currant (*Ribes aureum*)
 Dwarf huckleberry (*Vaccinium cespitosum*)
 Kinnikinnick (*Arctostaphylos uva-ursi*)
 Oregon grape (*Berberis repens*)
 Rose (*Rosa* spp.)
 Russet buffalo berry (*Shepherdia argentea*)
 Serviceberry (*Amelanchier arborea*)
 Snowberry (*Symphoricarpos albus*)
 White spirea (*Spiraea albiflora*)

TREES

Aspen (*Populus tremuloides*)
 Cottonwood (*Populus balsamifera*)
 Douglas-fir (*Pseudotsuga menziesii*)
 Englemann spruce (*Picea englemanni*)
 Grand fir (*Abies grandis*)
 Juniper spp. (*Juniperus* spp.)
 Lodgepole pine (*Pinus contorta*)
 Ponderosa pine (*Pinus ponderosa*)
 Speckled alder (*Alnus incana*)
 Subalpine fir (*Abies lasiocarpa*)
 Water birch (*Betula papyrifera*)
 Western larch (*Larix occidentalis*)
 Willow (*Salix* spp.)

Appendix F—Authorized Public Uses



U.S. Fish & Wildlife Service

Lost Trail

National Wildlife Refuge

Authorized Public Uses

2005 - 2006

Welcome

Lost Trail National Wildlife Refuge (NWR) is the 519th refuge inducted into the National Wildlife Refuge System. We invite the public to the Refuge for wildlife observation, wildlife photography, environmental education, and access to adjacent State and Plum Creek Timber Company (PCTC) lands. At this time, limited public use is permitted on the Refuge. A Comprehensive Conservation Plan (CCP), which involves public review, is currently being completed for the Refuge and will determine public use that will be permitted in the future.

General Information

This 7,885-acre Refuge, established in 1999, is managed for the benefit of migratory birds and other wildlife species. The Refuge shares portions of its boundary with PCTC, the Montana Department of Natural Resources and Conservation (DNRC), and private landowners. Visitors and hunters must have landowner permission before accessing or hunting on private property. Lost Trail NWR is a satellite unit of the National Bison Range Complex headquartered in Moiese, Montana.

Directions

The Refuge can be reached via Highway 2 by going west from Kalispell approximately 20 miles to Marion. Turn right (north) at Marion onto Pleasant Valley Road. After approximately 1.3 miles, the blacktop road will fork. Stay to the right! Continue on the main gravel road (Pleasant Valley Road) about 13 miles; the Refuge headquarters is located north of the County Road.

Parking on the Refuge

- Parking areas are located on North 1019 Road near Bleise Road and on the west end of the Refuge at the intersection of South Pleasant Valley Road and the County Road.
- Parking along North 1019 Road and Orr Road is prohibited.
- Blocking roads or gates is prohibited.

State Land

Four parcels of State land within the “executive boundary” of the Refuge are owned and managed by the DNRC. These parcels are not part of the Refuge and are open to public recreation according to State law. A Recreational Use License is required and can be obtained from any authorized Montana Fish, Wildlife and Parks license agent.

Authorized Public Uses

- Visitors are allowed to observe or photograph wildlife, hike, cross-country ski, or snowshoe throughout the Refuge, except in the seasonally closed area, (closed September 1 through December 10).
- Motorized access to PCTC land is permitted via Pleasant Valley Road (County Road), North 1019 Road, and Orr Road (see map). PCTC’s “Open Lands Policy” provides recreational rules and guidelines; copies are available at any PCTC office and at the Refuge headquarters.
- Refuge management allows mountain bike (non-motorized) and horseback use on those roads designated on the map for non-motorized access.
- Regulations and further information are available at the Refuge headquarters.

To Protect You And The Refuge

- Possession or discharge of firearms or archery equipment in designated closed areas is prohibited.
- Pets must be on a leash and attended at all times.
- Motorized use of the Refuge is allowed only on North 1019 Road, Orr Road, or the Pleasant Valley Road (County Road).
- Off-road vehicle travel is strictly prohibited.
- Collecting, injuring, disturbing, destroying, or harming animals, animal parts (including horns), or plants is not permitted unless authorized.
- Open fires are prohibited.
- Overnight camping is prohibited.
- Please comply with all signs.
- Shooting into a closed area is prohibited.

Refuge Hunting Regulations

Hunting elk, white-tailed deer, mule deer, turkey, and mountain grouse is permitted on the Refuge, except in designated closed areas. ***The Closed Area is outlined on the map. This area is closed to all public access from September 1 through December 10.*** All State of Montana hunting regulations apply; in addition the following Refuge regulations apply:

- ***The first week of archery and the first week of general deer and elk season is open to youth (12-14) only. Youth hunters must be accompanied by an adult who is at least 21 years of age.***
- Guiding or outfitting is prohibited.
- Hunters need consent from the Refuge manager before retrieving game from within the closed area.
- Portable or temporary blinds or tree stands are permitted, but must be removed on a daily basis.
- Refuge management allows mountain bike (non-motorized) and horseback riding or pack stock on those roads designated on the map for non-motorized access.
- Dogs may not be used for hunting.
- ***Coyote hunting and ground squirrel shooting are not permitted under Refuge hunting regulations.***
- When hunting grouse or turkey on the Refuge, only a shotgun no larger than a 10-gauge and federally approved non-toxic shot may be used.

Accessibility Information

Equal opportunity to participate in and benefit from programs and activities of the U.S. Fish and Wildlife Service is available to all individuals regardless of physical or mental ability. Dial 7-1-1 for a free connection to the State transfer relay service for TTY and voice calls to and from the speech and hearing impaired. For information or to address accessibility needs, please contact the Refuge staff at 406 / 858 2216 or the U.S. Department of the Interior, Office of Equal Opportunity, 1849 C Street, NW, Washington, D.C. 20240.

Appendix G—List of Facilities

Facilities on the Lost Trail National Wildlife Refuge are listed below.

<i>Buildings</i>	One 4-bedroom, 2-bath residence
	One 3-bedroom, 2-bath residence with a 2-car garage
	One 3-bedroom, 2-bath modular residence
	One small, single unit residence consisting of a single room with bath, kitchen, and bedroom
	One large indoor horse arena with a 4-bedroom apartment
	Two log-construction buildings
	One newly constructed office complex consisting of 3 offices, an administrative area, and a visitor contact area
	Two log-construction horse barns with stalls
	One old, unusable cattle station, which includes an office, numerous holding stalls and pens, small wooden-fenced corrals, and a calving barn previously used for ranch cattle operations
	Three storage buildings
Two shop areas (one currently being used)	
<i>Infrastructure</i>	Three wells that supply potable water to the residences (one well is located at the “lake house” area and is currently not being used)
	Five underground septic systems (all operational, one system not being used)
<i>Fences and Roads</i>	Approximately 70 miles of 4- and 5-strand barbwire boundary and interior fence
	Approximately 28 miles of interior and boundary roads (grass-covered “two-track” roads and graveled roads)
	Several culverts and cattle guards
	Pleasant Valley Road
	One county-maintained road traverses the refuge east-to-west
<i>Artificial Habitats</i>	Ten artificial wetlands

Appendix H—Management Rationale

This appendix describes the rationale for development of the objectives and strategies, specific to the management alternatives (chapter 4).

The rationale describes the background, assumptions, and technical details so that the reader can understand how and why objectives and strategies were formulated.

The rationale is organized following the order of topics in chapter 4.

RIPARIAN HABITAT

Rationale 1 (all alternatives): The riparian and aspen woodlands were heavily grazed in the past. This resulted in scattered, height-suppressed shrubs; a sparse, even-aged overstory of willow, alder, and aspen; and an herbaceous layer in some areas where invasive species have replaced native species. Aspen and woody, riparian shrubs have not been as easily recruited, resulting in structurally simple woodlands.

Grazing can result in degradation of resources, especially when combined with other impacts. If care is not exercised and range grasses are overgrazed, often they will be encroached on by invasive species.

Vigor must be returned to accomplish productivity needed to regain the native, climax community (i.e., native plants in their “correct” percent compositions). Rest from cattle grazing would allow managers to determine current grassland conditions (cover, height, and productivity).

Prescribed fire is one method of promoting quaking aspen, and keeping conifers from succeeding.

“Burning increases soil pH and adds organic carbon and nutrient to the soil. However, fire will probably not rejuvenate the stand if quaking aspen biomass is so low that burning does not appreciably raise soil pH and nutrient levels. Sucker vigor will probably be low.”
(Howard 1996; Tirmenstein 1988)

Aspen regenerate from seed and by sprouting from the roots. Germination and seedling survival require a moist, mineral seedbed with adequate drainage, moderate temperature, and freedom from competition (McDonough 1979).

Rationale 2 (all alternatives): It is unknown how long it would take the water regime to be restored. In addition, it is unknown how long it would be before native fish populations could be restored, or

even if they could be restored to a level that could support quality sport fishing. Historically, the valley may never have had a viable fishery resource.

The cost, personnel, and time needed to restore the fisheries to a level that could support fishing may be large enough to make restoration within the period of this CCP (10–15 years) unrealistic or totally prohibitive. The restored hydrology may not support large enough populations of sport fish species for a quality fishing program. Until a restoration program moves forward and is successful, the objective of providing fishing opportunities cannot be implemented.

Rationale 3 (alternatives A, B, and C): The NRCS purchased a wetland reserve easement from the MPC for the entire section of Pleasant Valley Creek on the refuge. The WRP project has the following goals that relate to the Pleasant Valley Creek habitat:

- Address habitat needs for a diversity of fish and wildlife with a priority for species most impacted by degraded condition, beaver, moose, and those of ESA concern such as bull trout, westslope cutthroat trout, and redband trout.
- Restore wetland hydrology and vegetation to historical conditions.
- Restore streams to historic channels and function, where feasible.
- Restore fisheries habitat and aid fish passage to tributary channels, where feasible.

The NRCS restoration plan includes only the south section of Pleasant Valley Creek, beginning at Lower Moose Pond area and flowing west out of the refuge. The restoration plan calls for stream sinuosity and streambank vegetation.

Lower Moose Pond is an artificial impoundment developed years ago when the refuge was a working cattle ranch. The dam has been breached; however, a functioning pond still exists. This pond provides waterfowl pair habitat and is one of the two locations on the refuge that has been documented as one of the largest reproductive sites for boreal toads in the Rocky Mountains.

The refuge would like to foster NRCS efforts for revegetation further north on the creek; maintain waterfowl, songbirds, and amphibian habitat; and work with the MFWP to monitor stream quality for native fisheries so as to not contribute to degradation of the Fisher River drainage.

Pleasant Valley Creek is a tributary of the Fisher River. Fisher River is an important focus area for native fish restoration for MFWP. Pleasant Valley Creek can contribute to the system as a non-fish-bearing tributary, and possibly as a native-fish-bearing tributary after restoration efforts.

Pleasant Valley Creek presently is a non-fish-bearing tributary of the Fisher River. Historically, it supported Columbia redband trout and westslope cutthroat trout, and drains into the waters of the Fisher River where bull trout are being restored. The Pleasant Valley Creek currently does not support westslope cutthroat, redband trout, or bull trout (Mabbot 1996, Hensler 2001). All three fish species are cold-water species. Water temperature is a critical component of habitat selection for native fish. Pleasant Valley Creek, with its control structures, has the following conditions and effects:

- limited fish movement
- decreased depth and increase water temperature due to ponding and channeling
- large sections of streambanks denuded of native vegetation, which has led to increased water temperatures
- siltation habitat problem

Much of western riparian habitat has been lost or degraded due to flood control, irrigation projects (Hendrickson and Kubly 1984), grazing (Bock 1993), logging, and housing development. This type of habitat is important to a diverse set of migratory birds. The north end of Pleasant Valley Creek is in relatively good condition and has been relatively undisturbed for approximately 10 years. Prior to that, some selective logging occurred. Preliminary bird surveys already suggest bird use by passerines such as song sparrows, and ruby-crowned and golden-crowned kinglets. Stream habitat on the refuge could provide additional habitat for migratory birds with minimal effort—restoration through a revegetation project.

Willow flycatchers breed in riparian habitat with a midstory of 6- to 7-foot alders or willows, interspersed with openings (Casey 2000). This area could be enhanced by planting alders, willow, and hawthorn. This additional stream vegetation would provide migratory bird habitat and foster a reduction in water temperature that would enhance the native fisheries and amphibians. Any future discussion of stream restoration efforts that include changing the ponds on Pleasant Valley Creek would need to evaluate the effects on waterfowl and songbirds.

The boreal toad is a candidate species in Colorado and Wyoming, but not listed in Montana. It was once recorded much more frequently in Montana than the previously mentioned states. However, the extent of boreal toad populations in Montana is unknown due to limited monitoring efforts.

The USGS has been conducting surveys in Montana for the last few years (Hossack 2003). With more than 3,000 wetlands surveyed, boreal toads were found reproducing at only 3 percent of these sites, with a maximum of only 10 females at any one site. On the refuge, upwards of 40 breeding females have been found at Lower Moose Pond, and more than 200 breeding females have been found on the south side of Dahl Lake. The refuge has the largest known population, by far, for the Rocky Mountains.

The Pleasant Valley Creek restoration project would benefit native fish restoration as well. However, for fish restoration to succeed, efforts for fish passage would have to be evaluated and developed on parts of the creek off the refuge as well. A large portion of the off-refuge stream is the downstream section that also has a WRP easement, similar to the WRP easement on the refuge. Working with NRCS, MFWP, and private landowners could make this project a highlight of restoring native fish, as well as other members of the ecosystem such as calliope hummingbird, willow flycatcher, otter, beaver, and moose.

Restoration is always expensive. The refuge has had multiple entities requesting information about the restoration effort on Pleasant Valley Creek. Many of these potential partners have offered to provide funding and expertise, as well as help to find additional funding sources. The refuge would continue to work with these groups and liaison with NRCS regarding funding needs to produce a restoration effort that would contribute a quality conservation effort for riparian habitat, migratory birds, and native fish.

Rationale 4 (alternatives A, B, and C): Aspen groves are an important component of the diverse habitat types and provide food and nesting habitat for a variety of wildlife. Aspens are important for stabilizing soil and watersheds. Healthy stands of trees, shrub, and herbaceous understories, and the litter of aspen stands provide nearly 100 percent soil cover. Soil cover and the intermixture of herbaceous and woody roots protect soil, except during very intense rains (DeByle 1985b).

A bald eagle has nested in the aspens on the north side of Dahl Lake for the last several years. Many migratory songbirds and woodpeckers use aspen for foraging and nesting habitat, especially moist aspen sites where avian species diversity tends to be higher than stands on dry sites (DeByle 1985a). Ruffed grouse use aspen communities extensively for an abundant and nutritious food source, as well as for courting, breeding, and nesting sites (DeByle 1985a). Young aspen provide browse for elk and deer, especially valuable during fall and winter, when protein levels are high relative to other browse species (Tew 1970), and for summer shade and thermal cover in winter. Moose use aspen in summer and winter (DeByle 1985a).

Monitoring of aspen stands would alert managers of when action is needed to maintain the stands. Prescribed fire is one method of promoting quaking aspen and keeping conifers from succeeding.

“Burning increases soil pH and adds organic carbon and nutrient to the soil. However, fire will probably not rejuvenate the stand if quaking aspen biomass is so low that burning does not appreciably raise soil pH and nutrient levels. Sucker vigor will probably be low.”
(Howard 1996; Tirmenstein 1988).

Aspen regenerate from seed and by sprouting from the roots. Germination and seedling survival require a moist, mineral seedbed with adequate drainage, moderate temperature, and freedom from competition (McDonough 1979). Monitoring may be needed if it looks like ungulate overbrowsing is impacting regeneration efforts.

Rationale 5 (alternatives A and B): Much of western riparian habitat has been lost or degraded due to flood control, irrigation projects (Hendrickson and Kubly 1984), grazing (Bock 1993), logging, and housing development. Riparian shrublands consist of tall shrubs such as alder, willow, birch, and dogwood. This habitat is important because it provides foraging and nesting habitat for a diverse set of migratory birds, including many priority species identified by the MPIF (e.g., willow flycatcher, gray catbird, warbling vireo, MacGillivray’s warbler, and lazuli bunting).

As the Montana Bird Conservation Plan points out, this habitat is also used by common species such as song sparrows, which should respond quickly to restoration efforts. Such efforts and results could be highlighted in public outreach efforts to illustrate the concept of “keeping common birds common.” (Casey 2000).

Rationale 6 (alternative B): Preliminary sampling was conducted on the refuge by the MPC in 1996 to determine the extent of the fisheries resource. The dissolved oxygen in Pleasant Valley Creek is sufficient to support a cold-water fishery. The only fish sampled were downstream of USDA Forest Service road 1019. They included the redband shiner, northern pike minnow, yellow perch, pumpkinseed, and suckers. Stunting characteristics were observed in all fish populations except redband shiners and suckers (Mabbott 1996). The sampling report recommends introducing redband and westslope cutthroat trout.

Columbia River redband trout, a subspecies of rainbow trout (*Oncorhynchus mykiss*) is native to the Columbia River drainage. It is considered a species of special concern by the Service, American Fisheries Society, and all states throughout the trout’s historical range (Idaho, Oregon, Washington, Nevada, California, and Montana). The redband trout is classified as a sensitive species by the

USDA Forest Service and the Bureau of Land Management.

In 1994, the Biodiversity Legal Fund of Colorado and a private individual from Kalispell formally petitioned the Service to consider the Kootenai River population of redband trout as an endangered species; the petition was dismissed due to lack of information (Muhlfield 2001). It is believed that, historically, redband trout were in Pleasant Valley Creek, but current water temperature is too high and there has been too much siltation. Redband trout can be found downstream in the Fisher River.

Adult redband trout use deep microhabitats (>0.4 meter) with low to moderate velocities (<0.5 meter per second), while young trout select slow water (<0.1 meter per second) and shallow depths (<0.2 meter) (Muhlfield 2001).

Westslope cutthroat trout (*Oncorhynchus clarki lewisi*) is native to Montana. Its spawning and rearing streams tend to be cold, nutrient-poor, pool habitat, and more cover than uniform, simple habitat (Gardner 2001). To survive the winter, adults need slow-moving pools that do not fill with ice (Brown and Mackay 1995). Loss of habitat is the trout’s main problem, due to loss of stream water to irrigation and barriers created by dams and road culverts (Gardner 2001).

Bull trout are native to Montana and are federally listed as threatened. This trout requires water that is especially cold (<64° F) and clean. Logging and overgrazing are detrimental to their habitat; these management practices remove riparian vegetation, which reduces stream cover and leads to increased temperatures. These practices also increase runoff, which adds sediment loads.

“Bull Trout Interim Conservation Guidance” (USFWS 1998a) has an objective for maintaining or restoring cold-water temperature contributions of non-fish-bearing tributaries. The guidance also calls for discontinuing diversions that result in thermal barriers to passage or increased water temperatures. The ponds on Pleasant Valley Creek could be contributing to increased temperature by spreading and holding the water in one spot.

Rationale 7 (alternative D): The NRCS purchased a wetland reserve easement from the MPC for the entire section of Pleasant Valley Creek on the refuge. The WRP has the following goals that relate to the Pleasant Valley Creek habitat:

- Address habitat needs for a diversity of fish and wildlife with a priority for species most impacted by degraded condition, beaver, moose, and those of ESA concern such as bull trout, westslope cutthroat trout, and redband trout.
- Restore wetland hydrology and vegetation to historical conditions.

- Restore streams to historic channels and function, where feasible.
- Restore fisheries habitat and aid fish passage to tributary channels, where feasible.

Pleasant Valley Creek is a tributary of the Fisher River. Fisher River is an important site for bull trout; therefore, Pleasant Valley Creek can contribute to the system as a non-fish-bearing tributary. Pleasant Valley Creek does not currently support any of the above-mentioned fish species (Mabbot 1996, Hensler 2001).

Pleasant Valley Creek has been channelized and a large portion does not have native, woody, streambank vegetation. Subsequently, MFWP has sampled the stream and found high water temperatures and heavy siltation. Plans are in draft form to improve the stream channel to create or enhance fish habitat by restoring sinuosity on the south end where it was channelized and straightened. There are also sections along the stream where the channel would be revegetated with herbaceous and woody wetland plants. Revegetation would provide bank stabilization and cover that should help decrease water temperatures. Woody vegetation (such as alders, willows, and hawthorn) would also contribute to habitat for many passerines including the willow flycatcher, a species of concern for MPIF. These projects are scheduled for 2003–2007.

Restoration is always expensive. The refuge has had multiple entities requesting information about the restoration effort on Pleasant Valley Creek. Many of these potential partners have offered to provide funding and expertise, as well as help to find additional funding sources. The refuge would continue to work with these groups and liaison with NRCS regarding funding needs to produce a restoration effort that would contribute a quality conservation effort of riparian habitat, migratory birds, and native fish.

WETLAND HABITAT

Rationale 8 (all alternatives): Dahl Lake is a natural lake that spills over to the west in high water years into the surrounding wetland complex. This complex is a system that naturally fluctuated in water level seasonally and yearly, creating an array of temporary, seasonal, and semipermanent wetlands.

The NWI data (1982) for the Dahl Lake complex designated the following:

- 182 acres of open water
- 80 acres of semipermanent wetlands (water through spring and summer and frequently into fall and winter)
- 432 acres of seasonal wetlands (water in spring and early summer but generally dry by late summer and early fall)
- 376 acres of temporary wetlands (water for only a few weeks after snowmelt and few days after heavy rainstorms)

Around 1940, the natural spillway was channelized and directed through a ditch system (named Meadow Creek) to reduce the lake to lower levels and dry the surrounding wet meadows to increase hay pasture. Meadow Creek extends westward through the valley from the western end of Dahl Lake. Portions of this creek were channelized and, more recently, dredged in an effort to increase water flow efficiency for irrigation. Historical and recent aerial photos show the area as a wetland complex of temporary and seasonal wetlands, with seepage and some overflow heading out of the west end of the complex and north across the county road before it turns back north. The Service would work closely with NRCS on restoration of the Meadow Creek area back to a wetland complex, since it continues west off of the east mitigative parcel onto the NRCS's wetland reserve easement.

