CHAPTER 6
Affected Environment

This chapter describes the characteristics and resources of the refuge complex considered in this analysis:

- 6.1 Physical environment
- 6.2 Habitat management
- 6.3 Wildlife management
- 6.4 Research, inventory, and monitoring
- 6.5 Threatened and endangered species
- 6.6 Special management areas
- 6.7 Visitor services
- 6.8 Cultural resources
- 6.9 Operations
- 6.10 Socioeconomics

The refuge complex comprises 4 national wildlife refuges, 14 waterfowl production areas, and conservation easements in Lake, Sanders, and Flathead Counties of northwestern Montana. Three of these refuges and nine of the waterfowl production areas are entirely within the exterior boundaries of the Flathead Indian Reservation (figure 1 in chapter 1). The descriptions in this chapter cover these 12 units (table 1)—the only areas of the refuge complex subject to the considered alternatives. The management and enforcement of the conservation easement program is not part of any proposal. This responsibility will be retained by the Service.

Table 1. Management units of the National Bison Range Complex, Montana.

Unit name	*Unit type*	*Acres*	*Ownership*	*County*
National Bison Range	National wildlife refuge	18,800	Service	Lake, Sanders
Ninepipe	National wildlife refuge	2,062	CSKT	Lake
Pablo	National wildlife refuge	2,474	CSKT	Lake
Anderson	Waterfowl production area	163	Service	Lake
Crow	Waterfowl production area	1,549	Service	Lake
Duck Haven	Waterfowl production area	719	Service	Lake
Ereaux	Waterfowl production area	28	Service	Lake
Herak	Waterfowl production area	80	Service	Lake

Table 1. Management units of the National Bison Range Complex, Montana.

Unit name	*Unit type*	*Acres*	*Ownership*	*County*
Johnson	Waterfowl production area	80	Service	Lake
Kickinghorse	Waterfowl production area	169	Service	Lake
Montgomery	Waterfowl production area	80	Service	Lake
Sandsmark	Waterfowl production area	400	Service	Lake
Total acreage 26,604				

6.1 Physical Environment

This section describes the topography, soils, air quality, climate, and hydrology of the affected refuge complex units.

TOPOGRAPHY

The Bison Range is much more rugged than the rest of the refuge complex with elevations ranging from 2,530 to 4,892 feet. Elevation within the approved boundary of the Ninepipe Refuge ranges from 2,790 feet at the southern boundary to 2,937 feet in the northeastern corner. Elevation of the Pablo Refuge is 3,215 feet.

SOILS

The glacial history of the region has had a pronounced influence on the soils and landforms of the Flathead Valley. Glacier advance and retreat, Glacial Lake Missoula, and mountain runoff have deposited extensive, loose valley sediments, lakebed silts, and assorted glacial debris up to and including boulder-sized, glacially transported rocks that originated in British Columbia.

At the Bison Range, topsoils are generally shallow and mostly underlain with rock that is exposed in many areas, forming ledges, outcroppings, and talus slopes. Soils over most of the refuge complex were developed from pre-Cambrian quartzite and argillite bedrock. These well-drained soils range from shallow to moderately deep. They have a loamy surface horizon with near neutral pH (measure of acidity and alkalinity), high organic content (remains of once-living plants and animals), and varying amounts of parent material fragments. Except for surface soils, lower soil horizons have a loamy texture interspersed with rock fragments. Water infiltration rates are generally high and soil erosion is minimal.

The earliest known soil survey of the lower Flathead Valley was completed during the late 1920s (DeYoung and Roberts 1929). Soils to the south, west, and north of Pablo Reservoir were classified as Polson silt loam; Hyrum sandy loam was located to the east. A large area of different phases of Post silty clay loam surrounded Ninepipe Reservoir. Areas of Crow gravelly silt loam, Crow stoney loam, McDonald gravelly loam, and undifferentiated alluvium occurred to the east of silt loam and silty clay loam. Soil mapping, started in 1995, shows similar soil type patterns around the reservoirs, but has

more detailed mapping with additional soil classifications (Natural Resources Conservation Service 2008, 2012). Compared to the 1929 soil map, sands to the east of Pablo Reservoir have been reclassified as McCollum fine sandy loam and Sacheen loamy fine sand. Polson silt loam to the west of Pablo Reservoir was mapped in complexes with Truscreek silt loam. Kerr loam and Truscreek silt loam also occur to the west of Pablo Reservoir.

AIR QUALITY

Air quality in the refuge complex is protected under several provisions of the Clean Air Act, including the National Ambient Air Quality Standards and the Prevention of Significant Deterioration program. One of the goals of the Prevention of Significant Deterioration program is to preserve, protect, and enhance air quality in areas of special natural, recreational, scenic, or historic resources, including those of the refuge complex (Ross 1990). Only a limited amount of added air pollution—associated with moderate growth in the human population of the Mission Valley—can be allowed in the future.

The Flathead Indian Reservation was designated in 1979 as a voluntary class 1 airshed under provisions of the Clean Air Act, which confers the highest degree of protection under the act. Air quality is considered exceptionally good, with no nearby manufacturing sites or major point sources of pollution. However, the cities of Polson and Ronan in Lake County and areas of Flathead County are designated as nonattainment areas—areas that do not meet air quality standards—and are not in compliance with particulate matter, or PM_{10} (EPA 2002).

Seasonal burning of logging slash in the mountains and stubble fields at valley ranches cause short-term, localized smoke. In drought years, there has been heavy smoke from local wildfires or delivered from distant fires by prevailing winds. Smoke from wood-burning stoves is trapped in the valley during temperature inversions that are common in winter months.

CLIMATE

Average high temperatures in the Mission Valley range from approximately 30 °F in December and January to 90 °F in July; average low temperatures range from 18 to 50 °F. Most of the precipitation in the valley occurs during the spring and early summer, averaging more than 2 inches per month in May and June (Western Regional Climate Center 2011). Precipitation during the rest of the year averages between approximately 1 and 1.5 inches per month.

Long-term climate data—1895 to 2011—from the U.S. Historical Climatology Network is available for St. Ignatius, Montana (station number 247286), approximately 7 miles south of Ninepipe Reservoir. Long-term average precipitation for St. Ignatius, Montana, based on Menne et al. (2012) is 15.82 inches per year and shows considerable variation from year to year.

HYDROLOGY

Mission Creek drains the north side of the Bison Range, and the Jocko River drains the south side; both are tributaries to the Flathead River. More than 80 natural springs occur on the Bison Range, and about 40 of those have been developed into watering sites for bison and other wildlife.

Precipitation and snowmelt in the Mission Mountains influence streamflow entering the Lower Flathead subbasin. Average monthly discharge from Mission Creek (USGS station number 12377150) increases rapidly from April at 24 cubic feet per second (cfs) to May at 99 cfs and peaks during June at 179 cfs. Streamflow declines during the summer and early fall to less than 20 cfs from December through March. A similar seasonal pattern, but with less flow, is observed for South Crow Creek near Ronan.

Differing valley-fill sediments from sediment accumulation throughout the geologic history of the valley and multiple glaciations created a variable matrix of aquifers (bodies of permeable rock) in the Mission Valley. Direction of ground water flow in the valley is to the west and southwest from the Mission Mountains. Aquifers occur in the deep valley-fill sediments and in zones of secondary permeability where bedrock is fractured.

In 2009, the Federal Government and the State of Montana signed a compact that settled water rights at the refuge complex for all time (Montana Code 85–20–1601). Besides instream flow and nonconsumptive uses for the Elk, Mission, Pauline, and Trisky Creeks, the compact documents water rights for 97 springs, seeps, and wells on the National Bison Range. At some locations, these water sources include or support small wetlands and associated wildlife.

6.2 Habitat Management

This section describes the grassland, forest, riparian area, and wetland habitats of the affected refuge complex units. There are also descriptions of the invasive plant species that grow in these habitats.

We manage many of the refuge complex habitats with an objective to maintain and restore biological diversity and integrity to these systems and provide habitat for Federal trust species. This section also describes management tools and considerations—prescriptive grazing and farming, the role of fire, and water-level management. An integral part of these programs is inventorying and monitoring the plant and animal species affected by these actions to gauge the effectiveness and success of the selected management activities.

GRASSLANDS

Grassland communities dominate all units of the refuge complex, covering approximately 85 percent of the area. Dominant grass species on the Bison Range include rough fescue, Idaho fescue, and bluebunch wheatgrass. Other common species include prairie junegrass, intermediate wheatgrass, western wheatgrass, green needlegrass, and needle-and-thread. On Pablo Refuge, Ninepipe Refuge, and the district, dominant grasses include smooth brome, western wheatgrass, and intermediate wheatgrass. While these grassland communities remain productive and capable of supporting the bison herd and other associated wildlife with some native components intact, the condition of the refuge complex's grasslands has declined over the past century as invasive plants have become established and spread (see invasive plant species section, below). Pablo Refuge, Ninepipe Refuge, and the district have little native species component remaining, owing to a history of intensive agricultural use,

followed by Service planting to dense nesting cover for waterfowl production. A few areas, including the Kicking Horse Waterfowl Production Area, are believed to never have been tilled for agricultural purposes and have a strong representation of native plants.

Grazing by bison and other large herbivores is the primary use of grasslands on the refuge complex (see prescriptive grazing and wildlife management sections, below). Bison grazing is managed using a rotational grazing system in order to disperse use across the Bison Range and to reduce the risk of localized overutilization. These grasslands, dominated by cool-season species, evolved with periodic, relatively low-intensity grazing throughout the year, but are not believed to have supported the large, year-round herds that we have had for the past 105 years.