Filling in the drain ditch out of the west end of Dahl Lake would affect the type of wetlands in the complex for seasonality (temporary and seasonal versus semipermanent) and amount of emergent vegetation. With the drain ditch filled in, the lake should fill to cover greater amounts of surface acreage and spill over to the west end to restore the wetland complex. The wetland complex would be able to fluctuate with natural variations in available water. There would be an increase of at least 200 acres of temporary wetlands. Water would be held longer to restore current temporary wetlands back to seasonal and semipermanent.

Water levels should increase gradually to avoid scouring turbidity and plant mortality (Weller 1981). The complex should refill slowly and with naturally occurring runoff and collection and, therefore, should not increase turbidity or reduce seed stocks for establishing emergent vegetation (Weller et al. 1991). Wildlife would benefit from an increase in foraging and nesting habitat if the natural ecosystem functioning and wetland complex of Dahl Lake is restored.

Temporary wetlands are important for breeding waterfowl, especially early nesters such as mallards and teal, because they provide isolation and spacing. In addition, their shallow waters warm rapidly, providing the first invertebrate food resources in spring (Swanson et al. 1974, Baldassarre and Bolen 1994). However, seasonal wetlands also provide abundant invertebrate foods and nesting cover for species that nest over water.

Most species exploit different types of wetlands to gain various life history requirements. This illustrates the importance of maintaining a complex

of wetlands. For example, American bitterns nest in shallow (<10 centimeters) water with dense, robust emergents, while trumpeter swans will nest in water >50 centimeters. Both black terns and trumpeter swans need abundant, floating, dead vegetation. Providing a mosaic of wetland types with a healthy, robust, emergent plant community, well-interspersed with open water, would provide habitat for a diversity of water birds.

Restoring the wetlands and Dahl Lake wetland complex, and constructing islands, would increase wildlife habitat—as well as comply with the habitat development plan, which is a result of a FERC-approved settlement between the Department of the Interior, the MPC, and the CSKT. The settlement was for mitigation of habitat and wildlife losses on the Flathead WPA caused by past and future operations of Kerr Dam by the MPC. The refuge has 3,112 acres because of this mitigation process. The habitat development plan addresses planned habitat enhancements on the refuge per the “Stipulation and Agreement” (December 12, 1997) and the “Order Approving Settlement.” These developments and enhancements are the result of nearly 15 years of study, assessment, planning, and negotiations between the MPC, the CSKT, and the Service.

The Northern Rocky Science Center has expressed an interest in conducting research that would evaluate how western montane wetlands function. These data, in association with NWI classifications, would provide an understanding of how the naturally occurring fluctuations in water levels of Dahl Lake wetland complex function and the response of associated vegetation and wildlife. These data are a critical link between land management decisions and the appropriate response or result. Subsequently, this would foster the restoration of the biological integrity of the refuge, while restoring wetland habitat that has been increased as habitat and food sources for nesting and foraging waterfowl. However, there are no current plans for collaboration with Rocky Mountain Science Center in alternative D.

Rationale 9 (all alternatives): Dahl Lake water levels have been stabilized at a lower level for multiple years to promote drying of the upper portions of the meadow for hay pasture. A consequence of stabilized water levels is promotion of cattail and reed canarygrass growth in the wetland, which can reduce the attractiveness to waterfowl (Smith and Kadlec 1986). Reed canarygrass will often grow into a monoculture reducing species diversity. Although some waterfowl species use reed canarygrass as nesting substrate, it is not a native plant species.

In the past, cattle grazing has kept the reed canarygrass in check to some degree. However, it still has taken over the wetland with approximately 750 acres in units 14 and 19; therefore, some type of control must be attempted. In unit 14, the largest section of *Phalaris* is still interspersed with *Carex*,

and therefore, hopefully has a chance at restoration to native species.

Rationale 10 (all alternatives): Many of the wetlands were drained in the interest of promoting hay pasture. The reduction of surface water and loss of wetland vegetation is not as conducive to waterfowl and other water bird use. Many of the wetlands can be manipulated back to a basin that can discharge and recharge on a seasonal basis. One wetland (near office headquarters) does not need dirt work, just installation of a water control structure. Naturally occurring runoff should be adequate to fill wetland basins. However, water control structures would allow the maximum flexibility to manipulate water. As wetlands return to a normal seasonal fluctuation, wetland vegetation should reestablish without further manipulation.

These wetlands are classified as semipermanent and seasonal, which with recharge and time, should provide invertebrate foods and emergent vegetation for foraging habitat and nesting and brood cover.

Rationale 11 (alternatives A, B, and C): Fens are sedge-dominated emergent wetlands in northern regions that have an underlying layer of peat covered with many species of mosses and aquatic macrophytes. A fen is similar to a bog, but is alkaline rather than acidic with a much higher nutrient content. Fens gain nutrients found in precipitation, surface water, and groundwater, whereas bogs are fed by nutrients in precipitation only (Aerts 1999).

Wet meadows are like fens, but are much more numerous across the country and are dominated by plants including sedges, rushes, and grasses such as reed canarygrass. Fens are special management areas that the Service would like each refuge to inventory for future protection.

Rationale 12 (alternatives A, B, and D): Wetlands with diverse emergent vegetation, interspersed seed-producing annuals, and open water with a submergent vegetation community provide the habitat requirements of many waterfowl and water bird species (Cowardin et al. 1979). The refuge’s primary purpose is for migratory birds, with emphasis on waterfowl and other water birds. Emergent vegetation (e.g., *Typha*, *Scirpus*, and *Juncus*) is critical to successfully raising a brood—from use as foraging habitat to escape cover. Submergent vegetation such as *Potamogeton*, *Mentha*, and *Equisetum* provides seeds and the substrate necessary for invertebrate populations to grow and provide food to waterfowl.

While there are some differences among waterfowl—such as mallards’ preference for abundant emergent vegetation, while gadwall broods use more open water—the variety of wetlands should provide enough interspersed open water to emergent vegetation to meet the needs of many species. Other

water birds such as black terns, American bitterns, and grebes, along with mammals such as moose and mink, would provide maximum wildlife-viewing and photography opportunities.

Rationale 13 (alternative A): Kilbride and Paveglio (1999) described a four-step method of controlling reed canarygrass that included a late spring application of herbicide (Rodeo), disking in summer, application of herbicide the next growing season, and inundation with water until mid-June. However, with early high-water levels, this method may not be appropriate. It would also be dependent on how much area can be disked. Further review of the literature and speaking with experts would provide the best management practice available.

Many water birds use the emergent vegetation of the Dahl Lake wetland complex. A colony of black terns (Montana species of concern), has been nesting in this area along with other species such as American bittern, sora, (potentially) Virginia rail, and redheads. Although some bird species will nest in reed canarygrass, native plant species diversity would be increased with species such as cattail and bulrush, along with a variety of wetland plants such as *Carex*, *Scirpus*, *Juncus*, *Typha*, *Mentha*, and *Potamogeton*. These wetland plant species would increase food and nesting substrates for a greater diversity of wildlife.

Rationale 14 (alternative B): Restoration of wetlands should also increase the number of waterfowl, which may enable the refuge to provide a quality waterfowl hunt.

Rationale 15 (alternative B): Wild rice has been shown to attract and concentrate large numbers of breeding waterfowl and may increase nest success and duckling survival (Peden 1977, Huseby et al. 2001). In areas of reed canarygrass, wild rice plantings can be used to maximize local production, and increase hunting and wildlife-viewing and photography opportunities.

Rationale 16 (alternative C): Native species restoration is the management priority for alternative C, and the managers would like to complete the restoration without herbicide. Restoration in reed canarygrass areas may release the *Carex* and other native species and provide a good chance at restoration success. As native plant species recolonize the area, it would also increase the diversity of plant species, which would lead to more diverse food sources. The subsequent wildlife diversity, as well as abundance, could increase with the increase in food.

Rationale 17 (alternative D): To stop reed canarygrass from taking over the entire wetland complex, some type of control must be attempted. Many water birds use the emergent vegetation of the Dahl Lake wetland complex. A colony of black

terns (Montana species of concern) has been nesting in this area along with other species such as American bittern, sora, (potentially) Virginia rail, and redheads. Though some bird species will nest in reed canarygrass, native plant species diversity would be increased with species such as cattail and bulrush along with a variety of wetland plants such as *Carex*, *Mentha*, and *Potamogeton*. These wetland plant species increase food and nesting substrates for a greater diversity of wildlife.

GRASSLAND HABITAT

Rationale 18 (all alternatives): The habitat development plan is a result of a FERC-approved settlement between the Department of the Interior, the MPC, and the CSKT for mitigation of habitat and wildlife losses on Flathead WPA caused by past and future operations of Kerr Dam by the MPC. The refuge has 3,112 acres because of this mitigation process. The habitat development plan addresses planned habitat enhancements on the refuge per the “Stipulation and Agreement” (December 12, 1997) and the “Order Approving Settlement.” These developments and enhancements are the result of nearly 15 years of study, assessment, planning, and negotiations between the MPC, the CSKT, and the Service.

The refuge is surrounded by PCTC lands that are open to public use and grazing leases. Many individuals hunt, mountain bike, and horseback in the area. These uses are not allowed on the refuge. The public needs to understand when they are on the refuge so that they stay in compliance with regulations. Boundary fencing is needed in areas of grazing leases to prohibit trespass grazing.

Rationale 19 (all alternatives): Management success for specific plant communities is dependent on soil type. The soils layer has been defined for the refuge; however, many of the soil types are unique to the area and have not been classified. NRCS can classify the soil types with sampling and through literature review of associated plant communities. This information is crucial for determining whether a particular plant community can be achieved with a management practice. It may also help explain or understand invasive plant control efforts or encroachment and native plant restoration.

Rationale 20 (all alternatives): Cumulative impacts from grazing can occur by heavy grazing leading to replacement of Idaho fescue with invasive species such as cheatgrass (Mueggler 1984) and knapweed (Olson and Wallander 1997), and can adversely affect soil fertility. Rough fescue is a highly palatable species and is extremely susceptible to grazing and trampling damage. Two to three summers of heavy grazing can effectively eliminate plants from sites (Johnston and MacDonald 1967). Continued close grazing greatly

lowers vigor and eventually results in death of the plant (Johnston and MacDonald 1967).

Recovery from overgrazing is slow due to erratic seed production and limited tilling abilities (Johnston and MacDonald 1967). However, light grazing does not reduce overall plant vigor (Johnston 1961, Mueggler and Stewart 1980). As with Idaho fescue, it is suggested that a carryover of 40–50 percent of the current year’s growth of rough fescue and 20 percent of the seed stalks would maintain plant vigor.

Maintenance of grasslands in the Intermountain West is dependent on periodic fires to remove dry matter and invading shrubs and trees. The fire interval historically was quite variable. Using prescribed fire at 10- to 25-year intervals has neutral to negative effects on Idaho fescue (Antos et al. 1983, Arno and Gruell 1986). Fire effects vary with condition and size of the plant, season, and severity of fire, and ecological conditions.

Idaho fescue has been reported to be more sensitive to fire than bluebunch wheatgrass (Conrad and Poulton 1966). Rough fescue seems to be well adapted to periodic use of prescribed fire. Spring and late fall burns on Idaho and rough fescue sites with good soil moisture, during plant dormancy, and with favorable Idaho fescue root reserves are thought to injure plants less; yet late-season burning results are varied for both fescues (USDA Forest Service fire effects information system database). Spring burns should be conducted as soon after snowmelt as possible to minimize fire damage. Spring burns after new growth has initiated on western wheatgrass can severely injure this species (Volland and Dell 1981).

Fire effects are varied also with respect to increase in vigor. Vigor has been seen to return in 2–5 years for Idaho and rough fescue and western wheatgrass, with an increase in protein content for Idaho fescue (Launchbaugh 1964, Phillips 1973, Stubbendieck et al. 1986, Singer and Harter 1996). Western wheatgrass increases in abundance and density after a fire. Drastic reductions in rough fescue seed production are also possible following spring burning (Bailey and Anderson 1978).

Prescribed fire frequencies of 5–10 years are recommended for mountain grassland sites where management objectives are aimed at rough fescue maintenance.

Rationale 21 (all alternatives): Monitoring for flora and fauna response to land management would provide feedback crucial for determining whether management efforts are achieving their desired outcome. This adaptive approach provides a prescriptive process rather than crisis management. Species would be better provided for in a manner

that is driven with a purpose—leading to better chance of success and use of funds and time.

Rationale 22 (alternatives A and B): Upland grasslands and one unit of bottomland grasslands (figure 2; management units 11, 12, 13, 14, 19) surround the Dahl Lake wetland complex. These grasslands would be managed for waterfowl-nesting habitat based on their location and grass species. Though waterfowl hunting is not allowed, the Service is working towards improving waterfowl habitat and the potential to provide hunting in the future. These grasslands are native and tame grasses, but the *Alopecurus* is not considered in the objective acreages, since another objective is restoring it to native species.

It has long been established that vegetation structure and litter are what species key into for nest site selection rather than species composition (Cody 1968, Wiens 1969, Kantrud and Higgins 1992). Therefore, it is acceptable to work with tame grasses for ground-nesting birds. However, with initiatives such as “Bring Back the Natives,” refuges are putting more effort into maintaining and working with native plant communities when possible and feasible. To achieve and maintain the above-stated desired vegetative condition, short-term management practices (e.g., grazing or fire) would be used to remove decadent, residual vegetation [every 5–7 years (Kirsch et al. 1978), 6–7 years (Gilbert and Woodling 1996), or 5–10 years (Barker et al. 1990) depending on productivity, precipitation, and vegetation-monitoring results].

Maintaining vigorous, medium-tall grassland around Dahl Lake would provide waterfowl nesting habitat along with benefits to other species such as the short-eared owl, savannah sparrow, meadowlark, and northern harrier. The public would be able to enjoy increased opportunities for wildlife observation and photography, due to increased use by birds and other species such as moose, elk, and bear.

Rationale 23 (alternative A): Upland grasslands overlay rolling topography that grades into forest habitat and encompass approximately 1,500 acres. The majority of the upland grassland areas are native grasses. Native bunchgrass prairie is an important habitat coverage that is limited in the northwest. The refuge has a substantial tract that can be conserved for use by native wildlife species and public use, including environmental education. Upland habitat restoration is also part of staying in compliance with the habitat development plan.

The refuge was a working cattle ranch prior to refuge establishment and some areas have been overgrazed, which has led to areas with invasive plants and sparse vegetation with low productivity. Impact of defoliation on plant vigor is depression of herbage and flower stalk production. For vigor to

recover in grassland species such as Idaho fescue, areas of extremely poor vigor may need 6–7 years of rest, while bluebunch wheatgrass can take up to 10 years (Mueggler 1975). In areas of intermediate vigor, Idaho fescue may be able to recover after 3 years of protection (Mueggler 1975). Resting would allow management to determine grassland conditions for plant species composition and vigor (cover, height, and productivity).

The best management practices with the use of rest, prescribed fire, and grazing can be developed based on evaluating which tool at a particular timing would maintain native, vigorous bunchgrass uplands for nesting migratory birds and forage for other wildlife. Grazing would need to be used cautiously with either none, or limited to light grazing after the growing season, for maintenance of cool-season bunchgrass areas.

Repeated grazing may reduce the ability of Idaho fescue to compete with spotted knapweed when both are grazed (Olson and Wallander 1997), and grass defoliation in spring increases spotted knapweed cover compared to summer defoliations (Jacobs and Sheley 1999).

Rationale 24 (alternative A): The refuge and WRP easement south of the county road has a wide diversity of sedges, native grasses, and forest. With rest, native fescue would continue to recover vigor, depending on precipitation. Once vegetation targets are met, some disturbance would be required to maintain vigor, unless native herbivores are concentrating in these areas. Close monitoring and collaboration with NRCS is required, as well as interagency permission to conduct management practices on these easement tracts.

Rationale 25 (alternative B): There are more than 1,000 acres of relict, native, bunchgrass prairie that can provide wildlife cover and nesting habitat. Idaho fescue and western wheatgrass have very good to excellent palatability and have good energy value as forage for elk and deer (Mueggler and Stewart 1980). These grasses also provide fair to good cover for nongame birds (Dittberner and Olson 1983, Tirmenstein 1999).

The refuge has a popular big game hunting program and many visitors enjoy birdwatching and photography. Maintaining healthy native grasses would provide a unique setting for the surrounding area visitors to enjoy wildlife in several ways.

Rationale 26 (alternative B): The refuge and WRP easement south of the county road has a wide diversity of sedges, native grasses, and forest. With rest, native fescues would continue to recover vigor depending on precipitation. Once vegetation targets are met, some disturbance would be required to maintain vigor unless native herbivores are concentrating in these areas. Close monitoring and

collaboration with NRCS would be required, as well as interagency permission, to conduct management practices on these easement tracts.

Alternative B would maintain two extensive foot trails, with their use benefiting from maintenance of native grasslands in a vigorous state. Visitors would be able to view native wildlife habitat and the wildlife species associated with them. In addition, vigorous grasslands are more protected against invasive plant seed and undesirable annuals being brought in from visitors.

Rationale 27 (alternatives C and D): Palouse prairie is listed as a critically endangered ecosystem exhibiting a 98 percent decline (Noss et al. 1995), therefore, conservation is necessary. These upland grasslands overlay rolling topography that grades into forest habitat and encompass approximately 1,500 acres. The majority of the upland grassland areas have native grasses. Native bunchgrass prairie is an important habitat coverage that is limited in the northwest. The refuge has a substantial tract that can be conserved for use by native wildlife species and for environmental education. Upland habitat restoration is also part of staying in compliance with the habitat development plan.

The refuge was a working cattle ranch prior to refuge establishment and some areas have been overgrazed, which has led to areas with invasive plants and sparse vegetation with low productivity. For vigor to recover in grassland species such as Idaho fescue, areas of extremely poor vigor may need 6–7 years of rest, while bluebunch wheatgrass can take up to 10 years (Mueggler 1975). In areas of intermediate vigor, Idaho fescue may be able to recover after 3 years of protection (Mueggler 1975). Resting would allow management to determine grassland conditions for plant species composition and vigor (cover, height, and productivity).

Vigor must be returned to accomplish productivity needed to regain the native, climax community (native plants in their “correct” percent compositions).

Rest from cattle grazing would allow managers to determine current grassland conditions. For alternative D, future management efforts can then be developed based on evaluating which plant communities and areas have the greatest biological potential to be managed for a group of wildlife species.

The best management practices with the use of rest, prescribed fire, and grazing can be developed based on evaluating which tool at a particular timing would maintain native, vigorous bunchgrass uplands for nesting migratory birds and forage for other wildlife.

Rationale 28 (alternative D): Refuge managers cannot manage for everything and must prioritize species for which the habitat would be manipulated. To provide for priority species, a review must be conducted on the habitat requirements, which are then used as outcomes for habitat management. Once managers develop the habitat outcomes desired, a plan would be put together for how best to achieve the habitat outcomes using the various land management tools (rest, grazing, prescribed fire, or haying). Establishing an outcome, as well as how best to achieve it, is critical to saving money and effort in the long run.

FOREST HABITAT

Rationale 29 (all alternatives): Initial efforts to classify the forests on the refuge combined the largest area possible for dominant tree species, and other available habitat types within large forest areas may be missing.

Several wildlife species of concern could be using forest habitats. Forest habitat is not a priority for refuge management, however, as wildlife stewards, the Service should still determine what is within their boundaries, and not conduct any management that would hinder species of concern and their biological potential.

Bald eagles are nesting in aspen forest and golden eagles are nesting in Douglas-fir forest. Olive-sided flycatchers, flammulated owls, and black-backed woodpeckers are priority species (level 1) for the MPIF program. They are found in open-canopy woodlands, open-canopy ponderosa pine, and closed-canopy lodgepole pine, respectively. Olive-sided flycatchers have been recorded to occur on the refuge.

Yellow-billed cuckoos are a federal candidate species that could be using the cottonwood–aspen woodland associations. Grizzly bears and wolves are known to occur in the surrounding forested area, and Canada lynx could potentially be using the refuge as a corridor or foraging through the area.

Since there are no resources available to conduct forest management to improve the habitats for any of these species, management actions would be monitored and reviewed to not hinder the use of these habitats by these species.

Rationale 30 (all alternatives): The historical aspect of the lack of fire has resulted in a fire-intolerant species that increases susceptibility to severe wildland fires, shifts composition toward the more shade-tolerant Douglas-fir, and contributes to the loss of wildlife forage (Smith and Arno 1999). Arno and Smith (1999) recommend reversing this trend by reintroducing low-intensity wildland fires through the use of prescribed fire in conjunction with partial cutting or thinning.

Rationale 31 (alternative A): There is not enough forested habitat to provide all life requirements for species such as the grizzly bear, gray wolf, and Canada lynx. However, with the large tracts of adjacent USDA Forest Service and PCTC lands, the refuge could provide an important linkage area for these species.

Rationale 32 (alternative A): Stands of large ponderosa pine historically dominated most dry forest sites in western Montana. These dry forests are composed of a mix of ponderosa pine and Douglas-fir. Logging and fire suppression have resulted in an alteration of age class structure, physical structure, tree density, and tree species composition (Barrett 1979, Schubert 1974, Shepperd et al. 1983). Large, old-growth trees in open settings have been replaced with dense stands of younger trees.