Wildland fire has helped shape the environment and maintains the structure and function of some systems; its removal as an ecological driver can have adverse effects. Periodic fires would have maintained the grasslands and killed most tree seedlings before they could become established. The elimination of the historical pattern of frequent low-intensity fires in ponderosa pine and pine–mixed conifer forests has resulted in major ecological disruption (Arno 1996). Most of these stands have replaced the grassland understory with dense thickets of small trees, thereby shifting composition toward the more shade-tolerant and widespread Douglas-fir. In the absence of fire, we are challenged to manage and control conifer encroachment into native grasslands, which results in a loss of forage for bison and nesting habitat for grassland birds.

FORESTS

Forest communities cover approximately 10 percent of the Bison Range. Little forestland occurs at the Ninepipe and Pablo Refuges or the waterfowl production areas. Suppression of natural and Native American–lit fires has altered the habitat mosaic that historically occurred in the Mission Mountains and Mission Valley. Large pines that were sustained by frequent low-intensity fires were replaced by younger trees after the large trees were logged. Subsequent fire suppression created crowded conditions that promoted insect and disease outbreaks and increased the hazard of large, more intense fires. A shift in dominant species from ponderosa pine to Douglas-fir occurred as a result of fire suppression.

Before Europeans settled the area, the forests of what is now western Montana were composed primarily of open stands of mixed-conifer species with a grass understory. Ponderosa pine occupied the drier sites, and Douglas-fir occupied wetter sites on north-facing aspects. In the interior of the southern Flathead Valley, the forests were likely restricted to a few areas along the upper elevations and rocky areas.

Forest stands on the Bison Range occupy approximately 15 percent of the acreage. Black cottonwood and Rocky Mountain juniper are common along Mission Creek, while Douglas fir and ponderosa pine dominate most upland forest stands.

RIPARIAN AREAS

Productive, stable riparian areas occur along the Elk, Mission, Pauline, Sabine, and Trisky Creeks and the Jocko River. Common plant species at these sites are willows, water birch, cattails, sedges,

and rushes. Many seeps and springs occur on the refuge complex. Though no formal condition assessment has occurred, these areas are generally believed to be in good functioning condition across the refuge complex.

WETLANDS

The refuge complex has a variety of natural and developed wetlands. Low-lying areas that allow the accumulation of surface water—depressional wetlands—are extensive around Ninepipe Reservoir and are primarily classified as freshwater emergent marsh or freshwater pond. Depressional wetlands in the Mission Valley have been described as kettle or pothole wetlands (Hauer et al. 2002) using the terminology of Stewart and Kantrud (1971, and as pingo ponds (Phillips 1993). Regardless of their geologic origin, depressional wetlands in the Mission Valley have highly variable physical properties resulting from varying interactions of surface and ground water hydrology (Phillips 1993).

INVASIVE PLANT SPECIES

Invasive plant species threaten the health and quality of the habitat by not providing the necessary components of nutrition and cover for native species to thrive. Invasive plants detrimentally affect native communities through competitive exclusion, altering behaviors of insect pollinators, hybridization with native plants, and changes in insect predation. They outcompete, invade, and displace native plant communities, altering species composition and relationships and reducing species diversity. They form monocultures, where only one species grows, that change the physical structure of the native communities, increase soil erosion resulting in changes in soil structure and chemical composition, and alter microclimates (the climate characteristics in a small space such as the layer near the ground that is influenced by vegetation cover). Invasive plant species may alter ecological processes such as community productivity; soil, water, and nutrient dynamics; plant community successional patterns (sequential changes in vegetation); and disturbance cycles. Research has shown that the replacement of native plant species has resulted in reduced soil organic matter, reduced soil nutrients, degraded soil structure, decreased water-holding capacity, and increased soil erosion.

Table 2 identifies species that the refuge complex staff has identified as either widespread or localized on the refuge complex along with the length of known infestation. The refuge complex has long battled with invasive plant species encroachment onto native habitats using integrated and adaptive management techniques. We expend considerable resources, including staff, equipment, and supplies to combat and control these species that threaten to compromise the purposes for which these units were established. Part of this effort is substantial coordination and combining of resources with the State and CSKT to combat invaders across the Mission Valley.

Table 2. List of invasive plant species identified on the National Bison Range Complex, Montana, as of 2012.

Documented prior to 2002		*Documented after 2002*	
Widespread	Localized	Widespread	Localized
Dalmatian toadflax	Houndstongue	Teasel	Hawkweed
Spotted knapweed	Purple loosestrife		Yellow toadflax
St. Johnswort	Yellowflag iris		Flowering rush
Canada thistle	Whitetop		Poison hemlock
Sulfur cinquefoil	Russian olive		Leafy spurge
Cheatgrass			

Source: FWS 2012a.

Many invasive plants grow within a suite of native species, complicating our ability to maintain the existing natives while controlling targeted invaders. Consistent management and restoration of native habitats is particularly important in areas of dense infestations by established invaders.

Integrated pest management is an effective and environmentally sensitive approach to pest management that relies on a combination of common sense practices. Integrated pest management programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. We use this in combination with best management practices to manage pests by the most economical means and with the least possible hazard to people, property, and the environment. One of the fundamental aspects of a successful integrated pest management program is the surveying and monitoring of invasive plants and treatment areas. We have completed some mapping of known invasive plant species on the refuge complex. All treatment sites are mapped and monitored.

Approaches to managing or responding to invasive plant species can be categorized as prevention, suppression, and eradication—all in an atmosphere of partnership with neighboring landowners.

- Prevention methods apply when an infestation is expected and we take action to prevent it from occurring. Some species are not known to occur statewide, while others are known local threats. Examples of prevention methods are (1) restricting the use of watercraft on refuge complex waters, (2) washing equipment used to apply herbicide before and after each application, (3) surveying areas of likely invasion, and (4) promoting education and outreach to increase public awareness about problems with invasive plants including noxious weeds.
- Suppression techniques are applied when a problem has been detected. Methods include biological (integrated pest management), chemical, mechanical (grazing and burning), cultural (education), and legal measures. Early detection and rapid response is a programmatic strategy that incorporates active surveys with targeted treatment application. We apply containment and control strategies to manage or minimize the spatial extent of a known infestation.
- Eradication techniques are applied when an infestation can be totally removed. Eradication can be time and cost intensive and can be extremely difficult to achieve, especially for infestations of any size greater than a small patch of plants detected before a seedbank can be established.

It is generally accepted that early detection and rapid response measures to prevent a large-scale invasion by nonnative plants is more economical than the cost of suppression efforts after invaders become established. The refuge complex program emphasizes suppression and early detection and rapid response strategies for many species.

PRESCRIPTIVE GRAZING AND FARMING

The rotational grazing program for bison on the Bison Range is discussed in the grasslands and bison management sections. That program has differing purposes and management from the prescriptive grazing programs on other units of the refuge complex in that bison grazing on the Bison Range is a fundamental purpose and use of the refuge that must be managed in order to reduce impacts to grassland systems. On the other hand, prescriptive grazing on other refuge complex units is used periodically as a means to a desired end, such as for a desired habitat condition.

The Service purchased lands for waterfowl production areas with Federal Duck Stamp funds, underscoring the central goal of waterfowl production and hunting opportunity for these units. The refuge complex has used prescriptive grazing, mowing, and farming activities since acquisition of the various parcels in order to reset successional processes and to reinvigorate grasslands that thrive with periodic disturbance. Initially, we used these practices to control various invasive plant species and to convert historical agricultural fields into more productive sites for nesting, brood, and escape cover for waterfowl and other birds. Activities on waterfowl production areas require clear coordination and communication with any private cooperators doing farming or grazing.

We use prescriptive grazing to reduce matted, thatched dead vegetation for more effective herbicide application on target invasive forb species. On some units, we apply these treatments on a 3–5 year rotational plan to develop optimal waterfowl-nesting cover and habitat complexity.

The refuge complex uses farming activities on selected waterfowl production areas when the density of invasive nonnative species requires the use of herbicide for several years to remove established perennials (plants that live more than two seasons). This also helps to deplete or, in some cases, stop further development of the seedbank of the invasive plant species before establishing the desired species composition. To prevent seed set on dense stands of invasive plant species (teasel, for example), we use mechanical controls including rotary brush-hog mowing and sickle-bar cutting.

Grazing has historically, but not recently, occurred on the Ninepipe and Pablo Refuges; in the past, such grazing has been conducted by CSKT under a deferred rotational system with Service concurrence via a memorandum of understanding.

THE ROLE OF FIRE

Before modern agriculture, fire suppression, and urbanization, vegetation patterns were shaped by fire regimes with characteristic severity, size, and frequency (Frost 1998, Gill 1998, Heinselman 1981, Kilgore 1981). The Palouse prairie and forested areas on the refuge complex evolved through a regime of frequent, low-intensity surface fires at intervals of between 1 and 30 years (Arno 1976, 1996). Lightning was the principle cause of these fires (Smith and Arno 1999). Even today, lightning-ignited fires occur almost annually on the refuge complex, particularly the Bison Range.

Wildfire Response

We and CSKT participate in the National Interagency Fire Qualification System, which includes employees of Federal, tribal, State, and local fire organizations. CSKT has been an excellent partner in our fire management program, including wildfire response and prescribed fire activities. Most of the refuge complex is within CSKT's fire response area, and we have an annual operating plan with the Tribes to provide initial attack on all wildfires throughout the refuge complex. Several Bison Range employees have the necessary training to conduct fire operations; however, the only employee with specific fire duties is the range technician, who is qualified as a type 4 incident commander.