Many priority bird species—such as the Lewis’s woodpecker, pileated woodpecker, olive-sided flycatcher, flammulated owl, white-breasted nuthatch, and Williamson’s sapsucker (all noted on the refuge)—are closely associated with old forest stages and snags. Regional populations of these species have decreased due to the reduction of old forest stages.

Other species that are favored by the public such as elk and deer should benefit as well. Elk live in high elevations in semi-open forests and mountain meadows during the summer. In the winter, elk migrate to lower sheltered valleys, windswept meadows, and lower wooded slopes. Tree lichen is important forage for deer and elk during winter (Baty et al. 1996). Typical diet consists of mainly grasses, sedges, and forbs. The refuge may be able to provide more old-growth habitat to foster these species.

Rationale 33 (alternative B): A large wintering elk and deer population use the dry forest areas composed of a mix of ponderosa pine and Douglas-fir. Logging and fire suppression has resulted in an alteration of age class structure, physical structure, tree density, and tree species composition (Barrett 1979, Schubert 1974, Shepperd et al. 1983). Elk live in high elevations in semi-open forests and mountain meadows during the summer. In the winter, elk migrate to lower sheltered valleys, windswept meadows, and lower wooded slopes. Tree lichen is important forage for deer and elk during winter (Baty et al. 1996). Typical diet consists of mainly grasses, sedges, and forbs.

The open foraging areas of large, old-growth trees have been replaced with dense stands of younger trees. Halting Douglas-fir encroachment or young even-aged stands would favor elk and deer, while maintaining some of these areas to benefit them in the winter for thermal cover. Other species that the public like to observe includes many priority bird species associated with old forest stages such as the

Lewis's woodpecker, pileated woodpecker, olive-sided flycatcher, and flammulated owl.

Rationale 34 (alternative B): Turkeys are not indigenous to Montana and are not a priority species for management consideration; however, they are a popular game species and are considered for habitat management to serve the public. Wild Merriam's turkeys were transplanted to Pleasant Valley in 1999. Merriam's turkeys are associated with ponderosa pine, lodgepole pine, and Douglas-fir near edges, which provide open areas for feeding, mating, and habitat (MacDonald and Jantzen 1967). They use forested areas as cover from predators and for roosting in trees at night. Open areas provide a greater abundance of insects to young poults and females.

A varied habitat of both open and covered area is essential for survival of wild turkeys. Most sightings of turkey have been associated with mixed-conifer and hardwood areas and meadows surrounding the Dahl Lake complex.

Turkey hunting is open in fall and spring, except within the bottomlands between south of the county road and north of south Pleasant Valley Road.

Rationale 35 (alternative D): Resources do not currently exist to conduct forest management. Until further staff is on site, it would be impossible to determine the best management practices for forest habitat. Limitations with staff and equipment hamper the refuge's ability to develop objectives and use management tools such as restoration, prescribed fire, thinning, or removal. Alternative D has no migratory bird priorities established for species that use forest habitat.

INVASIVE PLANTS

Rationale 36 (all alternatives): The presence of invasive plants can alter the functioning of ecosystems by loss of wildlife habitat, displacement of native species, change in carrying capacity from reducing forage production, lowered plant diversity, and increased soil erosion and sedimentation.

These negative effects from invasive plants require control, which includes chemical, biological, and hand pulling for tansy ragwort, spotted knapweed, and sulfur cinquefoil to maintain native grasses and Spalding's catchfly.

Herbicide use for invasive plants would decrease the ability of these plants to outcompete the grasses and native forbs for light, water, nutrients, and pollinators.

Herbicide use would be distributed throughout the refuge and applied at the rate according to the label. Spraying would be monitored. There should be no detrimental effect from too much herbicide in one location. A negative effect could occur from care not

being taken where aerial spray of Tordon drifts onto forested areas and young trees are killed. If any, only negligible impacts should occur from herbicide use in the water systems due to application following label guidelines and refuge policy.

Care must be taken with prescribed fire in areas of invasive plants. Judicious removal of invasive plants needs to be conducted at least 2 years prior to use of prescribed fire to prevent seed production and dispersal (Goodwin 2001). Otherwise, prescribed fire could increase the coverage of invasive plants and reduce native grasses and forbs. Prescribed fire may have to be prohibited in areas of dense occurrence of invasive plants (with low to absent desired plant cover), to prevent rapid and expanded growth of invasive plants due to fire-produced disturbances. This approach of careful control prior to burning should have great positive benefits for reinvigorating and increasing Spalding's catchfly habitat.

Rationale 37 (all alternatives): Invasive plant control is a legal and popular issue for many national wildlife refuges, as well as required to be in compliance with the habitat development plan. The primary reason for control is that invasive plants displace native vegetation and impact wildlife by reducing availability of forage, cover, and nesting sites.

The refuge has not yet been inundated with a large number of invasive plant species. Spotted knapweed and tansy ragwort are the two most common and noticeable invasive plants. Sulfur cinquefoil exists intermingled with the native cinquefoil, so the extent of this problem has yet to be defined. Spotted knapweed is fairly dispersed and needs to have priority for control efforts to keep it from becoming dominant. Tansy ragwort is a new, encroaching invasive plant on that is in many isolated pockets; eradication may still be possible if heavy effort is put into early control. The refuge will continue in partnership with the working group that has been established for working on tansy ragwort control within the area.

Invasive plant control is costly in both time and money. Successful control requires careful planning, implementation, and monitoring as defined by. Past efforts and current infestation levels would be evaluated and monitored for effectiveness. This needs to be done to demonstrate that time and effort are not wasted. Chemical and biological control are the two most common control methods used on these invasive plants. However, careful application of chemicals would be essential to produce the desired result for native vegetation composition.

Biological control would need to be evaluated for the benefits and impacts to determine whether a nonnative species should be introduced on refuge lands.

- Determine if a biological control would switch from the target invasive plant to a native species.

- Determine demonstrated success in other areas with limiting or eradicating encroachment.
- Determine that a biological control would not alter or disrupt the native insect community, especially in regards to native pollinators.

Biocontrol agents have been shown to reduce the spread of invasive plants. However, controversy exists over whether there are direct effects of biological control on nontarget species, as well as indirect effects.

Pearson et al. (2000) demonstrated that the establishment of the biological control agent, *Urophora* spp., altered deer mouse diets and habitat selection by effecting changes in foraging strategies. This could result in spiraling changes to the food web. For example, a small mammal population increase could be followed by an increase in raptors, foxes, and skunks. These species also prey on ground-nesting migratory birds. On the other hand, increases in small mammals have been shown to result in less nest predation because predators are using the small mammals as alternative prey. However, high populations of small mammals can result in increased ground disturbance from tunneling, which often creates perfect sites for dispersal of invasive plants.

Spotted knapweed is the primary invasive plant found on the refuge. Invasive plants have undergone extensive range expansion and often create dense stands that turn native plant communities into invasive plant wastelands. The presence of invasive plants can alter the functioning of ecosystems by loss of wildlife habitat, displacement of native species, change in carrying capacity from reduced forage production, lowered plant diversity, and increased soil erosion and sedimentation.

Spotted knapweed aggressively invades grassland and early successional forest sites (Rice et al. 1997a). As spotted knapweed increases on a site, other species decline, with up to a 60–90 percent decrease in graminoid production (Harris and Cranston 1979, Bucher 1984, Morris and Bedunah 1984).

With limited staffing, the staff of the refuge complex would have to provide collateral effort for invasive plant control, as it has been able to do since establishment of the refuge, until a maintenance worker and biologist are added. This would limit the control effort to the stated, annual average of 200–400 acres. The refuge would continue to explore opportunities for grants and partnerships for additional invasive plant control and volunteer recruitment to maintain or expand control efforts.

Rationale 38 (all alternatives): Cumulative impacts from grazing can occur by heavy grazing leading to replacement of Idaho fescue with invasive species such as cheatgrass (Mueggler 1984) and knapweed (Olson and Wallander 1997), and can adversely affect

soil fertility. Rough fescue is a highly palatable species and is extremely susceptible to grazing and trampling damage. Two to three summers of heavy grazing can effectively eliminate plants from sites (Johnston and MacDonald 1967). Continued close grazing greatly lowers vigor and eventually results in death of the plant (Johnston and MacDonald 1967).

Rationale 39 (alternatives A, B, and C): The refuge has 1,000 acres of *Alopecurus*. This species is palatable, but a poor-nutrition forage grass for big game; while it can provide some nesting cover for waterfowl (Hitchcock 1971). These species are often seeded with timothy (*Phleum pratense*); plant diversity is reduced by the vigorous spread and domination of the occupied area. Control would require elimination along with simultaneous introduction of a desirable competitor (Weaver et al. 1990). These areas are temporarily flooded wet meadows (USFWS 1982) with many sedges already interspersed throughout the areas adjacent to native grasses.

A partnership is already established with NRCS for the WRP easement. The WRP easement has plans for native plant restoration. Restoration efforts are often costly and time consuming; the feasibility of restoring all tracts of *Alopecurus* is likely cost-prohibitive. The collaboration of the Service and NRCS should provide quicker results with greater cost efficiency than by working alone, hence a priority for areas within the WRP easement. Future efforts can be placed toward the remaining bottomland areas adjacent to the WRP easement and finishing with the areas in the more upland sites.

Rationale 40 (alternative A): The refuge was a working cattle ranch prior to refuge establishment and some areas have been overgrazed, which has led to areas with invasive plants and sparse vegetation with low productivity. Repeated grazing may reduce the ability of Idaho fescue to compete with spotted knapweed when both are grazed (Olson and Wallander 1997), and grass defoliation in spring increases spotted knapweed cover compared to summer defoliations (Jacobs and Sheley 1999).

Rationale 41 (alternative B): While the WRP easement would have priority for restoration of *Alopecurus* areas, other areas of *Alopecurus* would remain and be maintained for waterfowl-nesting habitat and other wildlife forage.

MIGRATORY BIRDS

WATER BIRDS

Rationale 42 (all alternatives): Disturbance can negatively affect waterfowl production by decreasing the number of breeding pairs, hatching success, and survival of the young. Disturbance during pair bonding, and nest building and initiation can cause

waterfowl to nest elsewhere or not at all. Several studies have identified human disturbance as the cause of desertion or abandonment of nests, especially during early incubation (Korschgen and Dahlgren 1992). Nest success can be affected by flushing hens away from the nest, leaving the eggs exposed to predators and the elements. Human-created trails and markers may also increase predation rates on hens and eggs. Disturbance during brood rearing may break up and scatter broods leaving them vulnerable to predation, exposure, and starvation.

Disturbance would be limited to increase production and survival. Human-induced increases in predation are a severe problem for breeding shorebirds in the Intermountain West (Oring et al. 2003). Shorebirds have higher metabolic rates than do birds of similar size (Wilson 1991). They are less likely to tolerate poor quality food. The effects of disturbance on shorebirds include reduced foraging time due to displacement and reduced food supply due to compaction of substrate (Hamann et al. 1999).

At Bosque del Apache National Wildlife Refuge (New Mexico), waterfowl increased nitrogen levels by 40 percent and phosphorus levels by 75 percent in the winter of 1995–1996 (Post et al. 1998).

To evaluate production and how management practices are affecting it, an index from pair-count surveys is used. Duck pair counts have been conducted on Dahl Lake and other wetlands since establishment of the refuge. Pair counts are conducted once during the nesting season in mid- to late May or early June. Pair-count data would only establish an estimate of how many pairs are nesting. Average brood size, hen success, and survival to fledglings must also be calculated to determine production:

Duck Production =

of pairs x average brood size x nest success
x constant of 0.7 (survival to fledgling)

Rationale 43 (all alternatives): The National Bison Range complex completes three aerial surveys for geese with partners; the CSKT, MFWP, and Avista Utilities. The two surveys that include the refuge are the goose pair count and goose brood survey. The midwinter waterfowl survey is not conducted on the refuge due to early ice-over of the wetlands. The pair survey was not conducted for several years, but has been resumed. These data are important to evaluate population trends from year to year and are used by MFWP for hunting regulations. The brood survey is used to calculate production.

Rationale 44 (alternatives A, B, and C): Wetland-dependant species are important to ecosystem health and many are listed as priority species under the U.S. Shorebird Conservation Plan and the MPIF initiative. These species are difficult to record with

traditional monitoring and general observation. Monitoring such as taped calls may be needed to record their presence. Once monitoring is accomplished, management practices can be developed to promote these species. The refuge would be surveyed to determine the status of shorebirds, marsh birds, and sandhill cranes.

One of the goals of the U.S. Shorebird Conservation Plan is to ensure that adequate quantity and quality of shorebird habitat is maintained at the local level. The conservation plan is split into individual regional plans with the refuge falling in the Intermountain West subregion. By monitoring and protecting shorebird habitat, the refuge can aid the Intermountain West region in obtaining two of their regional goals.

- *Habitat Management Goal:* Maintain and enhance diverse landscapes that sustain thriving shorebird populations.
- *Monitoring and Assessment Goal:* Acquire information on shorebird distribution and abundance for shorebird conservation.

Species of shorebirds known to breed in the northern Rocky Mountains that are listed as priority 3 (important) for conservation value include the black-necked stilt, American avocet, greater yellowlegs, willet, spotted sandpiper, Wilson's phalarope, and common snipe. The long-billed curlew is listed as priority 4 (very important). The snowy plover, killdeer, and upland sandpiper may occur in the area, but are not listed as priority species. Twenty-three additional species occur annually as migrants—6 in moderate numbers and 17 in small numbers.

The American bittern is as a priority 3 species for the MPIF initiative. It is a secretive species, which makes it difficult to monitor and, therefore, hard to determine occurrence and abundance. It is critical to establish distribution of this species and provide protection before they are lost in northwestern Montana. The biological potential exists for bitterns at the refuge, but surveys have not been conducted. Bitterns may nest in reed canarygrass (Dechant et al. 1999) and prefer relatively large (7.4 acres) wetlands.

One of the goals of the refuge as stated in the EA and conceptual management plan (1998) is as follows: to provide optimal feeding and resting habitat for waterfowl, cranes, other migratory water birds, and shorebirds.

At least two pairs of sandhill cranes have been observed during spring and summer. Colts have been observed, so nesting has occurred. Surveys would be conducted to determine nesting density and success.

Young shorebirds are especially vulnerable to mortality from hay cutting. In Harney Basin, Oregon, it was estimated that one operator killed 400–600 shorebirds (primarily Wilson's phalarope)

by mowing between July 1 and July 13 (Oring et al. 2003). Unlike ducks, shorebirds (especially Wilson's phalarope) tend to remain in hay meadows to feed after hatching. Consequently, even the earlier-nesting species are vulnerable to mowing. Bitterns will not tolerate haying, mowing, or grazing during or immediately prior to nesting season.

The emphasis in alternative C is to restore habitat and limit disturbance to develop a self-sustaining functional ecosystem that naturally supports marsh and shorebirds. Monitoring would be conducted to gather baseline information and record changes as habitat restoration is implemented. Disturbance would be limited to increase production and survival.

Rationale 45 (alternatives A and B): Fall populations of waterfowl on the refuge appear to be low compared to other areas in western Montana. Weekly surveys would be conducted to determine base numbers for comparison with similar habitat. The refuge would work with partners and volunteers to conduct surveys of available forage resources. Experts would be consulted or a research project would determine what the limiting factors are to fall waterfowl populations.

A hunt plan was developed in 2001. One of the issues that were raised was to provide opportunities for waterfowl hunting. Waterfowl hunting is not permitted, due to low numbers of ducks and geese using the refuge during hunting season. In the EA for the hunt plan, it was stated that waterfowl populations and habitats would be evaluated in the future to determine the potential for hunting opportunities. The water bird objectives address that promise. Implementation of alternatives A and B includes monitoring the effect that wetland enhancement projects conducted under the habitat development plan and the NRCS restoration project would have on fall waterfowl populations.

In alternative B, a goal to increase waterfowl numbers by 20 percent is included to increase public use opportunities such as wildlife viewing, photography, and hunting. Staff would conduct surveys and consult with experts to determine limiting factors to fall waterfowl numbers and would use adaptive resource management to increase numbers. If forage were determined to be a limiting factor, the development of food plots would be examined.

Rationale 46 (alternative A): Average brood size, hen success, and survival to fledglings must be calculated to determine production. This requires additional staff and partnerships to conduct duck brood surveys and nest dragging. Conducting these surveys on the refuge would more accurately assess production. Nest dragging would be conducted to determine nest success and to ascertain causes of nest failure. This baseline information would be used to develop a waterfowl management plan with a goal of 25–40 percent nest success averaged over 5 years. A

nesting success of approximately 15–20 percent is suggested to maintain stable duck populations. (Cowardin et al. 1985, Greenwood 1986, Klett 1988).

Nest predation by mammals, and to a lesser extent by birds is the major proximate cause of nest failure (Cowardin et al. 1985, Greenwood et al. 1987, Klett et al. 1988). Predation can be limited directly through predator trapping and indirectly through habitat manipulation and expansion to increase nest security. Predator control is often expensive and time consuming; therefore, habitat manipulation would be used to increase nest success, unless continued monitoring suggests that predator control is needed.

Another limiting factor to duck production is forage. Aquatic invertebrates play a critical role in the diet of most female ducks during the breeding season. Ducklings feed on aquatic invertebrates until approximately 1 month old, and then gradually increase consumption of seeds and vegetation. The Dahl Lake wetland complex would be surveyed to determine available forage for female ducks and broods in the spring and early summer. Hens and broods switch to seeds and vegetation later in the summer and fall and these resources would be surveyed.

Rationale 47 (alternative A): Monitoring the effect that wetland enhancement projects conducted under the habitat development plan and the NRCS restoration project would have on fall waterfowl populations would be an important focus. Nest mapping or nest searching would better quantify the effects of restoration efforts. Surveying would more accurately portray species use of the refuge and help determine how best to provide habitat for the life needs of these species.

One of the goals of the U.S. Shorebird Conservation Plan (2000) is to ensure that adequate quantity and quality of shorebird habitat is maintained at the local level. The conservation plan is split into individual regional plans with Lost Trail National Wildlife Refuge falling in the Intermountain West subregion. By monitoring and protecting shorebird habitat, the refuge can aid the Intermountain West region in obtaining two of their regional goals.

- *Habitat Management Goal:* Maintain and enhance diverse landscapes that sustain thriving shorebird populations.
- *Monitoring and Assessment Goal:* Acquire information on shorebird distribution and abundance for shorebird conservation.

Although habitat may be the most important resource necessary to produce ducks, additional factors may also affect production, including predation, lack of suitable food substrate, and human disturbance. Surveys would be developed to determine waterfowl nest success, causes of nest failure, and food

availability. Adaptive resources management would then be applied to increase production.

Rationale 48 (alternative B): Nesting and production would be studied and a waterfowl management plan would be developed. Success would be measured by the number of fledglings produced rather than nest success alone. A goal of 500 was obtained by using an average pair count of 260 (from on-site pair counts conducted in 1999, 2000, and 2002), average nest success of 40 percent (average nest success on the WMD), and average brood size of 4.9 (average brood size on the refuge).

Construction of additional goose and duck nesting structures and islands would be evaluated to increase production.

The quickest and easiest way to measure and evaluate production trends is with nest success. However, other factors may be limiting production such as suitable nesting habitat and available forage. Alternative B considers all these factors to maximize duck production to meet refuge-enabling responsibilities and to provide quality public use.

Rationale 49 (alternative C): Habitat would be restored and nest and brood-rearing areas would be protected from disturbance. Baseline information on nesting and production would be gathered. Monitoring would continue to determine the effects of habitat restoration and ensure that other management activities do not have a negative effect on production. Improving habitat and limiting disturbance should increase production. Predator control would only be used as a last resort.

Rationale 50 (alternative C): Duck populations would be monitored by conducting pair and brood counts on the refuge. Managers would maintain or increase waterfowl populations by restoring habitat and reducing disturbance. Predator control would only be used if severe declines in populations were determined to be a result of depredation.

Alternative C emphasizes restoration of habitats to reestablish the natural ecology. After restoration, active management would be minimal and consist mainly of reestablishment of natural processes such as fire. Monitoring of habitats and wildlife would document change. Disturbance from management and public use would be minimized to encourage natural processes.

Rationale 51 (alternative D): Waterfowl monitoring would consist of annual pair counts. Other production parameters would be obtained from National Bison Range complex data and previous nest-dragging studies. Changes in populations may not be as obvious as in other alternatives where brood counts and nest dragging occurs on the refuge.

Rationale 52 (alternative D): Current staffing levels and management obligations do not allow time for

on-refuge pair counts and surveys of average brood size, hen success, and survival to fledgling. Data on average brood size is calculated yearly by biologists with the National Bison Range complex, through surveys conducted on WPAs in the WMD, and on Ninepipe and Pablo national wildlife refuges. Hen success and survival are constants determined by literature and past nest dragging conducted by the Montana Cooperative Wildlife Research Unit.

The terns, grebes, and cranes are present on the refuge are wetland-dependent species and, therefore, important in refuge management. Current staffing levels are not sufficient to conduct individual surveys on these species; however, it is important to monitor changes through the years. Recording numbers observed on the annual duck pair count and other routine duties would count terns, grebes, and cranes.

Rationale 53 (alternative D): Goose populations and production are high in northwestern Montana; therefore, geese are not a priority species. The goose-nesting structures existed prior to establishment of the refuge. Since they are in good condition and there is not an overabundance of geese in the Pleasant Valley watershed, existing structures would be maintained. No new structures would be built.