Prescribed Fire

The refuge complex follows fire management plan guidelines when managing prescribed fire treatments and wildfire. We can use prescribed fire as a tool to control invasive plant species, improve grassland habitat, and manage wildlife movements. Using prescribed fire requires substantial planning and monitoring to decide location, duration, and size of treatment area. Our biological and fire staffs are responsible for writing a prescribed burn plan, including the monitoring protocol and safety aspects of the operation. Completion of prescribed fire treatments depends on available money and meeting the prescriptive window (environmental requirements such as specified temperature, wind direction and speed, and humidity, along with available resources). Dedicated funding for prescribed fire has been greatly reduced, so it is challenging to use this tool in refuge complex programs. Nevertheless, prescribed fire is an effective habitat management tool, and we would continue to use it throughout the refuge complex as objectives dictate and given available resources.

WATER LEVEL MANAGEMENT

The main bodies of water in the refuge complex are the Ninepipe Reservoir (15,000 acre-foot capacity) and Pablo Reservoir (28,400 acre-foot capacity). These were constructed as part of the Flathead Irrigation Project in the early 1900s. The Service's national wetland inventory classifies both as lakes with varying amounts of freshwater emergent marsh, scrub-shrub along their perimeters.

The Ninepipe and Pablo Refuges were first established as reservoirs for irrigation and are operated under an agreement among CSKT, the Flathead Irrigation Project, and us. As part of the refuge easement agreement between CSKT and us, these reservoirs continue to supply irrigation water to neighboring landowners while providing habitat for wildlife. BIA ran the irrigation project until 2010, when it was transferred to the cooperative management entity established by agreement with Federal, tribal, and State governments. In the spring of 2014, BIA reassumed management of the Irrigation District due to conflicts over the proposed reserved water right compact and accompanying water use agreement on the Reservation. This dispute resulted in the Flathead Irrigation Project being dissolved. Management of wildlife habitat is a secondary consideration to the irrigation uses of the Ninepipe and Pablo Reservoirs. Nevertheless, management of the water regime for irrigation has generally aided waterfowl and shorebirds, except in high water years when nests are often flooded.

The water level in both reservoirs peaks during May and June and gradually declines through the summer, depending on irrigation needs. Average storage from 1961 to 1985 at the end of June was 14,700 acre-feet at Ninepipe Reservoir and 23,000 acre-feet at Pablo Reservoir. Average overwinter

storage from 1961 to 1985 was approximately 6,000 acre-feet at Ninepipe and approximately 8,000 acre-feet at Pablo (Service unpublished data located at the Bison Range).

In the 1980s, Ducks Unlimited, Inc. funded the following water management projects at the reservoirs:

- At the Ninepipe Refuge, projects included the construction of three islands within the Ninepipe Reservoir and the Scoonover Dike impoundment on the east side of the reservoir. The Scoonover project comprises the dike itself, islands, and 7 acres of impoundments on refuge lands and another 19 acres on State lands.
- At the Pablo Refuge, work included the construction of a ditch and dike for independent water level management of six bays on the western side of Pablo Reservoir. Collectively, these bays provide breeding pair and brood habitat on approximately 275 acres of wetlands with approximately 9 miles of shoreline habitats and 1,150 acre-feet of water. Historically, these low-gradient bays were rapidly dewatered during the irrigation season. The water control structures increased the quality and longevity of marsh and open-water habitats during nesting, brood rearing, and migration.

There are water management capabilities on some of the waterfowl production areas. Historically, refuge complex staff filled potholes on the Anderson Waterfowl Production Area and parts of the Crow Waterfowl Production Area by pumping water from Spring Creek and the Post canal, respectively. Parts of the Crow, Duck Haven, Herek, Montgomery, and Sandsmark Waterfowl Production Areas have ditch systems to fill potholes via check dams placed in established ditches. The potholes at the Johnson 80 and Hall 80 Waterfowl Production Areas are filled via flood irrigation from the ditch or natural precipitation and runoff events. Refuge complex employees are responsible for water manipulation activities, sometimes with the help of Flathead Irrigation District staff.

6.3 Wildlife Management

This section describes the major wildlife groups and their management.

Bison

The National Bison Range maintains an overwintering herd of 300–350 bison. The basic objectives of the bison program are to conserve bison genetic diversity, maintain herd health, and provide opportunities for the public to view bison in a natural prairie setting. The herd size is managed to remain within ecological carrying capacity, including the habitat and forage needs of other wildlife species such as elk, deer, bighorn sheep, pronghorn and a variety of grassland nesting birds. Comprehensive herd health and genetic monitoring programs are integral parts of herd management. Though health is an important aspect of herd management, we manage the bison as wild bison; we do not regularly vaccinate the bison for any diseases and do not provide supplemental feed.

Bison Grazing Management

The range started the current grazing management program in 2011 based on preliminary data and recommendations on herd and range condition data, delivered under a cooperative agreement with researchers at Montana State University. Based on staff experience and expertise, periodic range condition assessments (most recently completed in 2005), and external expert input, refuge complex staff use best available science and an adaptive management approach to fine-tune and adjust annual grazing plans.

From April through October (29 weeks), we rotate the herd twice through 6 available pastures. The first rotation calls for 2 weeks in each pasture; the second rotation is 3–4 weeks per pasture, depending on the conditions and available forage as determined by the range biologist.

For the remaining 22 weeks during the winter months (not including the 1 week during roundup that they spend in and around the corral system), the herd has historically resided on the south side of the range. However, in winter 2013, we let the bison roam throughout the range. Our staff will monitor the effects of this adjustment to winter range management.

The rotational grazing program maximizes forage production and minimizes negative effects to vegetation communities and range condition. Various considerations must be weighed in crafting and carrying out an effective rotational system:

- herd and human safety
- minimal risk of movement-related stress on newborn calves and pregnant cows
- minimal potential for disease transfer between the Bison Range herd and domestic animals on adjacent properties
- provision of safe and secure calving locations during peak calving season (for example, consideration of environmental risks to newborn calves from spring high water in Mission Creek)
- available forage in each pasture and the timing of grazing demands relative to the annual timing of plant growth, productivity, and sensitivity
- viewing opportunities for refuge visitors
- ease of gathering the herd before roundup to bring the bison to corrals
- staff availability for moving bison between pastures
- adequate water, especially during warm months
- inability to control the movement of other big game grazers
- flexibility to adjust the grazing program based on real-time conditions and unpredictable events (such as unplanned bison moves through down fence)

Rotating the bison herd between grazing units requires unique skill in horseback riding and animal behavior related to wild bison. Experience with bison and horse behavior and the terrain of the range is

an important element for protecting the staff, horses, and bison during each move. The maintenance staff is responsible for leading all bison relocations, which involves developing a strategy based on the location of the herd, the weather, terrain, animal behavior, access to gates, timing of the move, and positioning and skill of riders. This rider and behavior program and associated activities help maintain the health and wellness of the bison and the habitat they depend on.

Bison Herd Health

We designed the program for monitoring bison herd health to assess the presence and prevalence of diseases in the population as a whole, not necessarily to find out the disease status of individual animals. The program includes (1) year-round direct observations of the herd aimed at detecting acute injuries, chronic conditions, mortalities, and emerging disease, and (2) regular sampling during roundup for a suite of diseases of particular concern.

Bison Range staff performs year-round, direct observations during routine work. Much of the information gleaned from herd health observations is documented and discussed informally among refuge complex staff, who have the experience to deal with situations such as injuries, mortalities, and necropsies. We routinely coordinate with our wildlife health office in Bozeman, Montana, on concerns about disease or life-threatening conditions.

Although annual sampling and disease testing has been conducted at the range for decades, a statistically derived disease detection model was used starting in 2000 to enhance detection of several diseases, including paratuberculosis. This disease, commonly known as Johne's (pronounced YO-nees) disease, is a bacterial intestinal disease that causes diarrhea, severe weight loss, and eventual death in bison and cattle. The range staff also collects samples for diagnostic laboratory testing to evaluate exposure to several viral and bacterial diseases common in the cattle industry, including bovine virus diarrhea (BVD types 1 and 2), parainfluenza-3 (PI3), infectious bovine rhinotracheitis (IBR), bovine respiratory syncytial virus (BRSV), leptospirosis, epizootic hemorrhagic disease, bluetongue and disease caused by *Mycoplasma bovis*. Statistically-derived sample sizes provide detection of disease occurring at a minimum of 5-percent prevalence with 95-percent confidence. Detection may be slightly improved by selecting approximately half of the animals for sampling at random and half based on historic testing results. We assess the body condition of most of the noncalf herd. Prior to the roundup, we randomly collect fecal samples in the field to evaluate parasite burdens.

Some agents of diseases such as malignant catarrhal fever, Johne's disease, and bovine viral diarrhea have been detected at low levels, or preliminary data suggests that they may be present. In 2010–11, an antigen test for bovine viral diarrhea was conducted on the herd and none was detected.

Though regular vaccinations are not administered as a matter of course, bison would be vaccinated (if the vaccine is available and effective) in the case of a disease outbreak. The last time we used a vaccine at the Bison Range was in 2010 as a preventative measure for bovine viral diarrhea.

Annual Bison Roundup

The annual bison roundup is critical to managing the range's bison herd. The roundup, conducted in October, is necessary to manage herd size, monitor herd health, collect genetic samples from calves, mark calves with microchips, and collect other necessary biological samples for disease monitoring.

Following the Bison Range's 1990 fenced animal management plan and an evaluation of the current habitat conditions, the range maintains an average herd size of 350 animals. We select surplus bison for removal based on a combination of factors—sex, age, and genetics. Our wildlife health office maintains a database for all animals on the range. Once the biology staff selects the number of bison that must be removed to maintain habitat quality, the wildlife health office selects which animals should be kept in the herd to conserve genetic diversity and which animals contain well-represented genetics in the herd that can be removed. Bison are first considered for transport to other Service herds to achieve Service-wide genetic conservation objectives. Based on existing regulations and policies, we can then donate additional surplus animals (up to 25 percent of the annual surplus) to American Indian tribes, approved research programs, other specific conservation organizations or government entities, or sell them to private individuals. Published research shows that culling young animals can reduce the effects of genetic drift by lengthening the generation time, so we generally sell animals 1-3 years old, with calves kept each year until results of the genetic testing are available for the following year's roundup.

The range's maintenance and biology staffs work specific stations and lead groups of team members in conducting various operations—from rounding up the bison and moving them through the corral system to collecting biological samples. By having these staffs lead individual teams at every stage in the process, we reduce the risks to workers, including volunteers, and the bison.

- The staff herds most bison, with emphasis on gathering as many of the younger animals as possible without undue stress to the animals, to the corral system through a series of fences and gates using horses and all-terrain vehicles.
- We first stage the bison in a series of smaller pastures next to the corral system. Our lead staff sorts the bison to ease their processing through the corral facility but also to make sure that each pasture contains only as many bison as the available grass and water would support. Even for the short-duration stay, this is an integral part of wildlife stewardship and the roundup.
- We scan each bison for a microchip that identifies the animal in a database. The animal is weighed and scored for body condition and any signs of disease or injury.
- After the bison are identified by their microchips, we send most animals directly back to the range, with some going to the chutes for further workup.
- At the chute, we test adult bison for a variety of potential diseases while calves are microchipped and genetic information is gathered. Surplus animals are also checked at the chute to confirm they have an eartag as required for transport off the range.
- Maintenance workers operate the hydraulic chutes and work with the biology staff to move bison through the operation safely and collect samples quickly, in an effort to prevent stress or injury to the bison.

This annual event takes extensive planning and preparation. Soon after the end of each bison roundup, we start getting ready for the next year's roundup. Each year, the staff looks for ways to further improve the corral and chute facilities, animal handling, and data processing procedures.

Bison Genetic Conservation and Management

The Department of the Interior's bison herds are part of a metapopulation management approach to bison conservation—managing small scattered herds throughout several States as one herd for genetic considerations. Smaller herds are in greater danger of the effects of genetic drift (incremental loss of genetic diversity over time) when those herds are managed in isolation from each other. When genetic diversity is used as the key criterion for evaluating management options, a population size of about 1,000 animals is needed to achieve a 90-percent probability of keeping 90 percent of alleles (Gross and Wang 2005). Our DOI metapopulation approach is built upon an expectation of an over-winter herd size at the Bison Range in the range of 300-350 bison, depending on local conditions.

The Bison Range herd has a high level of genetic diversity, with one of the highest levels of allelic richness, genetic variation, and private alleles (genes of a specific subpopulation) of tested Federal herds (Halbert 2003, Halbert and Derr 2007, Hedrick 2009). Our bison also have a low level of cattle introgression (the incorporation of the genes of one species into the gene pool of another). The range has only had 12 animals brought into the herd in the last 98 years. We have closed the herd to bison from outside sources to preserve high genetic diversity, maintain low levels of cattle gene introgression, and reduce the potential for the introduction of disease. Though small, the actual amount of cattle genetic material in the range's herd is unknown. Genetic drift may be decreasing the level of cattle introgression.

Each year, Bison Range staff identify a desired cull number based upon the number of calves produced that year and the current condition and trend of rangelands on the range. Given that number and our specifications on target age classes for the cull and the desired post-cull herd sex ratio, the Service's wildlife health office in Bozeman, Montana, selects individual bison for cull based on genetic information. Using the latest in microchip hardware and software technology, the Bison Range is able to effectively manage the bison herd to maintain high genetic diversity. This effectiveness relies on having a staff with skills in bison management, population dynamics, and wildlife health. These skills can be acquired through experience over time, and the Service's wildlife health office plays a central role in supporting the cull selection. However, local biologists' knowledge and decisions made to maintain bison genetics is important, as the effectiveness of local biologists' disease and health surveillance work guards against threats, such as disease, that could impact the herd and thereby the genetic representation at the Bison Range.

OTHER BIG GAME

Besides the bison herd, the range manages herds of Rocky Mountain elk, mule deer, white-tailed deer, Rocky Mountain bighorn sheep, and pronghorn (see table 3).

Table 3. The species and estimated populations of other big game animals on the National Bison Range, Montana, in 2012.

Species	*Estimated current population*
Rocky Mountain elk	130
Mule deer	200
White-tailed deer	200
Rocky Mountain bighorn sheep	125
Pronghorn	110

Elk

The only other big game species actively managed on the range are elk, which use the same grazing resources needed by bison, reducing available forage. To lessen this effect, we maintain a target population of elk on the range. As with bison, the range's fenced animal management plan establishes target elk herd numbers. This plan is scheduled to be updated in the next few years.

Deer, Sheep, and Pronghorn

Some of the smaller big game species, such as deer, are able to move in and out of the range. Other species, such as bighorn sheep and pronghorn, are resident to the range. In recent years, the range has documented a pronounced increase in the bighorn sheep population. Sheep are effective grazers and can reduce forage availability for bison. The biology staff plans to work with researchers to evaluate the effects of the increasing sheep herd and decide if a response is needed, which could include offering sheep to relocation programs.

Other Big Game Health Issues

Wildlife health monitoring is a cornerstone of the wildlife management program. Our biology staff has worked with the wildlife health office to design and carry out a monitoring program for wildlife health. The wildlife health office (1) provides current information and guidance on wildlife threats, (2) helps in the development of protocols and plans for disease management on refuge complex lands, and (3) provides technical reports on lab results and findings.

Refuge complex staff monitors refuge animals for signs of disease and sickness and conducts necropsies on many big game animals that die or are removed from the herd. We also participate in other Federal and State programs to monitor for chronic wasting disease and West Nile Virus, a disease that can be spread to humans.

Chronic wasting disease is a transmissible spongiform encephalopathy in which infectious proteins accumulate in the brain and brain stem resulting in neurological impairment, diminishing body condition, and eventual death. The staff collects CWD samples from elk that are removed during population management activities. We perform full necropsies either opportunistically or if a clear and present risk is identified. We also collect samples from deer that die from unknown causes. Together

with the wildlife health office, our biology staff creates protocols for sample management and processing.

Bird surveys for West Nile Virus and bird flu are conducted based on perceived refuge-specific concerns or threats identified by local, State, and Federal officials.

OTHER WILDLIFE

The refuge complex supports a diverse array of other wildlife from birds to large carnivores.

Birds

More than 200 species of birds have been documented on the refuge complex. Notable grassland species include grasshopper sparrow, long-billed curlew, and western meadowlark. Forest and riparian areas support a diverse suite of species including western bluebird, yellow warbler, yellow-breasted chat, Townsend's solitaire, and Lewis' woodpecker, a bird identified by the State as a species of concern. Upland gamebird species include ring-necked pheasant, gray (Hungarian) partridge, blue grouse, and ruffed grouse.

Common raptors include American kestrel, northern harrier, red-tailed hawk, short- and long-eared owls, and great-horned owl, which forage and nest on the refuge complex. In some years, the Mission Valley, including the refuge complex, supports high densities of wintering rough-legged hawks.

Waterfowl, such as canvasback and American wigeon ducks, are abundant on the wetlands, rivers, and lakes found on the refuge complex but particularly on the district, which includes the Ninepipe and Pablo Refuges. We see the largest concentrations in the spring and fall, but many species, such as mallard and pintail, nest on the managed and natural wetland basins. In the past, artificial nesting structures for waterfowl have been used intensively at the Ninepipe and Pablo Reservoirs in the form of nest platforms and boxes. Some of these still exist.

Trumpeter swans, a species of concern in Montana, nest on the waterfowl production areas and the Pablo Refuge. The swans spend the winter on the Flathead River and those district waters that do not freeze. Trumpeter swans are regularly observed on Mission Creek and its associated sloughs and wetlands but are not known to nest there.

Mammals

Large carnivores such as badger, bobcat, coyote, black bear, and mountain lion are year-round residents that reproduce on the Bison Range. Wolves have been sporadically reported on or near the Bison Range; in the winter of 2012 and again in 2013, a lone wolf was documented on the range. Similarly, grizzly bears have been occasionally reported on the Bison Range in recent years, and have been photographically documented each year since 2012.

Small mammals such as Columbian ground squirrel, yellow pine chipmunk, and voles are common and cyclical and are an important forage base for carnivorous mammals and raptors.

Muskrats are regular inhabitants of wetland potholes. Waterfowl, including swans, use the muskrat mounds or lodges for nesting. Although not considered common, mink and long-tailed weasel have also been recorded.

Fish, Reptiles, and Amphibians

Most of the units on the refuge complex support fish species. The reservoirs in the Ninepipe and Pablo Refuges support the largest populations of warm-water fish, such as yellow perch and largemouth bass. Mission Creek and the Jocko River, on the Bison Range, are the only bodies of water that support cold-water species such as rainbow trout and brown trout. Historically bull trout, a threatened species, occurred along the entire length of Mission Creek. Only a small part of this creek is on the range. Rising creek temperatures, particularly off the range, has affected this species' ability to survive.