OTHER MIGRATORY BIRDS

Rationale 54 (all alternatives): In the past, management decisions were often based on single species or habitats. Recently, preserving ecosystems has been receiving more attention as resource managers recognize the need for a landscape perspective in conservation. Landscape planning is extremely important to the conservation of Neotropical migratory birds (NTMB), since managing a habitat to the benefit of one set of species would inherently be a detriment to other species.

The landscape approach to NTMB management is necessary to ensure there is enough ecological variety to support all native species simultaneously over a broad landscape. Thus, special emphasis can be placed on regionally rare or threatened species and habitats without compromising habitat of more common species.

Long-term conservation of NTMBs cannot be achieved on the refuge level. No refuge is ecologically isolated from activities and conditions in surrounding areas. Population sizes and viability of NTMBs are determined by interactions between local habitat factors and regional or landscape features such as total habitat area and biogeography.

Rationale 55 (alternatives A, B, and D): Western and mountain bluebirds are found in the Pleasant Valley area. Populations of mountain bluebirds declined about 6 percent annually across western North America according to the National Breeding Bird

Survey. Bluebird populations have rebounded since the box program became popular in the 1980s. There has been a significant decrease in natural nesting cavities for bluebirds throughout the country, due to increased urbanization with a corresponding decrease in the number of dead trees and replacement of wooden fence posts with metal. Compounding the problem of habitat loss has been the introduction of two imported species—the house sparrow and the European starling. Both species are cavity nesters that aggressively compete with bluebirds for cavities.

A bluebird box trail was established along the road system in the refuge, in the early spring of 2001. Bluebird boxes were donated and volunteer Erv Davis and the Pleasant Valley School established the trail. The Pleasant Valley School monitors and maintains the boxes. Although bluebirds are not currently a priority species for Montana, the maintenance of this bluebird trail is useful as an educational tool, to interest students and the public in NTMBs and their conservation.

About 85 species of North American birds excavate nesting holes, use natural cavities resulting from decay, or use holes created by other species in dead or deteriorating trees. The absence of suitable nest sites is usually considered the limiting factor for cavity-nesting species (Thomas et al. 1979). The Partners in Flight Montana Bird Conservation Plan includes retention of all large snags and broken-top trees. Management for adequate numbers over the landscape is a critical objective to maintain viable populations of the Lewis's woodpecker and flammulated owl.

Other cavity-nesting priority species in Montana that would benefit from the retention of snags include the black-backed woodpecker, three-toed woodpecker, Williamson's sapsucker, pileated woodpecker, downy woodpecker, red-naped sapsucker, pygmy nuthatch, red-breasted nuthatch, white-breasted nuthatch, hairy woodpecker, and western screech-owl.

Rationale 56 (alternatives A and B): About 85 species of North American birds excavate nesting holes, use natural cavities resulting from decay, or use holes created by other species in dead or deteriorating trees. The absence of suitable nest sites is usually considered the limiting factor for cavity-nesting species (Thomas et al. 1979). The Partners in Flight Montana Bird Conservation Plan includes retention of all large snags and broken-top trees. Management for adequate numbers over the landscape is a critical objective to maintain viable populations of the Lewis's woodpecker and flammulated owl.

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red-breasted nuthatch, white-breasted nuthatch, hairy woodpecker, and western screech-owl.

Rationale 57 (alternatives A and B): One of the primary goals of gathering information about populations of birds that breed on the refuge is to determine how to best provide habitat for their life needs. The Service is the primary federal agency responsible for conserving, enhancing, and protecting migratory birds. By managing for and monitoring nongame migratory birds, the refuge can assist the Service in meeting the following goals of the National Wildlife Refuge System:

- Perpetuate migratory bird resources.
- Preserve natural diversity and abundance of fauna and flora on refuge lands.
- Provide refuge visitors with high quality, safe, wholesome, and enjoyable recreational experience oriented toward wildlife.

These objectives also help the refuge to meet its goal (as outlined in the EA and conceptual management plan) to “preserve a natural diversity and abundance of flora and fauna, with emphasis on Neotropical migrants.”

Partners in Flight uses a system that identifies species of conservation priority in each of its planning units, rather than writing planning information for all species. If conservation measures are focused on these species and their habitats, it is expected that other species in the area would benefit as well.

MPIF has identified a pool of species that represents priorities for conservation action within Montana. A species may be considered a priority for several different reasons, including global threats to the species, high concern for regional or local populations, or high state responsibility for conserving large or important populations of the species. MPIF also identified target habitats for conservation and study in the northern Rocky Mountains. The refuge contains three of these habitats—ponderosa pine forest, grassland, and marsh and wetland.

Relatively little is known about the abundance and population trends of most species of nocturnal owls in North America. Most species of owls are poorly monitored by existing NTMB surveys. In the last few decades, there has been increasing concern over the status of both diurnal and nocturnal raptors. Birds of prey are high on the food chain and are, therefore, highly susceptible to changes in the environment, which makes them good indicator species.

Broadcast surveys are one of the most widely used techniques to locate and survey owls. Broadcasting recordings of owl vocalization can increase calling rates. In September 1999, guidelines were developed for standardizing owl-monitoring surveys (“Guidelines for Nocturnal Owl Monitoring in North America,” Takats 2001).

Alternative B has an additional requirement that a bird species list would be developed to improve public use opportunities.

Rationale 58 (alternatives A, C, and D): Since Lost Trail is a relatively new refuge, documentation of avifauna is not well developed. Two point-count surveys were initiated in 2000. The first survey consists of 20 points along the South Pleasant Valley and county roads. This survey encompasses various habitats including grassland, wetland, and forest. The second survey is a walking survey along Pleasant Valley Creek. It starts in a forested riparian area on the north end of the refuge and ends in a grassland riparian area by the county road.

These surveys were developed to determine species presence and use, to develop a species list, and to monitor the effect that implementation of the habitat development plan and NRCS restoration projects would have on avifauna. Although point-count surveys would provide information on changes in species presence and general abundance, nest mapping or searching would better quantify the effects of restoration efforts.

The staff would work with the NRCS to develop intensive surveys along Pleasant Valley Creek, during and after restoration. NTMB surveys would be conducted in additional habitats such as forest, shrubland, and cottonwood and aspen woodlands. These additional surveys would more accurately portray species use and help staff determine how best to provide habitat for the life needs of these species.

Rationale 59 (alternative A): From a landscape perspective, the refuge is located in cattle country and healthy native prairie is disproportionately represented. Destruction and degradation of suitable habitat for NTMBs is a major factor in the decline of grassland bird species. Migratory birds would benefit from the restoration of grasslands to reflect natural conditions. Monitoring would be used to determine presence and absence of species, and production of indicator species, to assist managers in developing habitat management plans.

Rationale 60 (alternative C): The refuge's biologists would work with other public and private landowners in the Pleasant Valley area to preserve a diversity of habitats that would maintain a majority of the native bird species of the region.

OTHER WILDLIFE

LARGE MAMMALS

Rationale 61 (all alternatives): The refuge contains approximately 30 miles of interior fence, 10 miles of fence along the county road, and 20 miles of exterior fence. These fences were important for domestic herd

management prior to establishment of the refuge. However, they are not necessary for refuge management and can be harmful to wildlife. If fences become necessary on an interim basis, temporary fences (electric or barbless wire) can be constructed.

Wildlife can become entangled in fences, which can cause serious injury or death to an animal. At least five animals (four elk and one moose calf) have been found caught in fences on the refuge in the last few years. Fences can pose a hazard to ungulates by blocking escape routes, and allowing predators to more easily catch and kill animals. This is especially true of young animals that cannot follow adults over a fence. Young animals are also separated from their mothers by fences when the adult jumps the fence and the young cannot follow. The young, stranded animal often runs the fence line until the animal becomes caught in the fence or is killed by a predator.

The refuge receives up to 3 feet of snow in the winter. High snow levels may impede movement of ungulates through fences by blocking access under the fence. To alleviate this problem, all gates should be left open in the winter. Gates may also be added to remaining fences along the boundary and the county road.

Rationale 62 (all alternatives): As long as designated wildlife-viewing areas are not situated in critical survival areas for moose (e.g., calving grounds and winter feeding sites), high-quality photographic and observational opportunities can be provided (Youmans 1999).

Geist (1978) further defined effects of human disturbance in terms of increased metabolism, which could result in illness, decreased reproduction, and even death. Although winter is a time of lower metabolic rates and activity, ungulates normally lose weight. The degree of disturbance has mostly been reported in terms of flight distance or in some observed change in behavior manifested by animals.

Based on elk heart rate data, Chabot (1991) showed that even when disturbances do not induce an overt behavioral response, the increased heart rates could result in relatively high energy expenditures. Test results have been confirmed and expanded for a variety of ungulates including mule deer, white-tailed deer, and elk (Canfield et al. 1999). Responses of ungulates to human recreation during this critical period may range from apparent disinterest to flight, but every response has a cost in energy consumption. Although much research has been conducted on the effects of snowmobile disturbance on wintering ungulates, snowmobiles appear less distressing than cross-country skiers, hikers, and snowshoers (Freddy et al. 1986, Canfield et al. 1999).

The greatest disturbance for many ungulate species comes from unpredictable or erratic occurrences. In addition to increasing energy costs for wintering animals, recreational activity can result in

displacement to less desirable habitats, or in some situations, to tolerance of urban environments. Many ungulates enter early spring at the lowest physiological condition of the year. Until new, green forage restores lost weight and energy, these animals may succumb to stresses that would be considered minor at other times of the year.

Predators and prey interact with one another within their unique habitats, through seasonal weather patterns, and with other animal species and densities making it difficult to determine the direct relationship predators may have on prey. Identifying factors that drive changes in prey populations and predator-prey interactions is difficult. Many factors are involved, interacting with one another in a dynamic ecosystem, further complicating efforts to understand the affect of one single variable on a prey population.

Disturbance during the summer months may also have a negative impact on big game mammals as they seek optimum forage to provide energy for lactating females and antler growth in males. As summer progresses, impacts are expected to decrease as the snow melts and many animals head off the refuge to expanded summer ranges. Public use also disperses as logging roads and hiking trails open up on PCTC and public land surrounding the refuge.

Elk, white-tailed deer, mule deer, and moose are all herbivores. They forage to varying degrees on grasses, sedges, forbs, leaves, twigs, and stems of woody plants, masts, and fruits.

Rationale 63 (all alternatives): Chronic-wasting disease is a brain disorder that can cause death in deer and elk. It is highly contagious and can have serious impacts on populations. The refuge would be proactive in detecting chronic-wasting disease to prevent establishment of the disease, which could lead to a catastrophic loss of deer and elk. This adaptive approach provides a prescriptive process rather than crisis management.

Rationale 64 (all alternatives): The national scope and high profile of chronic-wasting disease, combined with Service responsibilities for wildlife resources that span state and federal jurisdiction, make it essential that the Service cooperate with other state and federal agencies in addressing this illness.

Chronic-wasting disease is a transmissible spongiform encephalopathy of deer and elk. Although the exact causative agent is unknown, the disease is related to infectious proteins that are resistant to normal metabolic breakdown processes and abnormally accumulates in the brain and brain stem. Consequentially, neurons die, which results in clinical signs referable to brain impairment. Eventually, diminishment of body condition and death occur.

There has been an increased distribution of chronic-wasting disease within and among states, and combined with high prevalence reported in some states has resulted in national and international attention to this disease. Therefore, it is the policy of the refuge to implement cooperation and coordination with other state and federal agencies in monitoring and managing this disease.

Rationale 65 (alternatives A, B, and C): The refuge is important winter habitat for a herd of approximately 300 elk. Moose and deer are primarily spring, summer, and fall residents. Although it would be difficult to manage for specific population numbers due to the wide range of these species across the boundaries of the refuge, the Service wants to ensure that their management decisions (i.e., hunting, public access, and vegetation manipulation) are not detrimental to large mammal populations, neighboring landowners, and habitat. Fluctuations in population sizes are natural and may occur for many reasons. If a decrease below 75 percent of current herd sizes occurs, managers must determine the cause of the change and if modifications in management are warranted.

Prior to establishment of Lost Trail as a national wildlife refuge, the land had been in private ownership. Opening the area to the public and public uses such as hunting and wildlife viewing may affect large mammal populations directly through hunting and indirectly through disturbance that may cause stress to the animals or changes in behavior. Disturbance can force animals off highly nutritious summer and fall range and onto less productive range. This may result in poorer body condition going into winter, which has been linked to lower reproductive performance and even death. Early fall movements may also leave nutritious summer forage uneaten at the cost of overgrazing winter range.

An example of this change in behavior was observed in Colorado. In the White River elk herd, an increase in early season hunting by bow hunters caused elk to move off their summer ranges before fall migration. The elk moved onto private land and secure areas. This led to complaints from local landowners of crop damage, complaints from resource managers that riparian areas were being damaged by this redistribution, and complaints by early season hunters of lower success rates in the public hunt areas (Conner et al. 2001).

Since the refuge has only recently been open to public hunting, it is still difficult to know if implementing the public use program may lead to elk movement and redistribution with corresponding overpopulation problems in localized areas including private lands. To increase landowner tolerance for big game animals and to minimize big game damage, it is advantageous for land managers to work with wildlife managers to reduce displacement of animals from public to private lands.

Rationale 66 (alternatives A, B, and C): Since Lost Trail is a relatively new refuge, management practices may result in large mammal populations increasing beyond carrying capacity, or may cause animals to concentrate in areas of high use, resulting in vegetation damage. Harassment by hunters and other public users may reduce use of select areas causing overutilization of areas with fewer disturbances.

Large mammal populations move freely across the boundaries of the refuge. It would be difficult to manage for a specific number of individuals given the size of their range and seasonality of use of the refuge. Staff can manage habitat and public use to affect population numbers and distribution of wildlife.

Managers must also coordinate with MFWP to evaluate how wildlife responses to practices on the refuge are affecting wildlife on an ecosystem level. In addition, evaluation would determine if effects observed on the refuge are a function of factors beyond the refuge. Vegetation and population dynamics would be evaluated to make and modify management decisions.

Rationale 67 (alternatives A and C): Until staff has time to determine big game use of habitats and movements of big game between habitats, recreational impacts on ungulates cannot be determined. Approximately 300 elk winter on the refuge. Winter is a critical time for ungulate survival. Animals that may have occupied thousands of acres of summer and fall range can be seasonally confined to relatively restricted geographic areas on which forage is limited and extreme environmental conditions can cause physiological stress. Almost 40 percent more food is required in winter to generate energy for daily metabolic and activity requirements.

Mackie et al. (1998) observed that, “Deer survive primarily by supplementing energy resources accumulated prior to winter with energy intake from submaintenance winter diets.” This requires behavior that emphasizes energy conservation. Inactivity provides an energetic advantage for animals exposed to cold; forced activity caused by human disturbance exacts an energetic disadvantage.

Many ungulates enter early spring at the lowest physiological condition of the year. Until new, green forage restores lost weight and energy, these animals may succumb to stresses that would be considered minor at other times of the year. The development of green vegetation at lower elevations on southerly slopes is also attractive for people following a long winter. Managers can provide an important contribution to energy conservation by reducing or eliminating disturbance of wintering ungulates and restricting recreational use of spring ranges that are important for assuring recovery from winter weight loss.

Rationale 68 (alternative B): Winter and spring are critical times for large mammals. Alternative B would allow winter recreation to a greater degree than in the other alternatives. An interpretive panel would educate visitors on the importance of minimizing disturbance to animals at this critical time of year.

Rationale 69 (alternative D): MFWP uses aerial surveys, ground surveys, and harvest data to monitor population trends and composition of elk, mule deer, white-tailed deer, moose, black bear, and mountain lion populations in northwestern Montana. The information gathered from these surveys is used by MFWP to determine the population health of individual species, project population estimates, and set hunting seasons. Hunting is the primary tool used by MFWP to manage ungulate populations (Canfield et al. 1999).

Only the data from the aerial elk survey can be separated out to be specific for the refuge. The other surveys show trends on a regional or area-wide scale. These surveys are still valuable, as the refuge is only a small part of the local ecosystem on which these species depend. Anything that affects populations outside the refuge would project onto those individuals using the refuge. Staff do not conduct formal refuge-wide surveys; however, they do record general observations that are valuable in monitoring herd health (i.e., wintering elk numbers and individual moose numbers).

Prior to establishment as a national wildlife refuge, Lost Trail had always been in private ownership. Although ranch owners and invited guests hunted the area, public hunting was not permitted. Opening the refuge to hunting and other public uses may negatively affect large mammal populations on the refuge and in the Pleasant Valley ecosystem. Monitoring would help managers assess the impacts of public use and other management decisions.

SMALL MAMMALS

Rationale 70 (all alternatives): Small mammal populations are a significant but often overlooked component of ecological communities. Any change in the density or diversity of small mammals can have significant impact and greatly affect the nature of the community. Changes in community structures commonly have ramifications far beyond the initial, small mammal species and may start an ecological chain of events resulting in much broader ecological consequences (Hickman et al. 1999). Despite this, small mammals have been little studied as to the effect that habitat changes and recreation may have on their populations.

Rationale 71 (alternative A): Columbian ground squirrels can cause extensive habitat damage and compete with other wildlife for forage and their diggings may accelerate soil erosion. Lambeth et al.

(1982) found that, up to a point, ground squirrel populations increased with plant retrogression. Other research has indicated that ground squirrels may move out of stands of heavy vegetation to more open, grass habitat.

Proposed habitat management should keep ground squirrel numbers in check by improving the health and density of native vegetation. Management towards a diverse predator base should also keep ground squirrel numbers in check. Ground squirrel populations would be monitored and adaptive resource management would only be used to reduce populations if a predetermined threshold of affected habitat is crossed.

Ground squirrels are an important source of protein for most predators in northwest Montana including birds of prey, weasels, canines, felines, and bears. The refuge is challenged with managing for predator species along with other native species. Although predators are of secondary importance behind native birds for management, they are critical to maintaining ecosystem health and are popular with public users. A substantial reduction in ground squirrel numbers would adversely affect those species that prey upon them. Ground-nesting birds may also be negatively affected as predators switch to alternate prey sources. Therefore, the refuge would maintain ground squirrel numbers within 20 percent of a baseline determined after initial monitoring and literature research.

RESIDENT BIRDS

Rationale 72 (all alternatives): Anecdotal information on golden eagles suggests that cumulative impacts on birds of prey from increased recreational activities may result in reduced nest success or nest abandonment (Canfield et al. 1999). A GIS-assisted viewshed approach, combined with a designated buffer zone distance, was found to be an effective tool for reducing disturbance to golden eagles in Colorado (Clark et al. 1989).

Rationale 73 (alternatives A, B, and C): Two NTMB survey routes have been run annually since 2000. The first of these routes follows the Pleasant Valley and South Pleasant Valley roads. The other is located on Pleasant Valley Creek, running from its inception onto the refuge to the Pleasant Valley Road. Neither one of these surveys adequately covers the upland habitats on the refuge. Migratory bird surveys are conducted in daylight hours using bird songs as the primary method of detection. Some resident species may not be detected using this method. Examples include species such as owls that are vocal predominantly in the evening, woodpecker-drumming patterns that are hard to distinguish between species, and marsh birds that are difficult to detect using traditional NTMB surveys.

The MPIF Plan (Casey 2000) and the Service's office of migratory bird management (USFWS 1995b) have prepared lists of bird species of concern. Several of these species can occur in habitats that exist on the refuge. The refuge may be able to contribute to these species' conservation simply by considering potential impacts from management activities prior to their implementation.

Rationale 74 (alternatives A, C, and D): The golden eagle is protected under the Bald Eagle Protection Act of 1940, as amended in 1962 (P.L. 87-844). Montana's population of golden eagles may be currently declining due to low productivity (Canfield et al. 1999). The Montana Bald Eagle Management Plan suggests a 0.5-mile radius buffer zone around bald eagle nests; therefore, the same criteria would be used for golden eagles.

Rationale 75 (alternatives A, C, and D): Habitat objectives would indirectly benefit upland games species.

Rationale 76 (alternative B): Grouse are endemic to the refuge and provide public use opportunities. They are a native component of the Pleasant Valley ecosystem. They are not, however, a priority species for which the refuge was established. Data from MFWP's region 1 suggests that grouse populations are stable region-wide and almost 50 percent of Montana's mountain grouse harvest comes from this region, which includes the refuge. For these reasons, the refuge proposes to foster mountain grouse populations, but not as a priority species. Populations would be monitored and habitat for grouse would be maintained.

Wild turkey is an introduced species and the refuge would not make management decisions based on turkey populations unless they become a nuisance species.

Rationale 77 (alternative C): There are some resident species—listed as a priority for conservation by the MPIF Plan (Casey 2000)—that the refuge could benefit. These include flammulated owls, black-backed woodpeckers, and brown creepers, for which the refuge could provide their habitat requirements. The refuge may be able to contribute to these species' conservation simply by considering potential impacts from management activities prior to their implementation. In addition, activities such as fire plans could be designed with these species' habitat requirements in mind.

AMPHIBIANS AND REPTILES

Rationale 78 (all alternatives): Reptiles and amphibians are important components of the biological integrity and functioning of an ecosystem. There are known and suspected declines of amphibians throughout North America, with a significant proportion of amphibians native to western United States (Corn 2000). Hossack (2003)

explains, “In response to documented and suspected declines in the United States, a national effort identified as the “Amphibian Research and Monitoring Initiative” was launched in 2000 to determine the status and trends of amphibian populations on Department of Interior lands nationally and to provide information useful in determining causes of declines.”

Rationale 79 (all alternatives): Survey data would be used to develop habitat guidelines and best management practices to protect and enhance these species. Reptiles and amphibians vary greatly in life history patterns. A single species may require a diversity of habitats. Aquatic areas with specific microhabitats and water temperatures are required for egg development, larval growth, and metamorphosis. Adults require different foraging and overwintering habitats—some aquatic, some terrestrial.

The diversity of needs, combined with the variety of unique habitats and microhabitats required to complete a life cycle, makes the impacts of recreation, water manipulation, and habitat alteration on herpetofauna difficult to study.

Amphibians and some reptiles require terrestrial and aquatic habitat to complete their life cycles. Adults generally live on land and lay their eggs in water. When the eggs hatch, they remain in aquatic environment as they metamorphose from tadpole to adult. Water temperature is critical to egg development and survival with each species having a maximum and minimum temperature at which it can survive.

Reptiles and amphibians select habitats with diverse physical characteristics including: (1) adequate sun exposure and water temperature; (2) substrates that are adequate for nesting and basking; (3) habitats that support insects and vegetation necessary for foraging; (4) aquatic habitats with mud bottoms for protection and deep waters that are unlikely to freeze; and (5) terrestrial habitats with animal burrows or deep litter for overwintering.

Many species are philopatric, choosing the same breeding, foraging, wintering, and migrating habitat year to year.

Rationale 80 (alternatives A, B, and D): To determine the cause of amphibian and reptile declines as well as the scope of a decline, a baseline for comparison must be determined.

Rationale 81 (alternatives A and C): Bullfrogs are not native to Montana. However, they have been widely introduced across the United States and now exist along the Bitterroot, Flathead, and Clark Fork rivers. Bullfrogs can affect amphibian and reptile populations directly through predation and indirectly through the avoidance of sites where bullfrogs are present. Bullfrogs have been implicated in the declines of several amphibian and reptile species.

Rationale 82 (alternative C): To determine the cause of amphibian and reptile declines we must first determine the scope of the decline on a regional or national level.

SPECIES OF CONCERN

Rationale 83 (all alternatives): The Service is required to carry out conservation programs for listed species and to ensure that agency actions are not likely to jeopardize the continued existence of listed species or adversely modify or destroy their critical habitat.

One of the primary purposes for the establishment of the refuge was to enhance the survival prospects of endangered and threatened species. Listed species that occur on the refuge include bald eagle, gray wolf, and Spalding’s catchfly. Species found in the forests surrounding the refuge and that probably use the refuge include the grizzly bear and Canada lynx. Bull trout do not exist on the refuge, but may be affected by management decisions.

Since the enabling legislation includes endangered and threatened species as a purpose for establishment of the refuge—and since the protection of endangered and threatened species in an inherently federal function with primary oversight by the Service—this plan has placed emphasis on these species.

The impacts on these species were considered in the development of objectives in the other sections such as habitat and public use. Managers must evaluate all actions prior to implementation to ensure that the action would not have a negative impact on endangered and threatened species.

Voluntary habitat conservation efforts, such as land or vegetation management plans and conservation easements would ultimately benefit many wildlife species (Sime 2002).

Private lands, in particular, have substantial value to wildlife because they frequently occur at low elevations with moderately extreme weather conditions such as deep snow.

Rationale 84 (alternatives A, C, and D): Lost Trail is a newly acquired refuge without a comprehensive list of plant and animal species.

Rationale 85 (alternative A): Since Lost Trail is such a new refuge, not all species using the refuge have been documented. Refuge staff must determine if a species currently exists on the refuge and then the biological potential for recovery or enhancement for the species must be evaluated.

Rationale 86 (alternative C): The Service is mandated to preserve and protect endangered species and to ensure conservation measures are available to

prevent species of concern from becoming threatened or endangered. The refuge would protect all threatened, endangered, or species of concern on the refuge and would evaluate the feasibility of restoring historical threatened and endangered species, or species of concern.

The refuge would develop an outreach program to raise public awareness of those species located in the Pleasant Valley area. As the public becomes more aware of threatened, endangered, and species of concern in their area, they would be more likely to notice and document the occurrence of these species. As they develop an understanding of the life history of these species, their importance in the ecosystem, and the reasoning behind management decisions, they would be more likely to accept restoration and protection efforts.

GRIZZLY BEAR

Rationale 87 (all alternatives): The refuge is located in an area classified as a management situation II under the Interagency Grizzly Bear Guidelines (USDA Forest Service 1986). Although grizzly bears occasionally inhabit the area, lack of highly suitable habitat and security precludes extensive use. The grizzly bear is important, but not the primary use of the area, and the refuge would not be managed exclusively for the grizzly bear at the expense of other priority species. However, the Service is required to carry out conservation (recovery) programs for listed species and to ensure that agency actions are not likely to jeopardize the continued existence of listed species, or adversely modify or destroy their critical habitat.

The refuge is located in an important linkage corridor for grizzly bears between the NCDE and CYE. Thus, it is important to maintain habitat and security for the grizzly bear.

Livestock grazing can have a significant impact on grizzly bears. In the NCDE, livestock depredation was the most common offense for which a bear was relocated (Thier and Sizemore 1981). Furthermore, these relocations were much less successful than relocations for other offenses (success being no return and no further conflict).

Knight et al. (1985) reported that depredations (livestock and property) were the leading cause of nonhunting mortality in the NCDE from 1975 to 1984. Unreported grizzly bear mortality related to livestock operations may be a significant part of the overall mortality. Jorgensen (1979) reported that only 41 and 17 percent of known bear kills in 1976 and 1977, respectively, were ever reported.

Several studies have addressed the question of whether grizzly bears can coexist with livestock without depredation. Knight and Judd (1983) reported that all radio-tracked bears (except one orphaned cub) that encountered sheep killed them.

However, Claar et al. (1999) found that only 2 out of 20 marked grizzly bears in the Mission Mountains (in the NCDE) were involved in sheep depredations, although almost all were in proximity to livestock during spring and fall. Several investigations observed that depredation behavior was apparently a learned process (Johnson and Griffel 1982, Jorgensen 1983, Knight and Judd 1983). Regional difference in depredation may be related to learned behavior and previous levels of control on depredating bears (Johnson and Griffel 1982).

Livestock can also affect grizzly bears through direct competition for early spring browse and by degradation of quality habitat by trampling and grazing. Finally, livestock grazing can affect bears by displacing them off quality habitat as they avoid areas of human activity.

To decrease the likelihood of depredation and the chance of individual grizzly bears becoming habituated to livestock as a food source, livestock grazing would not be permitted on the refuge if a bear were located within 1 mile of the refuge. Livestock grazing would also be restricted to prevent competition for spring forage.

Recreational activities can affect, directly or indirectly, the survival of grizzly bears. Grizzly bears can be directly taken in the defense of human life and through mistaken identity during black bear hunting seasons. In the Swan Range in northwestern Montana, out of 19 known human caused grizzly bear deaths, mistaken identity was the cause of 6 deaths and self defense was the cause 3 deaths.

Indirectly, recreationists can displace bears off quality habitat onto less desirable habitat. This may result in reduced reproduction by displaced bears, higher mortality rates due to food stress or lower security, and smaller bear populations due to reduced carrying capacity of remaining habitat (Serveen et al. 2001).

Conversely, grizzlies may become habituated to humans. Habituation generally leads to mortality of the bears as the bears are more likely to come in conflict with humans, are more vulnerable to hunters and poachers, and have an increased chance of becoming involved in a collision with a motor vehicle (Claar et al. 1999). Black bear hunting would not be permitted and other recreational activities may be suspended when a grizzly bear is known to be within 1 mile of the refuge.

Ground squirrel hunting is not permitted. Several studies have shown that ground squirrels may be important as a source of protein to grizzly bears and that the restricted availability of animal protein may limit grizzly populations (Nagy et al. 1983, Hechtel 1985, Hamer et al. 1978, Stelmock 1981).

The greatest impact of roads on grizzly bears is an increase in human access into grizzly habitat. Bears react differently to roads depending on habituation and security cover. Roads bring people into contact with bears, may cause bears to avoid habitats, or may habituate bears to humans. The refuge would not permit public use on any additional roads and would curtail administrative activities if grizzly bears were within 1 mile of the refuge.

Timber management and habitat manipulation can also affect grizzly bear use and should be evaluated prior to implementation.

Rationale 88 (all alternatives): Grizzly bears are not only a source of wonderment to wildlife enthusiasts, but also a source of fear and concern for some of the landowners whose lands border or are near the refuge, specially to those persons whose livelihood is intrinsically tied to domestic cattle and sheep ranching. It is known that these carnivores are opportunistic and kill available animals as prey to survive and feed themselves and their young. Cattle and sheep have been killed by these carnivores in areas where all of these species coexist, such as in western Montana.

The Service is working with the state of Montana and with private citizens and private conservation groups to conserve these species and to minimize conflicts with private landowners. The conservation group, Defenders of Wildlife, has established a successful compensation program to indemnify cattle or sheep ranchers that suffer losses from wolf depredations of their stock. The Service is confident that this group would continue with their program.

Interagency grizzly bear biologists believe that:

“Gaining support and confidence of people who live in or near grizzly habitat is one of the greatest challenges to grizzly bear recovery. Efforts that address the attitudes and concerns of the local public serve to foster tolerance and positive attitudes toward grizzly bears in communities throughout grizzly bear habitat. These efforts include intensive education programs, proactive livestock and garbage management projects that reduce bear attractants, and the maintenance of personal contact between citizens and wildlife biologists.” (LeFranc et al. 1987).

Opening the refuge to hunting may affect grizzly bears by increasing the chances of human–bear contact and conflict. Grizzly bears have also been killed by hunters who encounter them unexpectedly. Prior to 1999, 3 bears killed in the Swan Range in Montana and 14 bears from the NCDE had been killed by hunters who felt threatened by the bears (Claar et al. 1999). Hunting may also impact grizzly bears by habituation of these species to kill sites and subsequently humans. Grizzly bears have been

documented at kill sites and may even attempt to steal hunter-killed carcasses.

Rationale 89 (alternatives A, B, and C): Gaining the support and confidence of people who live in or near grizzly habitat are one of the greatest challenges to grizzly bear recovery. Efforts that address the attitudes and concerns of the local public serve to foster tolerance and positive attitudes toward grizzly bears in communities throughout grizzly bear habitat. These efforts include intensive education programs, proactive livestock and garbage management projects that reduce bear attractants on private land, and the maintenance of personal contact between citizens and state and federal wildlife biologists who live and work together in local communities and rural areas near grizzly habitat.

Managing human-induced mortalities is a major factory in effecting the recovery of the grizzly bear. Therefore, it is crucial to the recovery effort that the public understand reasons for actions to generate tolerant or positive attitudes toward the bear.

Rationale 90 (alternatives A and C): Where grizzly bear habitat was once continuous in the Rocky Mountain ecosystem, habitat fragmentation from human settlement and development has created isolated populations of grizzly bears. When a species exists as geographically separate populations, some level of movement and gene flow between them decreases their probability of extinction (Soule 1987, Harrison 1994, Serveen 2001). It is important to the survival of the species that individual bears from one localized population come in contact with individuals from other populations to maintain genetic variation. The probability of successful movement between grizzly bear populations depends on what is happening in the intervening areas between them. Thus, the management of linkage zones to maintain and enhance movement opportunities is a critical part of the successful recovery of the grizzly bear (Serveen 2001).

The refuge is located between the NCDE and the CYE of grizzly bear recovery. Potential linkage areas across Highway 2 remain between the towns of Marion and Libby. Grizzly bear recovery biologists believe that securing the future of the grizzly bear is dependant upon maintaining opportunities for linkage of wildlife populations across areas of human development (Serveen et al. 2001).

Habitat fragmentation is usually accompanied by habitat loss, increased disturbance and increased human–wildlife conflicts. The primary causes of fragmentation in grizzly habitat are human activities such as road building and residential, recreational, and commercial development. Conservation easements maintain agricultural lands and prevent increased fragmentation. Conservation efforts have

been initiated in the area surrounding the refuge. The NRCS has purchased conservation easements from willing landowners in the Pleasant Valley area, and the largest private landowner in the area, PCTC, signed a conservation easement with MFWP on 142,000 acres in the Fisher and Thompson river drainages. The refuge should work with other conservation organizations as well as the NRCS and MFWP to continue and expand this effort to preserve open space and limit fragmentation of habitat.

Managing human-induced mortalities is a major factor in the recovery of the grizzly bear. Therefore, it is crucial to the recovery effort that the public understand reasons for actions in order to generate tolerant or positive attitudes toward the bear. The interagency grizzly bear coordination team has appointed an information and education subcommittee to develop education programs and disseminate information. Private conservation organizations interested in the recovery of grizzly bears also provide valuable assistance when they include appropriate information in their publications and news releases.

Rationale 91 (alternative A): Maintaining the linkage area between the NCDE and CYE is important to the continued survival of the species. The grizzly bear has an increased risk of extinction because the population consists of a limited number of individuals that live in several distinct populations geographically isolated from one another. Small populations are less able to absorb losses caused by random environmental, genetic, and demographic changes (Serveen et al. 2001).

Linkage zones are areas between separated populations that provide adequate habitat for low densities of individuals to exist and move between isolated populations. The resulting exchange of genetic material helps maintain demographic vigor and diversity, increasing the viability of individual populations. For the grizzly bear, preserving the linkage between populations is as critical to long-term conservation of the species as managing the individual populations.

Rationale 92 (alternative B): Public viewing would improve interest in and public acceptance of the grizzly bear. Wildlife observation and photography are priority wildlife-dependent public uses for the Refuge System.

GRAY WOLF

Rationale 93 (all alternatives): The Service is required to carry out conservation (recovery) programs for listed species and to ensure that agency actions are not likely to jeopardize the continued existence of listed species or adversely modify or destroy their critical habitat. Disturbance during denning, around rendezvous sites, and in

winter habitat has the potential to adversely affect the survival of wolves in the area.

The presence of livestock on the refuge at any time of the year that wolves are in the area may contribute to depredation or habituation of wolves to livestock as a food source. Wolf–livestock conflicts cause negative public perceptions of wolves decreasing the acceptance of wolves by the public. Public support, particularly from private landowners, is critical to the continued success of wolf reintroduction.

Endangered species cannot be harassed or dispatched on refuge lands. They can be controlled on surrounding federal, state, and private lands if the Service’s wolf recovery team has determined that a wolf has habituated to killing livestock and, therefore, meets the definition of a problem wolf.

Lost Trail is one of the first national wildlife refuges in the Intermountain region to support wolves. The policy concerning gray wolves on national wildlife refuges in the western Great Lakes states is that, “gray wolves will be monitored, and refuge habitat management actions will maintain the current prey base for them while they are listed as threatened and for a minimum of five years following any future delisting. Trapping or hunting by government trappers in response to depredation complaints will not be authorized on these refuges.” The refuge will follow the same policy until notified otherwise.

Rationale 94 (all alternatives): Gray wolves are not only a source of wonderment to wildlife enthusiasts, but also a source of fear and concern for some of the landowners whose lands border or are near the refuge, especially to those persons whose livelihood is intrinsically tied to domestic cattle and sheep ranching. It is known that these carnivores are opportunistic and kill available animals as prey to survive and feed themselves and their young. Cattle and sheep have been killed by these carnivores in areas where all of these species coexist, such as in western Montana.

The Service is working with the state of Montana and with private citizens and private conservation groups to conserve these species and to minimize conflicts with private landowners. The conservation group, Defenders of Wildlife, has established a successful compensation program to indemnify cattle or sheep ranchers that suffer losses from wolf depredations to their stock. The Service is confident that this group will continue with their program.

Opening the refuge to hunting may affect wolves by increasing the chances of human–wolf contact and conflict. Claar et al. (1999) stated, “Of all recreational activities in Montana, big game hunting probably has the greatest potential for detrimental impact to wolves.” Hunting may also impact wolves by habituation of these species to kill sites and

subsequently humans. Wolves have been documented at kill sites and may even attempt to steal hunter-killed carcasses.

Rationale 95 (alternatives A and B): The success of wolf recovery in Montana has as much to do with the relationship between wolves and people as it does with the ecology of the species (Sime 2002). Providing scientifically based, factual information would keep the public informed and would reduce misconceptions, rumors, and suspicions. Education and knowledge about the wolf would hopefully make the public more objective and less emotional about this species and its management.

Rationale 96 (alternatives A and B): Because wolves and other large carnivores have large home ranges, attention should be focused on the habitat values of both public and private lands. Private lands, in particular have substantial value to wildlife because they frequently occur at low elevations with moderate extreme weather conditions such as deep snow. Voluntary habitat conservation efforts, such as land or vegetation management plans and conservation easements would ultimately benefit many wildlife species. (Sime 2002).

Farming and ranching in Montana maintains open space. That open space is also habitat for a diversity of wildlife species. Maintaining the land base for agriculture and wildlife habitat is an increasing challenge, given broader trends in resource and agricultural economics, human population demographics, and development of the “New West” (Sime 2002).

Increasing settlement during the last century has significantly transformed the valley floors of northwest Montana. Large undeveloped tracts of agricultural lands and a complex of wildlands, wetlands, rivers, grassland, and forests are being converted to home sites such as “ranchettes” of 2–20 acres as the region’s natural amenities attract new residents, vacation homebuyers, and businesses. This development trend has increased considerably in the last 20 years.

Flathead is one of the fastest-growing counties in Montana. Lack of planning and effective zoning has led to a highly fragmented residential development pattern. In 1999, 46 percent of new residential development in Flathead County occurred in rural areas.

The refuge is surrounded by large intact landownership. PCTC is a major landowner in the Pleasant Valley area. The state of Montana recently negotiated a conservation easement on PCTC lands in the Fisher and Thompson river drainages in northwestern Montana. However, the PCTC is selling land surrounding Island Lake just west of the refuge. Much of the other private land in the valley is under the ownership of large family-owned ranches. Two of

the ranches neighboring the refuge have already placed NRCS WRP easements on portions of their properties.

Pleasant Valley is located in a prime subdivision area with abundant wildlife, many lakes, and beautiful scenery and it is within easy commuting distance of Kalispell.

Rationale 97 (alternative A): One of the major limiting factors to wolf survival is an adequate prey base. In alternative A, big game population numbers are increased by improving habitat. Since deer and elk inhabit PCTC, USDA Forest Service, and private lands off the refuge during much of the year, the refuge would work with other agencies to determine what is limiting ungulate populations in the area. The refuge would then strive to provide or improve specific habitats.

For example, the refuge is an important winter range for elk in the Pleasant Valley drainage (personal communication, MFWP biologists and on-site refuge manager). Upland habitat improvement and time-specific public use restrictions may improve elk survival, which would increase the natural prey base available to wolves in the area.

A demonstration of the importance of an abundant natural prey base to wolf survival can be found in the examination of wolf–prey relationships in northwest Montana. White-tailed deer populations started to increase in the 1970s and remained high until the winter of 1996–97. Wolf numbers and distribution also expanded during this period.

Record hunter harvest in the fall of 1996, followed by one of the most severe winters on record, significantly decreased ungulate populations. This was followed by a corresponding increase in wolf depredation on livestock and subsequent wolf control. Conflicts between wolves and livestock during 1997 represented nearly 50 percent of all confirmed livestock depredations and lethal wolf control in northwestern Montana since 1987 (Bangs et al. 1998). Maintaining an adequate prey base should facilitate wolf recovery while decreasing depredation and control. Providing and sustaining sufficient prey base requires that ungulates be carefully managed and their habitats protected.

Evaluation of wolf management in the northern Rocky Mountains has shown that successful wolf recovery does not depend upon land use restrictions on private land due to the wolves’ ability to thrive in a variety of land uses. There is little, if any, need for land use restrictions to protect wolves in most situations with the possible exception of temporary restrictions around active den sites on federal land. Additionally, the public is much more tolerant of wolf recolonization if the presence of wolves does not result in restrictive government regulations.

Hunting success and regulations are directly related to prey populations. One of the greatest concerns the public had with wolf reintroduction was the effect that wolves would have on deer, elk, and moose populations. The primary deterrent of the long-term status of gray wolf survival is human attitudes toward wolves (USFWS 2001). The hunting public has made substantial financial investments and sacrifices to restore ungulate populations to Montana (Sime 2002), and hunters can be a strong ally or opponent to wolf survival. Therefore, the refuge would best gain support for a healthy wolf population by maintaining ungulate populations and not restricting hunting unless in direct conflict with the survival of a wolf pack in the Pleasant Valley area.

Rationale 98 (alternative A): An experimental, radio-collar-triggered, light and siren device developed to keep wolves away from livestock was tested in the Bitterroot Valley of Montana in 1999. Tests were conducted in 2000 on three members of the Sheep Mountain pack that were killing cattle in the Paradise Valley of Montana. The wolves were captured and fitted with electronic training collars and released into a 1-acre pen. A calf fitted with a remote training system was placed in the pen with the wolves. The wolves were shocked if they came within 1 yard of the calf. Initial results were good, but the project is still in the research and development stages. More research on this and other aversive methods are planned in cooperation with USDA Animal and Plant Health Inspection Service (APHIS), Wildlife Services; the University of Montana; and the Turner Endangered Species Fund.

Conducting control on problem wolves has led to local rural residents readily contacting the Service or APHIS if they suspect they have wolf-caused problems. Without control in place, there would most likely be more illegal killings than the average of one per year presently (USFWS 1999c).

Tolerance of wolves by the local public reduces illegal killing of wolves and allows more opportunity for the public and the Service to investigate innovative ways to reduce wolf–livestock conflicts without killing wolves (such as aversive conditioning). In addition, it enhances communication between resource agencies and people who live near wolves leading to more accurate data gathering on wolf restoration efforts. All this ultimately increases the likelihood of successful wolf recovery in the region.

Rationale 99 (alternative B): Alternative B focuses on maximizing the chances of wolf observation without substantially limiting other public uses.

Rationale 100 (alternative B): In the maximum public use alternative, the refuge would strive to provide viewing and photographic opportunities with minimal

disturbance to wolves. Wildlife observation and photography are two of the six priority wildlife-dependant public uses on refuges.