The Crow, Ereaux, and Montgomery Waterfowl Production Areas are the only units in the district that have enough water in isolated wetlands, creeks, or drainage ditches to minimally sustain warm water fish, similar to those found in the Ninepipe and Pablo refuges. The refuge complex is known to support prairie rattlesnake, rubber boa, bullsnake, eastern racer, and garter snake. Painted turtles are common in wetlands and ponds.

6.4 Threatened and Endangered Species

As of August 2012, we have identified seven listed species that are known to or may occur on the Flathead Indian Reservation: bull trout (threatened), grizzly bear (threatened), Canada lynx (threatened), Spalding's campion (threatened plant), water howellia (threatened plant), wolverine (candidate), and whitebark pine (candidate) (FWS 2013):

- Bull trout may occur in the portion of Mission Creek that flows through the Bison Range. The entire area is located within Bull Trout Critical Habitat Unit 31.
- Grizzlies are known to occur regularly and seasonally in the Ninepipe Refuge area and throughout the Mission Valley. Grizzlies have been reported by Bison Range visitors over the years and have been documented photographically in recent years. Refuge complex staff documented grizzly occurrences using game cameras on the Bison Range in the spring of 2013 and the spring of 2014. A visitor supplied a photo of a grizzly along Mission Creek within the Bison Range in the summer of 2014. No denning activity occurs on refuge complex lands. All grizzly sightings are reported directly to CSKT bear biologists, who lead trapping, tracking, and movement efforts within the Flathead Reservation.
- The other listed species have not been documented on the refuge complex.

Some species have legal protections in place, but are otherwise not recognized as federally listed under the Endangered Species Act and are not Montana species of concern. Bald eagles, golden eagles, and trumpeter swans are considered special status species in Montana because they are protected under the Bald and Golden Eagle Protection Act or the Migratory Bird Treaty Act, or both. These species occur throughout the Mission Valley and are frequently documented on refuge complex units:

- CSKT has an ongoing effort to reestablish a breeding population of trumpeter swans in the area; we have cooperated with the Tribes on this project by providing wetlands for reintroduction sites.
- Bald and golden eagles have been documented nesting and foraging on units of the refuge complex.

6.5 Special Management Areas

The National Bison Range and Ninepipe and Pablo Refuge have been designated as important bird areas. The Important Bird Areas program, started in Montana in 1999 and managed by the Audubon Society, is a global effort to identify and conserve areas vital to birds and biodiversity. Thirty-nine important bird areas in Montana encompass more than 10 million acres of outstanding wildlife habitat, including streams and wetlands. To qualify as an important bird area, sites must satisfy at least one of the following criteria to support the following types of bird species groups:

- species of conservation concern (such as threatened and endangered species)
- restricted-range species (species vulnerable because they are not widely distributed)
- species that are vulnerable because their populations are concentrated in one general habitat type or biome
- species or groups of similar species (such as waterfowl or shorebirds) that are vulnerable because they occur at high densities because of their behavior of congregating in groups

Some of the species that qualified these refuges for this designation include the Bald Eagle, redhead, semipalmated sandpiper, Lewis's woodpecker, grasshopper sparrow, and Caspian tern.

6.6 Research, Inventory, and Monitoring

This section describes the studies and surveys that we coordinate and conduct on the refuge complex to gain data and understanding about the systems we manage.

RESEARCH

Research projects are designed to address management needs on the refuge complex. By supporting and facilitating research projects, we have an important means to improve our understanding of refuge resources. Support can include money, but most often we would provide in-kind contributions (such as housing, fuel, loaned equipment, transport, help with site selection, and access to refuge areas not open to the public).

Our biologists work with universities and other partners to design and evaluate proposals including evaluating techniques, methods, and projected products or outcomes. The Bison Range has many ongoing research projects that, while quite productive and self-sustaining, require annual support, permitting, and networking with principal investigators and project staff. Among these efforts are long-term or multi-year projects that focus on basic ecology with implications for refuge management:

- grassland ecology, ecology of grasshoppers and their effects on available forage—University of Notre Dame
- pronghorn population ecology and demography—University of Idaho
- rangeland ecology and range condition assessment—Montana State University
- Rocky Mountain bighorn sheep population ecology and demography—Montana Conservation Science Institute
- ecology of native goldenrod, relative to its status as an invasive species in Europe—The University of Montana
- several studies on response of invasive species to herbicides—Montana State University and the United States Department of Agriculture, Forest Service

We also contribute to other research projects, including studies on the mineral requirements of bison and elk, and studies to develop or improve analytical genetics techniques. Our biology staff evaluates research projects relative to refuge purposes and management needs. These types of projects can be a cost-effective way to leverage limited resources into quality work. A key part of the success of partnerships is a biology staff with the knowledge of refuge complex resources and scientific methods that allows them to prepare project proposals and evaluate research designs. We support expanding opportunities for universities to involve their graduate programs in conducting research projects that we can use to address and resolve management issues.

INVENTORY AND MONITORING

Our biologists complete annual pair and brood counts for waterfowl across the district. These annual counts consist of two to three crew members conducting point counts at fixed, permanent locations each May (pair counts) and July (brood counts). The crews collect data on standardized field forms and enter the information into an existing database that resides on the refuge complex's file server. In 2013, this data was summarized in an annual report, while historical data was entered into a waterfowl count database. In some years, the refuge complex participates in an aerial winter waterfowl survey. We coordinate with FWRC to conduct this part of the survey that includes the reservation.

We conduct two types of big game surveys on the Bison Range, often annually:

- Refuge complex staff does ground-based elk counts (sometimes with volunteer help) at fixed points.

- Aerial surveys are completed in most years in January or February, when snow conditions offer improved visibility of animals.

Our research partners also provide annual population information on our bighorn sheep and pronghorn herds.

6.7 Visitor Services

Visitors come from all over the Nation and the world to learn about the National Bison Range Complex and enjoy a variety of wildlife-dependent recreational activities. In 2012, approximately 203,500 resident (from within 50 miles of the refuge complex) and nonresident visitors viewed and photographed wildlife, hunted, fished, and participated in events and programs. The number of visitors comes from the car counter located at the entrance to the visitor center, combined with estimated counts for the remaining units of the refuge complex. The use by activity follows:

- 1,000 visitor days for hunting upland gamebirds and migratory birds on the district
- 11,500 visitor days for fishing
- 138,000 visitor days for the auto tour route
- 50,000 visitor days for wildlife photography
- 6,500 visitor days for environmental education, interpretation, and special events
- 40,000 visitors to the National Bison Range Visitor Center

Brochures containing area maps, public use regulations, bird species, and general information are available for all units in the refuge complex. Birding is a popular activity on all units, given the abundant species of waterfowl, songbirds, and raptors that use the lands and waters in the area. The refuge complex is open from dawn to dusk, except during waterfowl hunting season (waterfowl production areas only) when hunters are allowed reasonable time to access hunting areas. The Ninepipe and Pablo Refuges are closed to all public access during waterfowl hunting.

Visitation is most heavily concentrated on the Bison Range, Ninepipe Refuge, and Pablo Refuge during wildlife-viewing seasons in the spring, summer, and fall. The most popular activity for visitors is driving the 19-mile Red Sleep Mountain Drive on the range. This route offers spectacular scenery and opportunities to view and photograph wildlife. The Bison Range visitor center is open every day in the summer from 9 a.m. to 5 p.m. In the winter, all but 5 miles of the Red Sleep Mountain Drive is closed due to weather and the visitor center is open Monday through Friday from 10 a.m. to 2 p.m.

Visitation on the district is highest during the waterfowl and upland gamebird hunting seasons in the fall. We permit hunting on the waterfowl production areas, which accounts for less than 1 percent of all visits.

HUNTING

The Bison Range, Ninepipe Refuge, and Pablo Refuge are closed to all hunting.

Hunting is permitted on waterfowl production areas in accordance with State law and per joint State and CSKT regulations. District units in Lake County that are open to hunting for big game, waterfowl, and upland birds and open to trapping are the following waterfowl production areas: Anderson, Crow, Duck Haven, Ereaux, Herak, Johnson 80, Kickinghorse, Montgomery, and Sandsmark. Big game hunting is only permitted by Tribal members. In 2012, it was estimated that approximately 1,100 visitors take part in hunting waterfowl and upland birds. Shotgun hunters may possess and use only nontoxic shot on lands within the refuge complex. Vehicle travel on the waterfowl production areas is not permitted except in designated parking areas and pullouts.

FISHING

Visitors often travel from Missoula and Kalispell during the summer months to fish for largemouth bass, while yellow perch is the most common species fished for in the winter months. Besides the refuge-specific regulations mentioned below, fishing is permitted on designated areas of the refuge in accordance with State law and per joint State and CSKT regulations.

Seasonal recreational fishing opportunities are available on all or part of the Bison Range, Ninepipe Refuge, and Pablo Refuge. Fishing is permitted on the waterfowl production areas but the wetlands provide minimal fishing opportunities. We prohibit (1) the use of boats, float tubes, or other flotation devices, and (2) the use of lead or lead-based fishing tackle.

National Bison Range

Anglers visiting the Bison Range enjoy fishing for cold-water species, such as rainbow and brown trout, along parts of the scenic Mission Creek and Jocko River. Mission Creek is open seasonally, spring through fall, and the Jocko River (next to the range's southern boundary) is open to catch-and-release fishing year-round. In 2012, an estimated 300 visitors fished on the range.