Rationale 101 (alternative C): One of the major limiting factors to wolf survival is an adequate prey base. In this objective, big game population numbers are increased by improving habitat. Since deer and elk inhabit PCTC, USDA Forest Service, and private lands off the refuge during much of the year, the refuge would work with other agencies to determine what is limiting ungulate populations in the area. The refuge would then strive to provide or improve specific habitats.

For example, the refuge is an important winter range for elk in the Pleasant Valley drainage (MFWP biologists and on-site refuge manager, personal communication). Upland habitat improvement and time-specific public use restrictions may improve elk survival, which would increase the natural prey base available to wolves in the area.

A demonstration of the importance of an abundant natural prey base to wolf survival can be found in the examination of wolf–prey relationships in northwest Montana. White-tailed deer populations started to increase in the 1970s and remained high until the winter of 1996–97. Wolf numbers and distribution also expanded during this period. Record hunter harvest in the fall of 1996, followed by one of the most severe winters on record significantly decreased ungulate populations. This was followed by a corresponding increase in wolf depredation on livestock and subsequent wolf control. Conflicts between wolves and livestock during 1997 represented nearly 50 percent of all confirmed livestock depredations and lethal wolf control in northwestern Montana since 1987 (Bangs et al. 1998). Maintaining an adequate prey base should facilitate wolf recovery while decreasing depredation and control. Providing and sustaining sufficient prey base requires that ungulates be carefully managed and their habitats protected.

Evaluation of wolf management in the northern Rocky Mountains has shown that successful wolf recovery does not depend on land use restrictions on private land due to the wolves' ability to thrive in a variety of land uses. Wolves have attempted to colonize the Pleasant Valley area two times in the last decade. In both instances, the wolves started to prey on livestock and were dispatched. Removing livestock, providing abundant natural prey, and protecting wolves from disturbance would create a more favorable habitat for the establishment of a free-ranging nondepredating wolf pack.

Hunting success and regulations are directly related to prey populations. One of the greatest concerns the public had with wolf reintroduction was the effect that wolves would have on deer, elk, and

moose populations. The primary deterrent of the long-term status of gray wolf survival is human attitudes toward wolves (USFWS 2000). The hunting public has made substantial financial investments and sacrifices to restore ungulate populations to Montana (Sime 2002), and hunters can be a strong ally or opponent to wolf survival. Therefore, the refuge would best gain support for a healthy wolf population by maintaining ungulate populations and not restricting hunting unless in direct conflict with the survival of a wolf pack in the Pleasant Valley area.

Rationale 102 (alternative C): Because wolves and other large carnivores have large home ranges, attention should be focused on the habitat values of both public and private lands. Private lands, in particular have substantial value to wildlife because they frequently occur at low elevations with moderately extreme weather conditions such as deep snow. Voluntary habitat conservation efforts, such as land or vegetation management plans and conservation easements would ultimately benefit many wildlife species. (Sime 2002).

Farming and ranching in Montana maintains open space. That open space is also habitat for a diversity of wildlife species. Maintaining the land base for agriculture and wildlife habitat is an increasing challenge, given broader trends in resource and agricultural economics, human population demographics, and development of the “New West” (Sime 2002).

Increasing settlement during the last century has significantly transformed the valley floors of northwest Montana. Large undeveloped tracts of agricultural lands and a complex of wildlands, wetlands, rivers, grassland, and forests are being converted to home sites such as “ranchettes” of 2–20 acres as the region’s natural amenities attract new residents, vacation homebuyers and businesses. This development trend has increased considerably in the last 20 years.

Flathead is one of the fastest-growing counties in Montana. Lack of planning and effective zoning has led to a highly fragmented residential development pattern. In 1999, 46 percent of new residential development in Flathead County occurred in rural areas.

The refuge is surrounded by large intact landownership. PCTC is a major landowner in the Pleasant Valley area. The state of Montana recently negotiated a conservation easement on PCTC lands in the Fisher and Thompson river drainages in northwestern Montana. However, PCTC is currently selling land surrounding Island Lake just west of the refuge. Much of the other private land in the valley is under the ownership of large family-owned ranches. Two of the ranches neighboring the

refuge have already placed NRCS WRP easements on portions of their properties.

Pleasant Valley is located in a prime subdivision area with abundant wildlife, many lakes and beautiful scenery and it is within easy commuting distance of Kalispell.

CANADA LYNX

Rationale 103 (alternatives A, B, and D): Although the Canada lynx would be considered in management decisions, the refuge contains only marginal habitat for lynx and even intensive management for lynx habitat on the refuge may not result in lynx using the refuge. Therefore, when conflicts arise, the needs of the lynx may not be the primary consideration in habitat management. However, Section 7 of the ESA (50 CFR 402) requires that federal agencies refrain from taking any action that destroys or adversely modifies critical habitat. While a critical habitat designation is warranted, critical habitat has not been designated for the lynx. Thus, the refuge should evaluate all management decisions in forest stands above 3,280 feet to ensure that lynx habitat is not adversely modified.

Lynx habitat in the Rocky Mountains consists of two structurally different forest types. Lynx require early successional forests that support high densities of snowshoe hare and late-successional forests that contain cover for kittens and for denning.

Timber harvest and related activities in forests have the greatest potential to affect lynx habitat. Timber harvest and associated forest management can be benign, beneficial, or detrimental to lynx depending on harvest methods, spatial and temporal specifications, and the vegetation potential of the site. Timber harvest can result in reduced cover, unusable forest openings, and large monotypic stands with sparse understories that are unfavorable for lynx and snowshoe hare.

Precommercial thinning also reduces snowshoe hare habitat by reducing cover. Forestry practices can benefit lynx when they result in understory stem densities and structure that meets forage and cover needs of snowshoe hare. Snowshoe hare densities are highest in regenerating stands with very high stem densities. Regeneration harvest can be used to create quality snowshoe hare habitat, especially where natural regeneration would be expected to provide dense, young vegetation (Hodges 1999a, 1999b; Ruggiero et al. 1999).

Although disease and insect attacks may increase fuel loads and the risk of large, high-intensity fires, they also provide dead and downed trees used for denning and cover. Thus, the role that disease and insects play in the dynamics of forest being manipulated must be carefully considered when managing stands for timber and lynx.

Rationale 104 (alternatives A and C): Although lynx trapping is currently prohibited in Montana, lynx can be trapped in other predator sets. It is not always possible to release a nontarget species from a trap unharmed. Human-caused mortality is believed to be additive in low-density lynx populations characteristic of the southern boreal forests (Koehler 1990). Therefore, illegal or incidental harvest can significantly reduce population numbers of lynx in southern regions.

Rationale 105 (alternative A): Late-successional mature forests that contain large, woody debris such as fallen trees or upturned stumps are required habitat for lynx denning (Berrie 1973, Koehler 1990, Koehler and Brittel 1990, Kesterton 1988, Murie 1963). Small-sized parcels (2.5–5 acres) of late-successional forest appear to be adequate for den sites, but these parcels must be connected by corridors of cover to permit females to move kittens to alternate den sites providing suitable access to prey. Several areas of habitat suitable for denning are required to ensure that habitat remains in the event of an uncontrollable natural processes such as destruction of habitat due to wildland fire.

Early successional forests where snowshoe hare are plentiful are favored hunting habitats for lynx. Such forests result from fires (Bailey et al. 1986; Fox 1978; Keith and Surrendi 1971; Koehler 1990, 1991), timber harvest (Conroy et al. 1979; Koehler 1990, 1991; Litvaitis et al. 1985), or windthrow and disease (Koehler and Brittel 1990). Based on hare pellet counts in Washington, Koehler (1990) found that hares were more abundant in younger-aged stands of lodgepole pine than in any other forest type. Studies strongly indicate that conifer cover is critical for hares during the winter. Hares are more likely to use young stands with dense understory than uncut or even-aged stands with little understory (Monthey 1986; Thompson 1988; Koehler 1990).

Although early successional forests are common habitat on surrounding PCTC lands, these stands may not be managed to support the dense understory that is required for high snowshoe hare populations. For instance, precommercial thinning is detrimental to snowshoe hare habitat but is a common management tool on productive timberlands. Staff should consult with PCTC biologists to determine snowshoe hare habitat on surrounding lands and then determine what would be required on refuge lands to support lynx in the Pleasant Valley ecosystem.

Canada lynx are specialized predators adapted to northern latitude and high-elevation habitats with abundant winter snows. Snowshoe hare are the lynx's primary prey, comprising 35–97 percent of their diet (McCord and Cardoza 1982). Conclusions from the "Ecology and conservation of lynx in the United States" are that a snowshoe hare density

greater than 0.5 hares per hectare (0.2 hares per acre) is required for lynx (Ruggiero et al. 1999).

Rationale 106 (alternative C): Lynx habitat consists of a mosaic of forest habitats such as early successional forests that support high densities of snowshoe hare and late-successional forests that contain cover for kittens and for denning. Wildland fire, windthrow, and disease are all natural processes that create these forest conditions (Bailey et al. 1986, Fox 1978, Keith and Surrendi 1971, Koehler 1990, Koehler and Brittel 1990). Although disease and insect attacks may increase fuel loads and the risk of large, high-intensity fires, they also provide dead and downed trees used for denning and cover.

A fire plan should be developed to reduce the risk of a catastrophic natural wildland fire resulting from natural processes management on the forestlands while allowing benefits derived from natural fires.

BALD EAGLE

Rationale 107 (all alternatives): An occupied eagle nest site is any site with recorded activity of breeding within 5 years. One of the preferred planning options in the Montana Bald Eagle Management Plan (MBEWG 1994) is nest site management zones. These zones are concentric circles around each nest site in which different management options are applied. Zone I extends 0.25 mile from the nest site in a concentric circle and is defined as the "nest site area." In this area, human activity or development may cause the abandonment or lower the productivity of the breeding area.

Zone II extends from 0.25 to 0.5 miles from an occupied nest site. This area is defined as the "primary use area" and is where 75 percent of a breeding pair's activity (foraging, loafing, and bathing) occurs.

Bald eagles are sensitive to human disturbance, especially activity after nest initiation and prior to fledgling. This activity can result in decreased nestling survival (Steidl and Anthony 1996). Lost Trail is a national wildlife refuge and, as such, is held to higher standards where endangered species are concerned. Although the Montana Bald Eagle Management Plan guidelines permit minimal disturbance in zone II, the refuge would extend zone I guidelines to 0.5 mile.

In management zones I and II, habitat alteration (such as timber harvest, prescribed fire, power line construction, pesticide use, land clearing, levee or dam construction, and wetland drainage) that may negatively affect the breeding and foraging area of bald eagles should be evaluated prior to implementation.

Guidelines developed by the bald eagle recovery team (USFWS 1986) recommend a goal of at least one fledged per year on average per nesting pair and

an average nest-success rate of not less than 65 percent over a 5-year period.

Rationale 108 (all alternatives): Nest site monitoring is an important tool in determining population trends of many bird species. The bald eagle nest survey form is designed to standardize raptor nesting data collection and is valuable in tracking progress toward the delisting of the bald eagle. The Montana working group coordinates the annual survey, and compiles and evaluates the results. After hatching, eagles are less sensitive to disturbance and are less likely to abandon or neglect young.

Rationale 109 (alternatives A, B, and C): Eagles are attracted to carrion. If carrion exists along a road, eagles become vulnerable to oncoming traffic. This is especially true when the eagle is gorged and during the winter when ambient temperatures are below freezing and wind is calm (MBEWG 1994b).

Power lines and poles pose an electrocution and collision threat to eagles. Existing power lines can be modified to reduce the danger to eagles and other migratory birds. New power lines should be evaluated to minimize affects on eagles.

Eagles are vulnerable to leg-hold traps near site baits. They can be caught in these traps and sustain severe injury or death.

Rationale 110 (alternatives A and C): Zone III in the Montana Bald Eagle Management Plan guidelines represents most of the home range used by eagles during the nesting season. It usually includes all suitable foraging habitats within 2.5 miles of all nest sites in the breeding area that have been active within 5 years.

The management goal for Montana is to facilitate population growth until the number of breeding pairs peaks. After that, the management goal is to provide secure habitat to maintain a healthy self-sustaining population as close to peak levels as possible (MBEWG 1994b). Secure habitat includes all area within 0.5 mile of a nest and key use areas within 2.5 miles of a nest site. Disturbance and habitat modifications in zone III could lead to the disruption of nesting or a decrease in nestling survival.

Rationale 111 (alternative A): The Montana bald eagle working group (1991) characterized quality habitat as a mature forest stand of low to moderate canopy closure consisting of cottonwood, Douglas-fir, ponderosa pine, or mixed conifer. Forest stands with nest sites should be 20 acres or larger and be located within 1 mile of open water. The stand should contain at least two suitable nest trees (older, large-diameter trees) and more than three perch trees. Feeding habitat should be greater than 80 acres with shallows, grasslands, and meadows intermixed.

Rationale 112 (alternative B): Development of public use would be allowed within zone II if it were found to be compatible with continued eagle production. This would be measured by the production of on an average of one fledgling per year and a nest success rate of 65 percent, over a 5-year period.

Rationale 113 (alternative B): Productivity objectives in the Recovery Plan (USFWS 1986) are an average of 1.0 young produced per occupied breeding area with 65 percent success, over a 5-year period.

An interpretive display located within 0.5 mile of the eagle nest may affect production. For a blind to be effective, it must be located close to the nest or perch trees. Use must be strictly regulated and affects on eagles monitored. Recreational activities that enhance awareness and understanding, and foster support of management objectives for bald eagles should be encouraged as long as they do not jeopardize the continued recovery of the species.

Rationale 114 (alternative C): Foraging flights by resident breeding adults may extend beyond the 2.5-mile radius of zone III. Nonbreeding bald eagles are often excluded from the preferred foraging areas by resident nesting bald eagles and must use outlying habitat. Security from intrusion and disturbance and the maintenance of adequate prey is important to the survival and eventual delisting of the bald eagle.

Rationale 115 (alternative C): Recreational activities that enhance awareness and understanding of bald eagles, and recovery needs should be encouraged. This would minimize disturbance to and conflicts with bald eagles on and off refuge lands.

TRUMPETER SWAN

Rationale 116 (all alternatives): Trumpeter swans are occasionally observed on Island and Flathead lakes, and various other locations in northwestern Montana. The Flathead Valley is one of three areas where suitable habitat existed and trumpeter swans were once a common breeding species in the United States. (Banko 1960)

One of the greatest threats to trumpeter swan survival in the Rocky Mountain population is that the swans concentrate in local wintering areas where food resources are becoming scarce and where they are at a greater risk of disease outbreaks. Locations of swans in areas outside of the Yellowstone-Idaho area should be reported to the trumpeter swan working group, as these swans may be pioneers that could establish new breeding and wintering grounds.

Rationale 117 (all alternatives): Nesting trumpeter swans have been shown to be sensitive to human disturbance during the nesting season. Birdwatching, photography, research, and other activities in or near nesting areas may cause nest failure or cygnet loss by disturbing adults (Mitchell

1994). In Yellowstone National Park, human intrusion was the most significant known cause of egg failure in trumpeter nests (Banko 1960).

Rationale 118 (alternatives A and C): Trumpeter swans are long-lived, social birds that are highly dependent on strong family bonds and traditional patterns of habitat use that are passed down through generations (USFWS 1995a). When swans were eliminated from much of their range, they not only lost a major segment of the population but perhaps of greater importance, they lost flyway traditions.

Today, the majority of trumpeter swans in the Rocky Mountain population concentrate on a small number of wintering grounds. Severe losses could occur from disease outbreaks, severe winter weather, and lack of forage. In 1989, more than 100 swans died in the tri-state area when a blizzard swept through a major wintering area. Since then, winters have been mild, but the possibility of another hard winter always exists.

As the swan population increases, the limited resources in the area are taxed and may not recover to provide forage for the next year. It is important to the survival of the RMP to relearn and rebuild migratory patterns that were lost when swans were exterminated from much of their range. Historical accounts indicate that the Flathead Valley was once a major nesting area for swans. In recent times, there have been sporadic reports of swans wintering in northwestern Montana along the Flathead and Clark Fork river drainages.

Trumpeter swans have also been observed during migration and a pair was documented in the Pleasant Valley area one summer but breeding was not recorded. The ultimate goal is to reacquaint trumpeter swans with wintering grounds, breeding areas, and migratory routes that were lost when the population neared extinction in the early 1900s. This would be accomplished through natural pioneering and through transplant of swans to suitable habitat.

Important requirements for successful breeding of trumpeter swans include the following:

- room for take off (approximately 328 feet)
- accessible forage
- shallow, stable levels of unpolluted, fresh water
- emergent vegetation, muskrat island, or other structure for nest site
- low human disturbance
- highly irregular shorelines
- water depth of less than 3.9 feet
- abundant and diverse communities of aquatic plants
- abundant invertebrate populations

(Mitchell 1994, Hansen et al. 1971, Maj 1983, Squires 1991, Lockman et al. 1987)

Rationale 119 (alternative B): The introduction of trumpeter swans to Dahl Lake may have an impact on public uses such as hiking, bird watching, fishing, and hunting. In alternative B, the refuge would look at the impact on public use and survey the public to determine if restoration efforts should be pursued on Dahl Lake. Naturally occurring swans would still be protected by minimizing disturbance.

Rationale 120 (alternative C): Interpretation and environmental education are priority wildlife-dependent public uses. Information promoting an understanding of the species would make the public more aware of the needs of the swan and the importance in limiting disturbance. Interpretation and environmental education reach beyond the boundaries of the refuge and help protect the species on a far greater level.

BLACK TERN

Rationale 121 (all alternatives): Black terns have shown continent-wide population decline since 1960 and are listed as threatened or endangered in six states. They are listed as a species of concern in 18 other states and provinces (Casey 2000). Black terns are listed as a Service nongame bird of management concern (USFWS 1995b, 2002). In Montana, black tern is listed as a species of special concern with a ranking of vulnerable under the Natural Heritage Program classification system (Shuford 1999), but has not been consistently monitored.

Declines are probably related to a loss of wetlands and a decrease in food supply, in part, caused by insect control (Dunn and Agro 1995). Black tern populations are difficult to quantify on an ecosystem level because black terns exhibit low site fidelity. Loss of potential nesting and foraging habitat for black terns is greatest in northeastern and northwestern Montana.

To evaluate the status of black terns in Montana, individual agency records need to be compiled and evaluated. Tern production on the refuge was documented by MFWP in 1999. Terns were observed by refuge staff in 2000 and 2001. Restoration and enhancement of refuge wetlands may affect tern nesting.

Black terns nest in shallow, freshwater wetlands in emergent vegetation. They prefer wetland complexes greater than 20 hectares (49.4 acres), in areas with 25–75 percent of the surface covered with emergent vegetation, water depths between 0.5 and 1.2 meters (1.6 and 3.9 feet), and nesting substrate within 0.5 and 2 meters (1.6 and 6.6 feet) of open water (Dunn and Agro 1995). Nests are often lost to bad weather, effects of winds and waves, and changing water levels. Known predators include great horned owl, mink, northern harrier, ring-billed gull, American

crow, common raven, raccoon, muskrat, long-tailed weasel, otter, and snapping turtle (Gerson 1988, Novak 1992, Dunn and Agro 1995). Nest success would be monitored to document production.

Degradation of lake habitat may occur by succession, raising or lowering water levels, introducing exotic species, and reductions in water quality (Novak 1992). Nest platforms can be flooded out by rising water levels. Low water levels may increase likelihood of nest predation by mammals. Black terns may shift breeding sites from year to year in response to changes in hydrologic cycles and emergent vegetation (Shuford 1999). In most cases, WPA managers can provide suitable nesting habitat for black terns without any major changes to their water management (Casey 2000).

Rationale 122 (alternative B): Black terns may be a species of interest to the birding community. A bird list would give the public information on species that may be observed on the refuge, the habitat in which to look, and the season of the year they are most likely on the refuge. It would also raise the awareness of the species of special concern status and foster understanding and support for management efforts.

Rationale 123 (alternative B): Since these species are rare, therefore difficult to observe, the refuge may not be able to provide viewing. Information about the sensitivity of the species and how to protect them would be disseminated to the public and public use would be directed to areas and species that could handle limited disturbance. Educating the public on the conservation needs of these species would promote understanding and support for management programs.

BOREAL TOAD

Rationale 124 (all alternatives): Hossack et al. (2001, 2003) found evidence of boreal toads breeding on 5 of 20 sites surveyed in 2001 and 15 of 28 sites in 2002. Boreal toads were located at less than 5 percent of other forested sites surveyed in Montana since 1999.

Dahl Lake has the largest reproducing population known for the Rocky Mountains (based on the number of larvae observed). There is a concern that this species is declining in the region. Evidence from Glacier National Park and the refuge show that breeding sites are often clustered in a small area, hence are at risk to environmental changes for local extinction.

The development of water impoundments or any change in water manipulation or water levels can result in the loss of key breeding, overwintering, and foraging habitats for herpetofauna. Water impoundments that are developed for waterfowl production may lead to a decline in reptiles and amphibians through increased depredation from a high concentration of waterfowl.

A high concentration of waterfowl can also lead to a decrease in water quality. At Bosque del Apache National Wildlife Refuge in New Mexico, waterfowl increased nitrogen levels by 40 percent and phosphorus levels by 75 percent in the winter of 1995–96 (Post et al. 1998). Amphibians have highly permeable skin and egg membranes and complex life cycles.

Many species are philopatric to specific breeding, foraging, and overwintering habitats. With such an important locally breeding population and possibly an important regional breeding population, refuge management and wetland restoration projects should be carefully examined for the potential impacts to this species.