Ninepipe National Wildlife Refuge

Fishing is popular on the Ninepipe Refuge with approximately 8,000 visitors annually. Visitors often travel from Missoula and Kalispell during the summer months to fish for largemouth bass, while yellow perch is the most common species fished for in the winter months.

We close the refuge to fishing during the waterfowl-hunting season in the fall to provide resting and loafing areas for waterfowl. The entire refuge is open to fishing, including ice fishing, from the close of the waterfowl-hunting season to the end of February. From March 1 to July 14, we restrict fishing to specific areas to minimize disturbance to ground-nesting birds. The entire refuge is open to fishing from July 15 until the waterfowl-hunting season.

Pablo National Wildlife Refuge

In 2012, approximately 3,000 visitors fished on the Pablo Refuge for warm-water species, such as yellow perch and largemouth bass. Winter ice fishing is popular with the local residents and visitors from Missoula and Kalispell.

We seasonally open the refuge to fishing. We close the southern and western parts of the refuge year-round to provide sanctuary for wildlife. During waterfowl hunting, we close the refuge to fishing to provide resting and loafing areas for waterfowl. We keep the northern and eastern parts of the refuge open the rest of the year for fishing, including ice fishing.

Northwest Montana Wetland Management District (Lake County)

The Crow, Ereaux, and Montgomery Waterfowl Production Areas are the only units in the district that have enough water in isolated wetlands, creeks, or drainage ditches to minimally sustain fish; therefore, fishing is poor. In 2012, we estimate that only 50 visitors fished the entire district.

WILDLIFE OBSERVATION AND PHOTOGRAPHY

Opportunities for wildlife observation and photography are abundant within the refuge complex, and in 2012 it is estimated that almost 150,000 people visited for these purposes. Given the beautiful setting and unique wildlife found on the refuge complex, we receive many requests for commercial filming. Commercial filmmakers must acquire special use permits to work on refuge complex lands. The permits specify regulations and conditions that permittees must follow to protect the wildlife and habitats they have come to capture on film and to prevent unreasonable disruption of other visitors enjoyment of the refuge complex.

National Bison Range

Wildlife photography is popular on the refuge complex especially on the Bison Range. Many photographers come to the range to capture the landscape of the Mission Mountains, the Bison Range itself, and the wildlife species present. The most popular species for wildlife photographers are the large mammals including bison, elk, deer, pronghorn, bighorn sheep, and black bear. Elk are especially popular during the rutting season in the early fall months.

The most popular activity for visitors to the Bison Range is the 19-mile Red Sleep Mountain Drive that guides visitors through a variety of wildlife habitats. The auto tour route is graveled and fully maintained through the summer months, including annual treatment for dust control. In the winter, the upper road is closed; but a shorter 6-mile winter route is kept open October through May. More than 120,000 visitors traveled the auto tour route in 2012.

The range has a day use area and nature trail near the main visitor entrance gate. There are picnic tables, a covered pavilion, drinking water fountains, and nine vault outhouses. The area receives a tremendous amount of use during the summer, especially on weekends and holidays. Many visitors begin or end the auto tour route with a visit to the day use area. Foot access at the Bison Range is restricted to a few designated trails to reduce the risk of visitors coming into close contact with bison.

Northwest Montana Wetland Management District (Lake County) and Ninepipe and Pablo Refuges

Birdwatching is particularly popular on the Ninepipe Refuge, Pablo Refuge, and waterfowl production areas, given the thousands of waterfowl, shorebirds, grassland birds, and wading birds that nest, feed, and rest on these areas every year. There is an interpretive walking trail at the Ninepipe

Refuge. Parking and walk-in access is allowed on the refuges during certain times of the year, but year-round access for wildlife observation is available on the nine waterfowl production areas.

ENVIRONMENTAL EDUCATION

The diversity of habitats and wildlife found throughout the refuge complex makes it an ideal "classroom" for the area's environmental education needs. The Bison Range receives more than 3,000 educators and students, from preschool to university level, on field trips. The refuge complex staff has created educational programs to promote an appreciation and understanding of the wildlife and habitats the refuge complex was established to protect.

Refuge staff and volunteers provide onsite programs, demonstrations, and talks, particularly at the visitor center. When adequate staff is available, the refuge holds teacher workshops to provide information on refuge resources, share opportunities for student learning, and give out educational materials to participants. School groups can check out various field kits, which can include activity sheets on various topics, field guides, and collection tools for wetland fauna. School groups extensively use the day use area near the main visitor entrance gate and nature trail for environmental education activities, staging, and eating.

INTERPRETATION

The visitor center has extensive interpretive displays and an orientation video. Here, the public can receive brochures containing area maps, public use regulations, bird lists, and general information for the refuge complex. Many displays focus on the wildlife found on the refuge complex, particularly the bison. The displays show both the importance and the destruction of the large, free-ranging herds of bison—from estimated populations of 30 to 60 million animals to the remaining public and private herds today. There is also a display developed by CSKT on the cultural importance and uses of bison.

There are several interpretive kiosks on the range and at least one each on the Ninepipe and Pablo Refuges. These kiosks orient visitors and provide information on refuge complex management. We are also working with CSKTs Division of Fire to create an interpretive kiosk at the visitor center that highlights the historical importance of fire on the landscape in the Mission Valley.

We give local newspapers periodic news articles on refuge complex activities and informative articles about the values and protection of the area's natural resources. The refuge complex's Web site provides information about the area's natural resources, programs, and regulations. Our Facebook page provides highlights and updates on activities including the following annual events:

- Migratory Bird Day bird and photo walks
- National Wildlife Refuge Week
- Public Lands Day
- Bison roundup
- American Outdoor Fee-Free Weekend
- National Bison Range birthday

6.8 Cultural Resources

The following section describes the cultural resources and history of the refuge complex and the Mission Valley, starting with the documented occupation by the tribes that now compose CSKT. Next, we describe Euro-American settlement in the valley and summarize changes to the area's land uses, including those within the refuge complex boundary.

THE PROTOHISTORIC PERIOD AND EARLY NATIVE AMERICANS

The Protohistoric Period is the period between the arrival of horses and manufactured goods but before the arrival of Euro-American traders and explorers. This period lasted only about 70 years because of the arrival of the Lewis and Clark expedition in 1805.

Malouf (1952) noted that these Intermountain areas of western Montana were the last areas of the United States for immigrants to settle. Many traits of aboriginal times survived through this period without influence from Euro-American culture. When early Euro-American explorers arrived, the area of western Montana was occupied primarily by three tribal groups: the Flathead and Pend d'Oreille (both considered Salish) and the Kutenai (Kootenai). In 1855, Governor Isaac Stevens stated the tribal population in western Montana to be 2,750 (Ryan 1977).

Early tribes were hunters and gatherers, and as such they did not accumulate surplus food and supplies. However, famines were rare. Nearly 30 species of plants were the main sources of foods, medicines, cookware, and housing. The root of the bitterroot plant was a central dietary feature. Families could dig 50–70 pounds of bitterroot in late March or April. Arrowleaf balsamroot, an abundant plant at most elevations of western Montana, was also extensively eaten. Stems were typically peeled and eaten raw before flowering, and later the roots were harvested and cooked. Ponderosa pine provided four forms of food: inner bark, sap between woody layers, cone nuts, and moss hanging from branches. Narrowleaf willow on river gravel bars was used in the construction of sweat lodges and baskets for cooking (sealed with gum). Tribes hunted most of the common mammals present today in western Montana including white-tailed deer and mule deer. Columbian ground squirrels were also harvested. Most birds, except waterfowl, were not harvested, yet mallard eggs were particularly plentiful and a popular food. Other gamebirds were not numerous. Fishing was employed on bison hunts and by those left behind.

HISTORY OF THE CONFEDERATED SALISH AND KOOTENAI TRIBES

The Salish and Pend d'Oreille are the two easternmost tribes of the people composing the Salish language family, whose territory extended from Montana to the Pacific Coast, generally north of the Columbia River. The Salish-speaking people separated thousands of years ago into different bands. These individual bands became separate tribes in different parts of the Northwest when the population began to exceed food supplies. Eventually these tribes began speaking different dialects of the Salish language (CSKT 2003). The Kootenai Tribe occupied the northern part of Montana and north into Alberta and British Columbia in Canada. Although the Salish and Pend d'Oreille share a common language, the Kootenai language is not related to any other tribe.

The cultures and life practices of these tribes were similar. In the traditional way of life, they gathered roots, including bitterroot and camas, from early spring through the growing season. Camas was a staple that was baked and dried for preservation. Tribes also picked chokecherries, hawthorn berries, huckleberries, serviceberries, and strawberries, and they fished for salmon and bull trout. The tribes' medicines and flavoring herbs all came from the earth.

In the fall, the men hunted mostly deer and elk. The tribes also hunted bison, which provided food, clothing, and important tools. They fashioned tools from stone, bones, and wood. The women dried meats and prepared animal skins for clothing, coloring the hides with natural dyes and decorating them with porcupine quills.

Over the past several centuries, the lives and traditions of the western Indian tribes has been dramatically altered by a series of transformations relating to non-Indian incursions into their traditional way of life. The first was the horse, acquired in the 1730s from the Shoshone Tribe in Idaho. The horse greatly expanded the tribes' range, enabling more efficient travel and hunting, particularly of bison. However, the erosion of intertribal boundaries also contributed to an intensification of conflicts with enemy tribes.

In the 1780s, the Bitterroot Salish were devastated by a smallpox outbreak. The disease spread rapidly and is estimated to have killed one-half to three-fourths of the Salish and Pend d'Oreille bands.

French and British fur traders arrived in the 1790s. However, it was the Bitterroot Salish interaction with the Lewis and Clark expedition in 1805 that opened the door to fur trading in the Bitterroot Valley, which is south of Mission Valley. The Hudson's Bay Company eventually entered the Bitterroot Valley and began to trade with different tribes that traveled through the valley. Traders secured furs from Indians and established forts and missions. In 1841, Catholic missionaries initially established the oldest consistently occupied town in Montana at the present-day site of Stevensville (Stevensville Historical Society 1971).

The expansion of fur trading significantly altered the economy and culture of this region, including providing access to firearms, which changed the way tribes hunted and protected themselves from enemies. The introduction of the gun by the Hudson's Bay Company decimated many tribes. This particularly affected the Salish people whose enemies, the Blackfeet, had acquired the weapons early on, giving the Blackfeet a significant advantage in any battles over resources and territories.

EURO-AMERICAN SETTLEMENT AND LAND USE CHANGES

Western tribes have long used the Mission Valley as a traditional gathering place. Its setting offered excellent hunting and gathering opportunities that provided enough economic resources to accommodate short-term gatherings of large contingents of tribes. The valley was used as a rendezvous site where bartering and gaming was conducted by tribes of the Bitterroot Salish, Kalispel, Kootenai, and Pend d'Oreille. The Mission Valley was known to have excellent soil, good grasses, plenty of water, and abundant forest nearby. The valley was also somewhat protected from Blackfeet Tribe war parties because it was flanked to the east by the rugged Mission Mountains. The richness of the valley and its traditional use by the western tribes as a central gathering place made it a favorable location for a trading fort.

Saint Ignatius Mission

Father Pierre-Jean de Smet, a Belgian Jesuit priest, arrived in the Bitterroot Valley in September 1841 at the request of the Salish Tribe to establish a mission. The result was the Saint Mary's Mission, the oldest mission in Montana. The religious foothold by the Jesuits among the Bitterroot Salish in Montana soon expanded to other Salish-speaking tribes. Sometime before the spring of 1854, Chief Victor of the Lower Pend d'Oreille band and Chief Alexander of the Upper Pend d'Oreille band searched together for a new mission location. The Jesuit priest required the new site to be more central to the various Salish and Kootenai tribes, provide sufficient natural resources to support the planned population density, and agreeable for agriculture.

After considering all the requirements, Chiefs Victor and Alexander decided to locate the new site in the Mission Valley. In 1854, the Jesuits established the new mission in the heart of Upper Pend d'Oreille territory, some 60 miles north of the town of Saint Mary, 7 miles from Fort Connah, and 7 miles from a major Upper Pend d'Oreille encampment along the Jocko River near present-day Ravalli. The new mission was named Saint Ignatius.

When the mission was moved from the Pend d'Oreille River (in Washington) during August and September of 1854, nearly all the Lower Pend d'Oreille or Kalispel joined with the upper bands in making the move to the new location. Small barges were prepared for transporting the food crops and equipment. Pack horses were used for moving tribal members and other cargo. The group arrived at the site on September 24, 1854, but by October, the main body of the Kalispel decided to return to their homeland on the Pend d'Oreille River. The Kalispel felt uncomfortable with the grouping of tribes that swelled the mission. Chief Victor declared that the Kalispel could not keep their autonomy, so he led his people downriver back to the main camp.

By the end of 1854, a log hut, chapel, houses, and a carpenter and blacksmith shop had been erected at Saint Ignatius Mission. By April of 1855, a population of more than 1,000 people lived near the Saint Ignatius Mission including Bitterroot Salish, Kalispel, Kootenai, Pend d'Oreille, and Spokane tribal members. Because of the establishment of the Saint Ignatius Mission, many Indian families built homes and developed agricultural lands along Mission Creek, including the lower valley that is now a part of the National Bison Range.

Fort Connah

During the winter of 1846–47, the Hudson's Bay Company built Fort Connah along Post Creek in the Mission Valley. Traders Angus McDonald and Neil MacArthur did the construction, and by 1847, 18 buildings were completed. One of those buildings still stands today. Fort Connah became the center of Hudson's Bay Company operations in Montana during the twilight years of the fur trade, continuing business until 1871.

The establishment at Fort Connah brought small groups of European trappers and farmers into the Mission Valley to work as support staff for the facility. They established gardens and crop fields and grazed livestock. The farmers exported seeds and domestic stock to the Columbia River Basin. By 1871, with the era of fur trading passed and an increasing emphasis on gold mining in northwestern Montana, Fort Connah was forced to close—it was the last fur trading post in Montana.

THE FLATHEAD INDIAN RESERVATION

When the United States divided the Oregon Territory into the Washington Territory and the Oregon Territory in 1853, western Montana was included in the Washington Territory. President Millard Fillmore appointed Isaac I. Stevens as the Territorial Governor of Washington and the Superintendent of Indian Affairs. Stevens began an aggressive plan to deprive the Indian nations within the territory of title to their lands. His plan restricted the western Montana tribes to one reservation, thereby opening the rest of the land to non-Indian settlement.

Stevens eventually began negotiations with the Salish tribes living on their homelands of the Bitterroot Valley. During these negotiations, observers noted a clear lack of understanding of the specifics of the treaty by the Bitterroot Salish, Kootenai, and Pend d'Oreille Tribes because of the cultural and language barriers. The interpreter, Ben Kyser, was reported to speak Salish badly and was not any better at translating English. During negotiations, the Lower Pend d'Oreille's Chief Victor proposed that Stevens conduct a study to determine the best site for the reservation, which stopped the immediate transfer of their lands in the Bitterroot Valley.

The 1855 Treaty of Hellgate defined the ceded aboriginal territory of the Bitterroot Salish, Kootenai, and Pend d'Oreille Tribes and set up reserved lands for the "exclusive use and benefit" of these tribes. The treaty provided money and infrastructure including mills, shops, schools, and employment. The treaty also recognized tribal members' right to hunt, fish, and gather in their usual and accustomed places outside the reservation

After the Treaty of Hellgate, pressure increased for the removal of the Salish from the Bitterroot Valley to the Jocko Valley on the Flathead Indian Reservation. In 1872, General James Garfield presented Salish Chiefs Charlo, Arlee, and Adolf with a second treaty that Charlo refused to sign. Chief Charlo remained in the Bitterroot Valley for 20 more years until 1891 when General Carrington and troops from Fort Missoula escorted the chief and his band to the Flathead Indian Reservation.

On the Flathead Indian Reservation, the Federal Government established increasingly restrictive control over traditional cultural practices of the Tribes, banning traditional dances, spiritual ceremonies, and even the speaking their language. Despite this repressive climate, the Tribes, in comparison to those at other reservations, were relatively prosperous, establishing farms and cattle operations. They also welcomed other tribal members to the reservation including Kalispels and Spokanes. Despite efforts to restrict the Tribes' cultural practices, the tribal languages and many of the Tribes' traditions are practiced today.

6.9 Operations

The maintenance staff carries out an extensive variety of operations on the refuge complex. Maintenance of facilities and equipment is essential at all the units, and managing the bison herd is a unique and complex program at the Bison Range.

MAINTENANCE OF FACILITIES AND EQUIPMENT

As on many national wildlife refuges, the maintenance staff is responsible for the maintenance and repair of all facilities, roads, equipment, and vehicles to provide dependable, safe, and secure operating conditions for all programs. Maintenance staff also helps with habitat management projects, such as invasive plant species control, haying and grazing programs, habitat restoration, and water level management.

Facilities

Well-maintained facilities help the staff effectively manage the units as well as provide safe, functional places for visitors to experience the refuge complex.

Fences

The maintenance staff repairs and replaces approximately 60 miles of the exterior and interior fences, which are 6–8 feet tall. This includes maintaining the electrified portions of the interior fence that is required to hold the bison herd for the length of the prescribed rotation based on habitat conditions. Maintenance of the exterior fence is critical to keep the bison from going outside the boundaries of the range onto private lands.

Water Developments

There are approximately 80 tanks on the Bison Range, associated with naturally occurring springs, that provide a year-round water source for the bison while protecting refuge resources. The maintenance staff use underground pipes and collection boxes to move the spring water to the watering tanks. The staff maintains and cleans the tanks, pipes, and collection boxes to provide the bison with an adequate supply of fresh, clean water.

Buildings

There are 10 buildings on the Bison Range including three staff homes, a bunkhouse, the visitor center and administrative office, a shop, and a barn for our horse herd. The visitor center and associated administrative office require a great deal of routine maintenance. More than 120,000 people pass through the visitor center annually. The maintenance staff addresses mechanical and structural issues in this facility. Other public use facilities, such as the day use area, also require seasonal maintenance such as mowing, cleaning the numerous restroom structures, picking up trash, and maintaining associated facilities.

Public Access

There are approximately 21 miles of interior roads throughout the refuge complex that are open to the public, at least seasonally. The most heavily used and popular road is the 19-mile Red Sleep Mountain Drive on the Bison Range traveled by approximately 100,000 vehicles annually. These public roads, some of which travel over steep terrain, must be maintained and graded periodically to make sure they are safe for the visiting public.

Other public areas, such as the Jocko fishing access, parking areas, including parking areas for hunting access on the WPAs, and observation pullouts and structures, require constant inspection and maintenance throughout the busy visitor season of spring through fall.

The Service maintains five nature trails on the refuge complex, two of which provide interpretation of resources.

Equipment

The maintenance staff maintains about 30 pieces of small equipment including trucks, cars, all-terrain vehicles, and trailers. The staff also maintains eight pieces of heavy equipment including tractors, motor graders, a front-end loader, a bulldozer, a dump truck, and a backhoe. To help us manage the wetlands, the staff maintains various water control structures.