SPALDING'S CATCHFLY

Rationale 125 (all alternatives): Spalding's catchfly is a native forb of the carnation family (Caryophyllaceae) that occurs in mesic slopes, flats, or depressions of open grasslands. It is associated with Idaho fescue, rough fescue, and bluebunch wheatgrass. The catchfly is occasionally interspersed with conifers.

Twenty populations have been documented in northwestern Montana in the following counties: Flathead (6), Lake (2), Lincoln (6), and Sanders (6). A new population was discovered on the refuge in 2002. This population is one of the largest documented sites in Montana and contains a minimum of 300 plants within about 9.5 acres. Part of this population exists on Montana DNRC land within the legislative boundary of the refuge. The staff is certain more plants will be discovered as inventory efforts continue.

Federal law requires that endangered species be protected and, if possible, restored on federal lands. The refuge has up to 2,500 acres of Idaho fescue- and rough fescue-dominant habitat that could support Spalding's catchfly. Since there are only 53 known populations of Spalding's catchfly in fragmented populations across the northwest, the relatively large population located on the refuge and any new populations that may be discovered are significant to the plant's survival.

Threats to Spalding's catchfly include grazing and trampling by domestic livestock and native herbivores, herbicide treatment, competition from nonnative plants, and competition from pollinators. Prescribed fire may have a positive effect on Spalding's catchfly by removing litter or duff layers and woody plants, thus improving natural propagation of the plant. Recruitment of Spalding's catchfly was enhanced following prescribed fire in Montana (Lesica 1992, 1999). The effects of fire would vary, depending on fuel moisture, species composition, season, and intensity of burning (Lesica 1997). Prescribed fire may also increase invasive nonnative plant populations, which may negatively affect on Spalding's catchfly. Therefore, prescribed

fire may enhance Spalding's catchfly survival and recruitment but must be thoroughly evaluated prior to use.

Invasive plants displace the plant and compete with it for water, nutrients, light, and pollinators (Delphey and Rey-Zizgirdas 2001, Montana Natural Heritage Program 1998). Many locations of Spalding's catchfly are at risk of being displaced by nearby populations of invasive plants, especially spotted knapweed and sulfur cinquefoil. Herbicide use to control invasive plants may also harm the catchfly. An integrated pest management program should be evaluated including hand pulling, hand spraying, and biological control to reduce encroaching invasive plants while not harming the catchfly.

Management tools such as prescribed fire and invasive plant control would benefit the catchfly as long as careful attention is given to implementation. Management tools such as grazing, prescribed fire, and spraying may adversely affect Spalding's catchfly populations, even though they could also be critical to its continued existence. A burning program at the wrong time of year or in an area subject to more invasive plant encroachment could create a disadvantage for the catchfly.

Invasive plant control alone is important due to invasive plants displacing and in competition with the catchfly (Delphey and Rey-Zizgirdas 2001). However, herbicide application has to be carefully applied at the right time of year and not in the location of plants to not damage the catchfly. Federal law prohibits modification of critical habitat, and any act that may jeopardize the continued existence of a listed species. Prior to implementation of any management actions that may affect Spalding's catchfly, a survey must be conducted to determine if this species is in the management area. If the species were located, refuge staff would evaluate the effect that implementing the management action would have on the plant and develop the best management practice.

Although there is a federal responsibility to maintain this threatened plant population, its location on a national wildlife refuge provides unique possibilities for environmental education and interpretation. Careful planning could present opportunities in the future for guided tours to view the plant and learn about its habitat characteristics and threats to its continued existence. Visitors could help locate new populations while out hiking or hunting, if they are exposed to preliminary information in the visitor contact station.

CULTURAL RESOURCES

Rationale 126 (all alternatives): There are a number of laws that require or encourage active surveying for cultural and historical resources, to minimize

damage and deterioration to sites and to preserve them for future generations.

The Archeological and Historic Preservation Act (ARPA) authorizes federal agencies to use various means to obtain funding to identify and preserve data of cultural and historical items and sites.

The ARPA requires that federal managers develop plans and schedules to locate the most scientifically important archaeological sites.

Cooperation between the Montana State Historical Preservation Office, the THPO, and the Service would be needed to ensure that surveys of resources by the Service's region 6 archaeologist or its contractors are comprehensive.

Maintaining and protecting cultural and historical resources requires law enforcement staff with appropriate training.

The integrity of cultural resources located on Service lands is subject to threats from erosion, neglect, vandalism, grazing, cultivation, and other land-disturbing activities. The Service is required by statute to exercise caution in carrying out its activities to assure that historical properties are not inadvertently sold, demolished, substantially altered, or allowed to deteriorate significantly without adequate review and protection.

Many of the laws that regulate management of cultural resources on Refuge System lands are concerned with avoiding or mitigating impacts to these resources during the planning of and implementation of projects. There are stipulations to stop projects if objects or sites are uncovered during work. Even though the refuge works with partners with expertise in cultural and historic fields, staff involved with planning and implementing projects should have enough training to recognize potential sites to minimize damage to resources.

Refuge projects would need to include trained personnel (whether on staff, the Service's region 6 archaeologist, or its contractors) who would check sites prior to and during implementation so as not to damage cultural or historical resources. While this would add to costs, it is required by law. It would also provide documentation of any new sites and resources uncovered.

Rationale 127 (all alternatives): The preservation of historical heritage is in the public interest so that its vital legacy of cultural, educational, aesthetic, inspirational, economic, and energy benefits would be maintained and enriched for future generations of Americans.

Minimum staffing guidelines for the refuge call for law enforcement and public use personnel. If provided, these can be available to coordinate and conduct documentation, protection, and

interpretation of cultural resources. Basic facilities and support provided for other management programs (such as office space, computers, and vehicles) can also be used to support management of cultural and historical resources.

By actively seeking and documenting as many sites as possible at the refuge, managers can develop plans that would avoid as much damage as possible to the resources. This would also save time and money by eliminating or modifying projects that would have to be delayed, redesigned, or stopped if a cultural or historical site were uncovered during the undertaking.

Rationale 128 (alternatives A, B, and C): The ARPA requires land-managing agencies to establish public awareness programs regarding the value of archaeological resources to the Nation. However, refuge managers should understand that these sites are sensitive, and allowing uncontrolled access by the public to them is unacceptable.

Refuge managers must ensure the physical integrity of the sites, including maintaining appropriate location confidentiality. These resources are increasingly endangered because of their commercial attractiveness and education is a way to encourage compliance with rules and regulations and increase protection.

Rationale 129 (alternatives A, B, and C): It is the policy of the Service to identify, protect, and manage cultural resources located on Service lands and affected by Service undertakings, in a spirit of stewardship, for future generations. Specifically, the Service would manage these resources in such a manner that sites, buildings, structures, objects, and values of importance are sufficiently protected for present or future scientific study, public appreciation, and socio-cultural use.

The historical and cultural foundation of the Nation should be preserved as a living part of community life and development in order to give a sense of orientation to the American people and a spirit of stewardship for the inspiration and benefit of present and future generations. The preservation of this irreplaceable heritage is in the public interest so that its vital legacy of cultural, educational, aesthetic, inspirational, economic, and energy benefits would be maintained and enriched for future generations of Americans. There are a variety of laws in place that provide direction and legalities, including the Archaeological Resources Protection Act, the Archaeological and Historic Preservation Act, the Historic Sites, Buildings and Antiquities Act, and the National Historic Preservation Act.

Rationale 130 (alternative B): With the refuge still developing its infrastructure, historical structures could be used for administrative purposes. In

accordance with Executive Order No. 13006, federal agencies shall—prior to acquiring, constructing, or leasing buildings for purposes of carrying out agency responsibilities—use historical properties available.

PUBLIC USE

Rationale 131 (all alternatives): Careful planning provides the visiting public with opportunities to enjoy and appreciate fish, wildlife, plants, and other resources. As a result, the public would develop an understanding and would build an appreciation of each individual's role in the environment today and into the future.

Rationale 132 (alternatives A, B, and C): Wildlife-dependent recreational public use—hunting, fishing, wildlife photography and observation, interpretation, and environmental education—are great means of fostering understanding and instilling an appreciation of native fish, wildlife, and plants and their conservation. They are also part of the priority wildlife-dependent public uses designated in the National Wildlife Refuge System Improvement Act of 1997.

Because Lost Trail is a new refuge, there is limited background on what the public wants and expects from the refuge. It needs to be determined which opportunities can be offered that would provide quality experiences, that would be used by and attract visitors, and that would complement and enhance opportunities provided by the private sector or other agencies.

Rationale 133 (alternatives A and B): A day use area would support and encourage wildlife-dependent public uses by allowing visitors to stay longer and experience more of the refuge. The refuge is remote, with few nearby services and no nearby public eating or restroom facilities.

These basic facilities would allow visitors to stay longer and obtain a higher quality experience. This, in turn, would lead to more opportunities to appreciate and support fish, wildlife, plants, and their habitats; the refuge; and the Service. To provide for environmental education opportunities for school groups, the refuge would need to provide a place for students and educators to eat their lunch, along with drinkable water and restrooms facilities.

Rationale 134 (alternatives A and B): An environmental education campground area would allow for the practical and effective operation of the environmental education program by allowing students and educators to stay longer and experience more of the refuge. Environmental education is one of the priority wildlife-dependent public uses that refuges are encouraged to provide if compatible.

Environmental education is an excellent means to foster understanding and instill an appreciation of

native fish, wildlife, and plants, and their conservation in educators and youth. Because the refuge is so remote (1 hour from the nearest large population center of Kalispell, population 15,000), travel time to and from the refuge would reduce time spent on-site. Participants could receive a higher quality experience if they had the opportunity to spend more time in the field participating in hands-on activities. The campground may also facilitate the participation in environmental education by more-distant schools, especially those that cannot make it to the refuge within a school day.

Rationale 135 (alternative B): Wildlife-dependent recreational activities are allowed on refuges if they can be carried out without detrimentally affecting the purpose for which the refuge was established and goals of the National Wildlife Refuge System. The refuge was established primarily for migratory birds, but also to enhance the conservation of all wildlife species. The public use activities proposed in this CCP have been developed with minimal data on important areas of the refuge for wildlife. Once refuge staff has determined these areas, there may be opportunities to enhance public use without harming native plants, wildlife, and their habitats.

Rationale 136 (alternative B): The National Wildlife Refuge System Volunteer and Community Partnership Enhancement Act of 1998 (P.L. 105-242) strengthens the Refuge System's role in developing effective partnerships with various community groups. Volunteer and support groups fortify refuge staffs with their gifts of time, skills, and energy. These groups are integral to the future of the Refuge System. Refuge staff initiates and nurtures relationships with volunteers and support groups, and continually support, monitor, and evaluate these groups with the goal of fortifying important refuge activities.

Rationale 137 (alternative B): Wildlife observation, wildlife photography, and fishing are priority wildlife-dependent public uses. Access to the lake would support these uses and would provide for different quality experiences.

Rationale 138 (alternative C): The refuge is remote with no other nearby restroom facilities or drinkable water. Providing these basic facilities would allow visitors to stay longer and obtain a higher quality experience. This, in turn, would lead to more opportunities to appreciate and support fish, wildlife, plants, and their habitats; the refuge; and the Service.

Rationale 139 (alternative C): A campground area would allow for the practical and effective conduct of the environmental education program by allowing students and educators to more effectively participate in data gathering and restoration projects. Because the refuge is so remote (1 hour away from the nearest large population center of Kalispell,

population 15,000), travel time to and from the refuge would cut into time spent at the refuge. To make best use of students and educators in data-gathering and restoration projects, many of which are long-term, it would help to allow them to stay one or more nights at the refuge. Participants could receive a higher quality experience if they had the opportunity to spend more time in the field participating in hands-on activities.

Rationale 140 (alternative D): Some basic facilities are needed to support the wildlife-dependent public uses currently allowed (hunting, wildlife observation and photography, environmental education, and interpretation). The refuge is remote with few nearby services. Basic commodities such as restroom facilities and drinking water are needed to extend the use of the refuge and, subsequently, promote opportunities to foster appreciation and support of natural resources, the refuge, and the Service. Limitations in these facilities may curtail public use.

HUNTING

Rationale 141 (all alternatives): The Service recognizes hunting as a healthy, traditional outdoor pastime, deeply rooted in American heritage. When managed appropriately, hunting can instill a unique understanding and appreciation of wildlife, their behavior, and their habitat needs.

Local wildlife populations should be able to coexist with a hunt program. Elk populations within MFWP's hunting district 103 are consistently above MFWP objective levels. Refuge lands are primarily elk winter range. Removal of some elk within the refuge would facilitate adequate harvest levels and assist MFWP in optimum management of the local elk population.

White-tailed deer are year-round residents; mule deer primarily use the refuge in fall and winter. Their populations have been steadily increasing in the past 4 years. MFWP monitors both species to facilitate adaptive management using harvest regulations.

Hunting generally has no appreciable impact on healthy small game populations as the harvest is insignificant compared to natural mortality. Of the MFWP's seven regions, region 1 yields 50 percent of the statewide harvest of mountain grouse, indicating a consistently high population in the area of the refuge and the ability to tolerate hunting pressure.

Turkeys were released in the area by MFWP to increase hunting opportunities. They are not indigenous to Montana and so are not a priority species for refuge management.

Rationale 142 (all alternatives): The mission of the National Wildlife Refuge System is to conserve and protect wildlife, plants, and habitat. The Service desires a hunt that reflects positively on the refuge,

the Refuge System, and the Service. However, hunting at the refuge is a relatively new use and there is limited history of impacts of hunters. The refuge will take the opportunity to “set the standard” early on so hunters will know what to expect in the future.

Rationale 143 (all alternatives): Hunting is a legitimate and appropriate public use of the Refuge System. Hunting programs will promote understanding and appreciation of natural and cultural resources and their management on all lands included in the Refuge System. Monitoring programs must focus on the impacts of recreational activities on wildlife, habitat, and the quality of experience for the public.

A quality hunt is defined as one that: (1) maximizes safety for hunters and other visitors; (2) is available to a broad spectrum of the hunting public; (3) provides hunters uncrowded conditions by minimizing conflicts and competition among hunters; and (4) provides reasonable challenges and opportunities for taking targeted species under the described harvest objective established by the hunting program. It also minimizes the reliance on motorized vehicles and technology designed to increase the advantage of the hunter over wildlife. By implementing successful monitoring techniques, hunting can be evaluated and adaptively managed to meet established standards and ensure that activities continue to be appropriate and compatible.

There is a history of extensive hunting on neighboring lands (PCTC has a block management plan in place with MFWP and there are a few sections of DNRC lands within the acquisition boundary of the refuge). Allowing hunting on portions of the refuge would allow for an expansion of hunting and provide for some quality opportunities.

The biggest restriction to a quality hunt is the limited staffing currently available. Much needs to be done to provide information needed by hunters—not the least being a clear and understandable handout with map, rules, and regulations, along with signing refuge boundaries and closed areas. Pulling staff from other areas of the complex to complete work for hunting may limit other wildlife-dependent public uses, although all can use some hunting resources (such as a public use handout).

Rationale 144 (all alternatives): To continue this use and instill a conservation ethic into future citizens, the refuge can provide quality hunting experiences that would encourage and teach youth the pleasures and responsibilities of hunting.

The refuge is in a beautiful Intermontane valley with quality opportunities for hunting. It is also remote, which provides for uncrowded hunting opportunities. This presents a good opportunity to introduce youth to hunting as well as foster a sense of appreciation

and stewardship to the refuge and its mission of protecting fish, wildlife, and plants for future Americans.

This program needs to have adequate staffing to contact the majority of youth involved in these early hunts, to impart messages of conservation and ethical behavior. The refuge would need to partner extensively with MFWP and others to ensure the success of this program.

FISHING

Rationale 145 (alternatives A, B, and C): Promoting youth fishing is an opportunity to introduce future generations to the pleasure and excitement of fishing. Those involved would not only learn how to fish successfully but ethically as well.

Rationale 146 (alternatives A, B, and D): Fishing is one of the six wildlife-dependent recreational public uses defined in the Improvement Act. A quality program is a good way to help foster appreciation, support, and understanding of the refuge, the Refuge System, and the Service.

An effort should be made to accommodate fishing as long as it is compatible with resources and other wildlife-dependent public uses. At this time, there are no viable sport fishery opportunities at the refuge, due in large part to past land practices that changed the hydrology of Dahl Lake, Pleasant Valley Creek, and the watershed downstream.

Rationale 147 (alternative C): A goal of the National Wildlife Refuge System is to conserve and restore representative ecosystems. With the acquisition of Lost Trail into the Refuge System, there is an opportunity to restore the hydrology, fisheries, and riparian communities on the refuge.

While fishing is considered an appropriate, wildlife-dependent, recreational public use under the Improvement Act, it is a consumptive use and would not fit under alternative C. The mandate to provide quality fishing opportunities would not be supported in this alternative. The natural water regimes, and their corresponding fisheries and plant communities, have been greatly modified in Pleasant Valley and do not support a quality fishing program.

WILDLIFE OBSERVATION AND PHOTOGRAPHY

Rationale 148 (all alternatives): Wildlife photography and observation are two of the six priority wildlife-dependent recreational public uses as defined in the Improvement Act. They should be provided for if found compatible and if the refuge has the resources to support them.

Rationale 149 (all alternatives): Information would be provided to visitors to enable them to pursue high-quality wildlife-dependent recreational activities while connecting to resources. This would

provide opportunities for them to develop an understanding and appreciation for natural and cultural resources. In addition, visitors would have information on how to use the refuge in an appropriate and compatible manner.

Rationale 150 (alternatives A, B, and C): Wildlife photography, wildlife observation, and interpretation are a great means of fostering understanding and instilling an appreciation of native fish, wildlife, and plants and their conservation. Providing the public with a safe, quality wildlife observation and photography experience includes following ethical behavior that results in minimal disturbance to wildlife and plants.

Rationale 151 (alternatives A, B, and C): Promoting wildlife photography and observation of plants, animals, and their associated habitats can foster an understanding of and increase public appreciation for America's natural resources and the role of the Refuge System in managing and protecting these resources. The refuge is part of an Intermontane ecosystem that typically has been used for farming and ranching. The refuge offers a unique opportunity for the public to view plants and animals in a natural ecosystem setting.

Rationale 152 (alternative A): Alternative A provides opportunities for quality public use experiences by opening the refuge to public access while minimizing disturbance to wildlife during critical periods of their biological cycle. Limiting disturbance, combined with habitat improvements, would maintain or increase populations. Ultimately, wildlife photography and observation opportunities would be improved.

Uplands would be open to authorized public uses throughout the year, except access would be restricted to designated trails and roads from December 15 through April 1 to protect wintering wildlife from disturbance.

Winter is a critical time for ungulate survival due to increased energy requirements related to searching for food and higher metabolic rates associated with maintaining body heat. Disturbance at this time results in even greater energy requirements and may weaken the animal to the extent that reproduction is compromised or individual survival is threatened. The greatest disturbance comes from unpredictable and erratic occurrences. Restricting public use to designated trails and roads would eliminate the most deleterious disturbance while still providing recreational opportunities.

The area between the county road and the South Pleasant Valley road, and areas around facilities, would be closed to all public access from September 1 through December 15. Authorized public uses would only be permitted on designated trails and roads from December 15 through April 1 to protect wintering ungulates from disturbance (as described

above); and from May 15 through September 1 to protect nesting waterfowl and other wetland- and bottomland-associated species from disturbance.

Effects on breeding waterfowl from human disturbance include: (1) a reduction in the number of pairs using the area; (2) an increase in nest desertion; (3) a reduction in hatching success; and (4) a decrease in duckling survival. These factors lead to a decrease in waterfowl populations. By limiting access to designated trails and roads, disturbance would be confined to a narrow corridor along these routes. Waterfowl and other avifauna would have protected areas in which to nest and rear their young, securing future populations.

A balance that allows for quality public use opportunities without negatively affecting the resources is sought. This would ultimately ensure that wildlife viewing and photography would be available for future generations. The definition of "authorized access" (foot travel, snowshoes, skis, mountain bikes, and horses) would be determined in the appropriate step-down plan.

Rationale 153 (alternative B): Authorized public access (primarily foot traffic) would be allowed except for the bottomlands, which are closed from September 1 to December 15 and restricted to designated trail and road use only from May 15 to September 1. The remainder of the year they are open to access.

One of the main purposes for which the refuge was established was the protection and conservation of migratory birds—primarily those species associated with wetlands. Restricting public use to designated trails and roads from May 15 to September 1 would provide these species with a secure area to nest and raise their young protected from human disturbance. Disturbance during this critical time can affect nesting populations by: (1) causing pairs to leave the area resulting in a loss of nesting or nesting in marginal habitat; (2) causing females to abandon nests; (3) reducing hatching success by flushing females off of nests and exposing eggs and young to weather extremes and predators; and (4) decreasing duckling survival by splitting up family groups, exposing young to predators and starvation.

To optimize public use, the remainder of the refuge would be open to authorized public access. Authorized access (foot travel, snowshoes, skis, mountain bikes, and horses) would be determined in the appropriate step-down plan.

Rationale 154 (alternative C): Emphasis is placed on improving wildlife observation and photographic opportunities both on and off the refuge by fostering wildlife populations. Restricting public use to designated trails allows access to the public with minimal disturbance to wildlife. Viewing opportunities may improve as animals become habituated to

predictable disturbance in a given area. Protection from disturbance in conjunction with proposed habitat restoration should boost wildlife populations and increase public use opportunities.

Rationale 155 (alternative C): Visitors would receive the information needed to pursue the best possible wildlife observation and photographic opportunities. This could provide a connection to natural resources and provide chances for visitors to develop an understanding and appreciation for natural and cultural resources.

Rationale 156 (alternative D): Wildlife photography and observation are good means of fostering understanding and instilling an appreciation of native fish, wildlife and plants, and their conservation, by providing the public with safe, high-quality and compatible experiences. Users would be provided information to enhance their experience such as ideas on where they could go, what to expect, and the best area, times, and seasons to observe and photograph wildlife.

Rationale 157 (alternative D): Visitors would be provided with the information needed to pursue wildlife-dependent recreational activities and to use the refuge in an appropriate and compatible manner.

INTERPRETATION

Rationale 158 (all alternatives): Interpretation is a great way to relate the natural resources to visitors. It allows them to come to appreciate and support the management of the refuge. Interpretive materials would include information on best areas and times to receive quality experiences. Information would help reduce conflicts between users and reduce resource damage. It would provide the public with access to rules and regulations.

Rationale 159 (all alternatives): Interpretation is one of the six wildlife-dependent recreational public uses as defined in the Improvement Act. Well-designed interpretive services can be a most effective and inexpensive resource management tool. For many visitors, taking part in one or more interpretive activities is their primary contact with refuge staff and could be their first contact with the refuge, conservation, and wildlife.

There is an opportunity to foster a sense of understanding and appreciation of the refuge and the Service, as well as influence visitors' behaviors when visiting units of the Refuge System. Personal contact can help us make management decisions and build public support by providing insight into management practices.

Interpretive planning and subsequent activities and products can:

- help visitors understand the impacts of their actions, minimizing unintentional resource damage and wildlife disturbance;
- communicate rules and regulations so they relate to visitors, solving or preventing potential management problems;
- help the refuge make management decisions and build public support by providing insight into management practices.

Rationale 160 (alternatives A, B, and C): Wildlife conservation is the first priority of the System, and new and ongoing recreational use programs should help visitors focus on wildlife and other natural resources. Activities should make visitors aware of the most important resource issues at the refuge, be supportive of management plans that address those issues, and show how the refuge contributes to the mission of the Refuge System.

The refuge was established as partial mitigation for habitat and wildlife losses and impacts on Flathead WPA due to erosional losses caused by increased Flathead Lake water levels (due to the operation of Kerr Dam by the MPC). Prior to Service acquisition, the MPC, in partnership with the NRCS, worked to protect portions of the refuge by purchasing a wetland easement under the WRP. Continuing partnerships would deal with restoring the hydrology, wetland, and stream ecology of Dahl Lake and Pleasant Valley Creek.

The story of wetland mitigation and protection is an essential element to the establishment of this refuge. The visiting public should be exposed to this story and the partners involved.

ENVIRONMENTAL EDUCATION

Rationale 161 (all alternatives): Environmental education is one of the six appropriate wildlife-dependent recreational public uses as defined in the Improvement Act. Quality environmental education programs would promote understanding and appreciation of natural and cultural resources, and so foster support and stewardship of the refuge, Refuge System, and Service.

Rationale 162 (all alternatives): Due to its diversity of habitat and wildlife species, the refuge lends itself to quality, outdoor environmental education. Educational institutions presently schedule environmental education field trips to other land management units of the National Bison Range complex.

Rationale 163 (all alternatives): Interaction with the Montana Academy and other local schools would aid the refuge in providing environmental education opportunities, develop community support, and promote interest in future goals and projects. Children located in the Pleasant Valley would be able to further their appreciation for the

surrounding environment. In addition, this would help establish community support that would increase interest and understanding of the refuge and the Refuge System.

Rationale 164 (all alternatives): Creating and providing a lending library of materials and resources for teachers and other educators is a Service recommendation for providing a minimal environmental education program. The library would be a good way to provide educational materials geared toward the refuge and its natural resources and history. Library materials would provide background about the Service, which would help promote support and stewardship. The library would provide educators with materials to develop programs, and reinforce lessons learned during field trips. Library materials would include field guides and activities to use on site.

The Service recommends that field station environmental education programs, at a minimum, should include:

- creating or providing a lending library of materials and resources for teachers and other educators;
- designating a trained staff contact person for environmental education;
- designating a study site and providing stewardship opportunities;
- helping local educators identify refuge resources and develop programs;
- forming partnerships or recruiting and training volunteers including senior citizens and people with disabilities to conduct environmental education activities.

Rationale 165 (alternatives A, B, and C): Partnering would extend refuge funding and staffing to reach a wider audience.

Rationale 166 (alternatives A, B, and C): Opportunities for hands-on experience with the resource would foster appreciation and support of the refuge and the Service. Involving students in simple monitoring projects would instill a sense of ownership and stewardship to the resources. This is a good way to advance science literacy through an interdisciplinary educational approach.

Learning and stewardship activities with direct contact with the resource would provide opportunities to contribute to refuge management goals. These activities would allow students and educator to see the changes to the environment their assistance has produced. Long-term projects would reinforce conservation messages learned in the field. The projects would be a means to give educators experience to bring back to the classroom and add depth to their messages. In addition, the activities

would teach students and educators about resources while getting needed help for restoration projects.

Rationale 167 (alternative C): Providing environmental education in schools is one way to expose students without disturbing resources themselves. It would help foster stewardship among our future caretakers.

Rationale 168 (alternative D): The refuge offers many opportunities for local school students to use the refuge for various environmental education activities. This on-going activity fosters refuge–community relations, aids in student education, and provides awareness and appreciation of the Refuge System and mission in the local community.

ADMINISTRATION

OPERATIONS

Rationale 169 (all alternatives): The refuge manager currently directs, implements and supervises daily administrative, management, public use, and maintenance activities and operations of the refuge. In addition, the refuge manager coordinates these types of activities on five WPAs in Flathead County and on Swan River National Wildlife Refuge.

The following factors dictate the necessity of an on-site refuge manager for the life of this plan:

- the size of the refuge
- on-going administrative and operational activities
- required maintenance needs
- community interest
- potential environmental education and interpretative programs
- recreational opportunities
- proximity to rural communities as well as a major, growing metropolitan area (KalisPELL)

Rationale 170 (all alternatives): Volunteers assist in organizing and conducting programs such as limited environmental education programs with local schools, refuge interpretation, minor facility and equipment maintenance, and various wildlife surveys.

Rationale 171 (alternatives A, B, and C): The following factors justify consideration of Lost Trail National Wildlife Refuge with other Service land management units in Flathead County as a field station separate from the National Bison Range complex:

- size of the refuge
- level of daily operations
- planned staffing with subsequent supervisory responsibilities

- political “awareness and inherent sensitivity of refuge activities within the local area and the Columbia Basin Ecosystem”
- wildlife activities, interests and activities unique and particular to this area of northwestern Montana
- anticipated increased public use activities

Rationale 172 (alternatives A, B, and C): Increased management and administrative responsibilities associated with development of a new refuge necessitates the need for a GS-12 supervisory position to assist with directing all Refuge System programs and to meet the goals and mission of the Service.

Rationale 173 (alternatives A, B, and C): With the refuge being newly established, there is a multitude of resource data to be collected that would assist and enable refuge managers to properly manage the refuge in accordance with applicable laws and Service policy. A full-time wildlife biologist would implement the biological program including monitoring, evaluation, and analysis of all habitats and associated ecosystems (streams, wetlands, grasslands, and forested areas).

Rationale 174 (alternatives A, B, and C): Managing habitats to fulfill refuge purposes and prevent invasive plant destruction of ecosystem functions is necessary to meet the mission of the Refuge System. Development and administration of the public use program and facilities to provide the visiting public with a quality, safe, wildlife-dependent recreational experience is also necessary to meet the mission.

Rationale 175 (alternatives A, B, and C): Increased authorization of public recreational activities would result in a need for a full-time law enforcement presence to ensure a safe and enjoyable experience by refuge visitors while ensuring the protection of natural and cultural resources.

Rationale 176 (alternatives A, B, and C): Increased staffing, administration, public use programs, equipment, biological data collection, and monitoring would result in the need for additional administrative support to effectively communicate, budget, and perform time and attendance and hiring activities.

Rationale 177 (alternatives A, B, and C): Managing resources and infrastructure to meet Service guidelines and policies would require adequate maintenance staff with proper tools and equipment. Implement the refuge operating needs system project for acquiring appropriate equipment and supplies to maintain refuge habitats and public use facilities (i.e., purchase of herbicide sprayers, mower, and tractor; and recurring costs of herbicide, mechanical invasive plant control, biological invasive plant control, and public use facilities maintenance).

Rationale 178 (alternatives A, B, and C): The safe and efficient operation of the refuge is dependent on having the necessary equipment to carry on daily operations. It is necessary, practical, reasonable, prudent, and proper to maintain necessary vehicle, shop, and office equipment as funding allows.

Rationale 179 (alternative B): With the refuge being managed for maximum, compatible public use opportunities in alternative B, there would be a need to have on-site planning and implementation by professional public use staff. An outdoor recreation planner would implement the public use program including planning, implementation, monitoring, evaluation, and analysis of all public use activities in the north portion of the complex (in coordination with the outdoor recreation planner for the complex).

Rationale 180 (alternative B): Volunteers would assist staff with the public use program, allowing for increases in recreational opportunities for visitors. The Secretary of the Interior may establish a senior volunteer corps, consisting of volunteers over the age of 50. To assist in the recruitment and retention of the volunteers, the Secretary may provide for additional incidental expenses to members of the corps beyond the incidental expenses otherwise provided to volunteers [16 U.S.C. 742f (c)]. This would allow for interpretation and potentially a well-established visitor contact station.

Rationale 181 (alternative D): Lost Trail National Wildlife Refuge is a satellite unit of the National Bison Range complex. Funding for the refuge is appropriated from the overall appropriations of the complex; therefore, coordination with complex headquarters for equipment repair and replacement is necessary from a practical, budgetary standpoint. It is prudent and appropriate to maintain equipment in a safe and efficient manner for proper management of the refuge. Future funding levels are uncertain, thereby making routine maintenance and repair of existing equipment a priority to maintain operations.

Rationale 182 (alternative D): The biological program of the National Bison Range complex coordinates research, data gathering, inventory and monitoring, and information needs for the entire complex, which includes the refuge. With limited biological staffing, needs and opportunities require close coordination for scheduling, prioritizing, and completing. Baseline inventories have been initiated and would need to be continued in a standardized format. In addition, as management actions and restoration projects are begun, monitoring would be required.

Rationale 183 (alternative D): A biological technician is essential to daily operations. The position assists with normal, on-going refuge work activities such as conducting wildlife surveys, facility and equipment maintenance, posting, law enforcement, and invasive plant inventory and control.

Rationale 184 (alternative D): No full-time positions are approved for the refuge at this time. Administrative staff is located at the headquarters of the National Bison Range. This staff assists daily for budget, time and attendance, and hiring.

Rationale 185 (alternative D): Managing refuge resources and infrastructure to meet Service guidelines and policies require adequate maintenance staff with proper tools and equipment. A maintenance worker is desperately needed to maintain facilities, habitats, and provide visitor assistance.

FACILITIES

Rationale 186 (all alternatives): With the exception of the headquarters residence, office, shop, and storage buildings, use of the other refuge facilities is on an “intermittent, as needed” basis by staff of the National Bison Range complex, fire crews, and other agency personnel who periodically stay on-site to assist with various activities (e.g., maintenance and surveys). It is necessary to maintain these facilities (to avoid major, costly maintenance) until completion of the CCP and pertinent “best use” of the facilities is determined.

Rationale 187 (alternatives A, B, and C): Many structures and facilities were previously used in ranching activities. Many of these facilities:

- are in excess to Service needs and are occupying areas that potential grassland habitat;
- are detrimental as a wildlife hazard or a harbor for predators of ground-nesting birds;
- increase maintenance costs;
- increase fixed costs;
- detract from the natural appearance of the landscape.

By removing these structures and facilities, maintenance costs would decrease, unnecessary facilities would be eliminated, and habitat would be restored.

Rationale 188 (alternatives A, B, and C): To adequately manage programs, it is necessary to provide productive workspace supplied with the necessary equipment, tools, and supplies to accomplish refuge and Service objectives.

Rationale 189 (alternatives A and B): An increase in public use activities would necessitate design and development of additional public use facilities.

Rationale 190 (alternative B): No educational, recreational, or visitor contact facilities are presently available. To increase significantly the on-site educational and recreational opportunities, facilities must be constructed.

Rationale 191 (alternatives B and C): Roads and trails are necessary to conduct properly the daily, on-going refuge activities (i.e., invasive plant spraying, census, and surveys). An anticipated increase in public use activities would necessitate the need for an efficient and safe road system.

PARTNERSHIPS

Rationale 192 (all alternatives): Partnerships would assist in preserving resources of the Pleasant Valley ecosystem for future generations. The refuge was purchased subject to an existing WRP easement, therefore the refuge would abide by NRCS rules and regulations to restore the hydrology of the WRP easement area. The WRP project as a whole is important to the hydrology of the entire valley not just the WRP easement that lies within the refuge boundary. In working with these partners, restoration of hydrology and vegetation on and adjacent to the refuge would be an important step in restoring the ecosystem to historical conditions.

Rationale 193 (all alternatives): Assistance in all areas of invasive plant control must be coordinated to have the maximum possible impact within the Pleasant Valley. Working with the grant program provides needed funding. The refuge would seek to preserve the valley and the ecosystem for future generations to enjoy and use for recreation. To maintain the current working relationship within the Pleasant Valley is also a critical tool for proper management of the refuge. Use of road 1019 is permitted, however maintenance issues must be addressed annually.

The Service currently does not have staff and funding to maintain roads that are damaged or destroyed by partners—the issue of maintenance is addressed in the easement document that allows use of these roads. The easement document mandates that maintenance of specified roads be based on primary usage of these roads by refuge staff or partners that caused the damage.

In addition, keeping an open working relationship with partners would allow for future negotiations and consultations for the ensured preservation of the Pleasant Valley.

Rationale 194 (all alternatives): Grants allow for additional funding, which the complex lacks, for management issues. The RMEF has enthusiastic and willing volunteers that would assist with big game winter range improvement. Use of volunteers provides extensive help with little or no cost. This volunteer effort is critical for removing 75 miles of interior barbed wire fence, which currently hinders big game movement throughout the refuge.

Labor forces within the refuge are minimal. Crews such as Landmark Volunteers would be essential to

completing projects such as fence removal, facility maintenance, and other labor-intensive projects that would enhance wildlife habitat (i.e., removal of the East Cattle Station).

The refuge often times does not have enough staff to complete all monitoring and inventory needs. The National Audubon Society has people who are enthusiastic and generally knowledgeable about birds. With a little training from staff, this partnership would help establish baseline data needed for management decisions.

Additional funding would assist with other habitat management projects involving volunteers. The mission of the MCC is to bring together Montana's commitment to its people and its natural resources by enhancing citizenship and employability through stewardship of our lands and community service.

The model of the MCC is:

young people + hard work + meaningful projects
= *quality citizens and a better environment*

The refuge would help fulfill this mission with community service projects that would provide for habitat management benefits. Removal of fencing, and facility maintenance, are high priorities. The benefits are numerous since fence removal helps wildlife movement throughout the refuge, as well as reducing the number of unwanted fence lines within the boundaries of the refuge.

Allowing interest groups to assist with these types of projects would make them less expensive and more feasible to accomplish within a reasonable amount of time. In turn, this allows community members to be involved at the refuge with hands-on assistance.

Rationale 195 (all alternatives): DNRC and the Service have entered into a memorandum of understanding for wildland fire suppression on the refuge. Interagency wildland-fire suppression efforts are necessary due to lack of staff. DNRC is the logical choice since they maintain a fire station within 15 miles, allowing for 24-hour assistance and quick response during the fire season.

Rationale 196 (all alternatives): County road crews maintain Pleasant Valley Road, which traverses the refuge. Road issues and maintenance concerns should be discussed and dealt with on a regular basis. Due to the layout of the road, any problems with the road may be dangerous to refuge staff as well as the visiting public.

Rationale 197 (all alternatives): The refuge was acquired subject to the existing power line easement and, therefore, is legally required to abide by the existing terms of the easement.

Rationale 198 (all alternatives): The PCTC is the principle landowner surrounding the refuge. Grazing

on these lands is an annual occurrence from June 15 to October 15. Not all of the refuge is properly fenced, therefore continued coordination and discussions with the lessee is necessary to prevent trespass cattle.

Rationale 199 (alternatives A, B, and C): Development of a "friends group" would increase public awareness, involvement, and support. It would promote cooperation among varied conservation and environmental groups.

A "friends group" would improve the management and protection of the Refuge System by providing information to the administration and congressional decision makers. They can assist with influencing legislation that defines the future of the Refuge System. In addition, they can advocate for adequate funding and improved policy guidance for the Refuge System. They can participate actively in the development of a system management plan. They may also network with "friends groups" and support their actions on behalf of refuges.

Rationale 200 (alternatives A, B, and C): A working relationship with MFWP must be developed and maintained to ensure an ethical, lawful, and quality hunting experience—or there can be no hunting program on the refuge. Law enforcement personnel would be available for other enforcement needs.

Rationale 201 (alternatives A and C): The refuge was created to preserve habitat and the wildlife that uses it. Development in the area could potentially increase invasive plants, provide for more domestic animal conflicts, and increase disturbance to resident wildlife. This program would encourage the current land use of private lands and ensure the public value of the forests is protected. The group would protect critical wildlife habitat and conserve watershed functions, however it would maintain all recreation opportunities.

Rationale 202 (alternative B): Restoring a viable fishery population could increase chances of opening the refuge to fishing in the future. Since fishing is one of the six priority public uses that the refuge is required to address, this would be considered at all times during restoration and throughout this CCP.

Rationale 203 (alternative C): The mission of the refuge is to restore and protect.

Rationale 204 (alternative D): The refuge lacks proper staff and funding to maintain an adequate hunting program without assistance from MFWP. A working relationship with MFWP must be developed and maintained to ensure an ethical, lawful, and quality hunting experience. Law enforcement responsibilities would be shared with law enforcement personnel from the National Bison Range complex that are usually stationed at complex headquarters in Moiese, Montana (2.5 hours distant).

Appendix I—Refuge Operations Needs System Projects

<i>RONS¹</i> <i>Number</i>	<i>Project Description</i>	<i>First- year Need</i>	<i>Recurring Annual Need</i>	<i>FTE²</i>
00002	Provide a refuge manager to direct habitat management activities and develop public use programs	\$152,000	\$87,000	1.0
00004	Provide a biologist to conduct biological monitoring to improve habitat management plans for waterfowl, other migratory birds, native fish, and large mammals	\$151,000	\$10,000	1.0
00009	Provide an administrative officer to answer phones, respond to visitor questions, prepare administrative documents, and track budgets	\$ 54,500	\$22,000	0.5
00010	Provide maintenance activities on all structures, facilities and mechanical and chemical management of Refuge System lands administered from the refuge	\$119,000	\$54,000	1.0
00011	Provide a law enforcement officer to protect resources and provide for visitor safety on Lost Trail and Swan River national wildlife refuges	\$129,000	\$64,000	1.0
00012	Provide an outdoor recreation planner to develop public use plans for Lost Trail and Swan River national wildlife refuges and WPA	\$ 66,500	\$69,000	1.0
99002	Acquire and install boundary entrance signs	\$ 30,000	\$ 5,000	
	Provide a part-time coordinator to take full advantage of volunteerism and to expand into friends and support groups	\$ 66,500	\$34,000	0.5
	Provide an environmental education room and campground so that locals may use and learn from the refuge	\$ 60,000	\$ 5,000	—
	Construct pit toilets for public use facilities	\$ 45,000	\$ 5,000	—
	Develop a refuge brochure and video	\$ 51,000	\$ 3,000	—
	Fence the exterior boundary of the refuge	\$155,000	—	—
	Contract for a cultural resource survey	\$ 35,000	—	—
	Conduct a comprehensive vegetation inventory and assess current habitat condition	\$122,000	\$62,000	—
	Modify an existing building to provide a maintenance shop and construct a flammable storage building	\$520,000	\$30,000	—
	Improve many easement roads by purchasing dump trucks, gravel, and other needed equipment	\$310,000	\$10,000	—
	Enhance and assist the biological program by hiring a biological technician to assist with surveys, monitoring, and other work	\$ 94,000	\$54,000	1.0

¹RONS=refuge operating needs system

²FTE=full-time equivalent position

Appendix J—Maintenance Management System Projects

<i>MMS¹ Number</i>	<i>Project Description</i>	<i>Cost (\$)</i>
01006	Replace worn John Deere 410 backhoe/loader	80,000
01105	Rehabilitate deteriorated storage building complex	278,000
02007	Replace water well supplying water to residence #2	50,000
01099	Repair deteriorated horse ranch quarters	35,000
01108	Rehabilitate deteriorated boundary fence	202,000
02006	Replace quarters' roofing, guttering, furnace, and ductwork	35,000
01116	Repair deteriorated roads open to the public	350,000
02004	Remove nuisance east cattle station buildings and structures	30,000
02003	Rehabilitate office and visitor contact space to remove shelves	10,000
01098	Repair deteriorated water line system in horse ranch area	30,000
01100	Repair deteriorated exterior of headquarters quarters	35,000
01111	Remove nearly all interior fences	61,000
01011	Replace severely worn John Deere 544B front-end loader	101,000
01110	Remove unneeded cattle station water well	25,000
00002	Replace 1978 model case loader	125,000
01106	Remove unneeded frame wood shed at ranch headquarters	11,000
01107	Remove unneeded equipment shed at east cattle station	40,000
01104	Replace deteriorated shop at horse ranch area	329,000
01097	Replace deteriorated garage at horse ranch quarters	30,000
01102	Replace inaccessible ranch office space	71,000
02005	Remove small log building used as office space	25,000
99004	Develop and print refuge and WMD ² brochures for public use	41,000
		\$1,994,000

¹MMS=maintenance management system

²WMD=wetland management district

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