STAFF

The refuge complex is funded for 11 permanent positions (figure 10); however, 2 of these permanent positions are currently vacant and the other two employees in the fish and wildlife biologist and maintenance worker positions were recruited as term appointments (lasting no more then 4 years):

- refuge manager
- deputy refuge manager
- supervisory wildlife biologist
- fish and wildlife biologist (term)
- range conservationist (vacant)
- supervisory outdoor recreation planner (vacant)
- law enforcement officer
- range technician
- engineering equipment operator
- 2 maintenance workers (one position is a term)

All these positions, including the two current terms, are included in the base budget for staff. We also use the money for a vacant WG–7 maintenance worker (permanent seasonal) position to keep the current GS–7 range technician and WG–7 term maintenance worker on longer into the year.

Up to six temporary seasonal employees help with the biological, visitor services, and maintenance programs. The employees range between a GS–3 and a GS–5 (biology and visitor services) or a WG–3 (maintenance). The number of temporary employees depends on the annual funding for refuge complex programs. Because of recent budget cuts, we have become more reliant on volunteers and other programs such as the Student Conservation Association, to staff the visitor center and assist with the biological program.

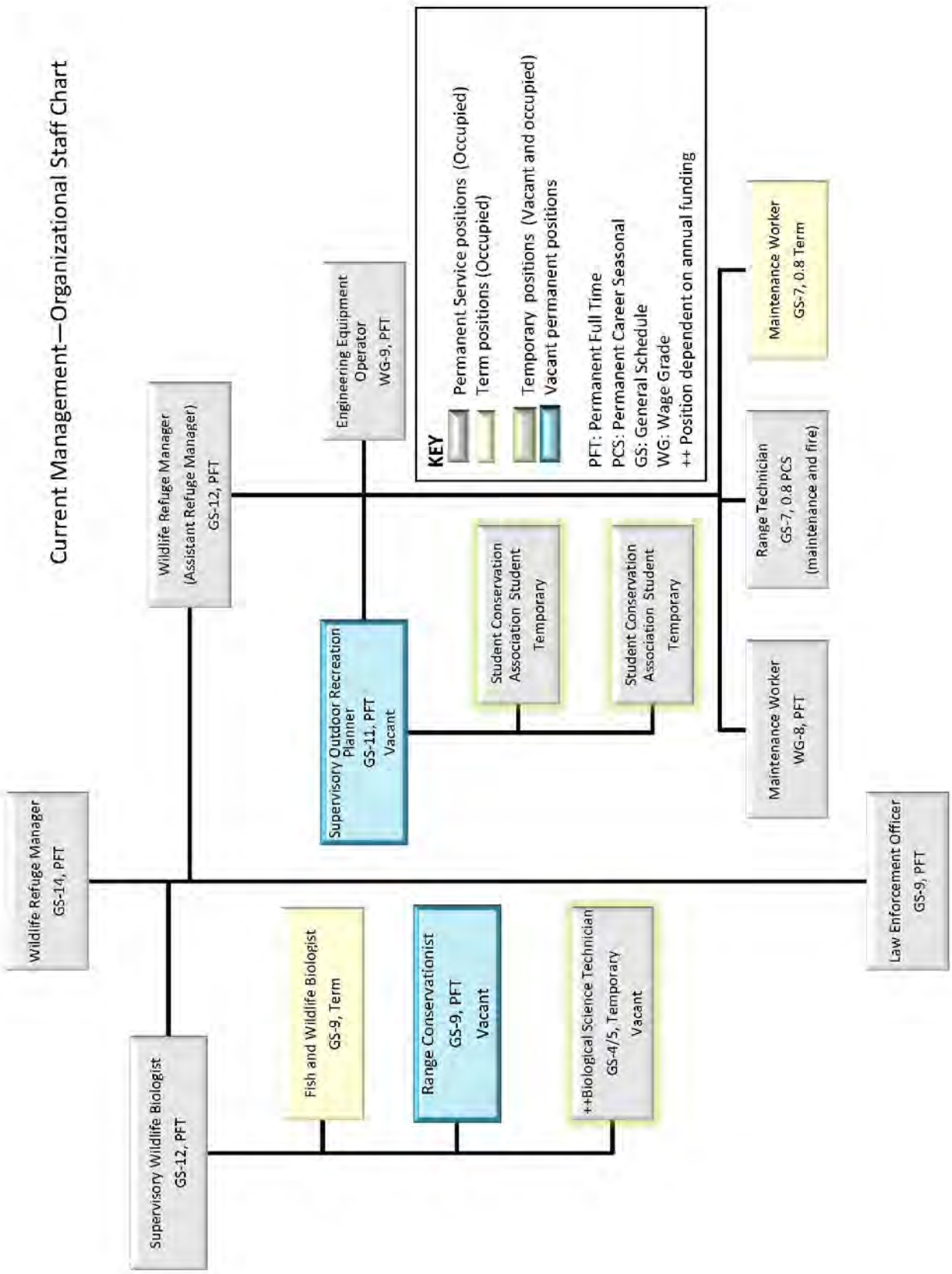

Figure 10. Current organizational staff chart.

Bison and Horse Herd Management

Our maintenance employees have bison handling responsibilities because they possess the necessary skill. Other employees help with the bison moves as their riding skills allow or progress.

The maintenance staff also feed and train the range's herd of 10–12 horses used in the bison management program. These employees select the animals, based on their knowledge of horses and the needs of the operation. They look for injuries or illnesses and conduct minor veterinary care. This ensures that the horses are treated humanely and are able to perform when needed to move the bison efficiently, while also providing for the safety of the riders and the horses.

6.10 Socioeconomics

This section describes the social and economic aspects that the alternatives may affect, as follows:

- population, demographics, and employment
- public use of the refuge complex
- baseline economic activity

The refuge complex has been part of the surrounding communities for more than 100 years. Most local community members have come to enjoy and appreciate the resources and public use activities available to them. Besides local and State residents, visitors come from all over the country and the world to visit the refuge complex and experience these iconic refuges. Several of the refuge complex units are located along a major State highway that is also the main road leading to Glacier National Park, 2 hours north. The National Bison Range, although located on a county road, is well identified by directional signage on the highway. The Bison Range is listed as one of the top ten tourist attractions in Montana by the Institute for Tourism and Recreation Research (Grau et al. 2012).

Attractions like the refuge complex brought almost 11 million visitors to the State in 2012, an increase of 9.1 percent from 2011. The most frequently cited activity was scenic driving. Nature photography and wildlife watching were the second and third most popular activities engaged in by 46 and 44 percent of vacationers, respectively. Most of the refuge complex is open to compatible public use, at least seasonally, and these recreational opportunities attract nonresident visitors who spend thousands of dollars in the local communities. Visitor spending brings an estimated 3 billion dollars into the State, contributing significantly to the local economies, including lodging, food, gas, and tourism industries (Grau et al. 2012).

Because Montana does not have a sales tax, the State and local tax receipts generated by nonresident travelers are generally lower than other States. However, Montana does have a statewide accommodations tax of 7 percent on overnight lodging. In addition, nonresident travelers contribute to the tax base through the payment of excise taxes on items such as gasoline and alcohol and by supporting industries that pay corporate taxes and whose workers' pay income, property, and other taxes (Grau et al. 2012).

POPULATION, DEMOGRAPHICS, AND EMPLOYMENT

The portions or units of the refuge complex affected by the alternatives are located in Lake and Sanders Counties. Sixty-two percent of these refuge complex lands are in Lake County; the remaining 38 percent are in Sanders County. The largest community in this area is Polson, Montana, which is the Lake County seat and has an estimated population of 4,500. The remaining communities in Lake County are Arlee, Big Arm, Charlo, Dayton, Dixon, Elmo, Pablo, Ravalli, Ronan, St. Ignatius, and Swan Lake. The communities in Sanders County are Thompson Falls, Dixon, Heron, Hot Springs, Lonepine, Noxon, Paradise, Plains, and Trout Creek, with the closest being Dixon, Hot Springs, and Plains. Thompson Falls is the county seat and has an estimated population of 1,300.

The largest communities within 100 miles of the refuge complex headquarters are Missoula, Montana (40 miles south) with an estimated population of 69,122 and Kalispell, Montana (90 miles north) with an approximate population of 21,000.

Lake County Population and Demographics

Lake County is Montana's ninth most populous county, with an estimated population in 2011 of 28,947. This number represents almost 3 percent of the State population, estimated at 997,667 (U.S. Census Bureau 2010). Between 1999 and 2009, the number of people living in Lake County increased by 9.7 percent, which was higher than the State average of 8.6 percent. In 2010, the population density for Lake County was 19.3 people per square mile, much higher than the State average of 6.8. Approximately 25 percent of Lake County's population lives within the incorporated communities of Polson, Ronan, and St. Ignatius. Between 2007 and 2011, the median household income in Lake County was $38,268, which is 16 percent below the State average. Approximately 68 percent of residents own their own homes. Future population projections for the study area and the State overall are expected to follow historical trends, increasing slowly.

In 2011, most of the residents in Lake County were under 18 years, estimated at 25.4 percent. Persons over 65 years of age represented 17.3 percent of the population. In 2011, 69.7 percent of the study area population was white persons and 22.4 percent were American Indians or Alaska Natives (CSKT 2013a).

Montana and Lake County Employment

The Montana and Lake County economies have changed significantly over the past 40 years. In 1970, half of Montana's workers were employed in the basic industries of farming and ranching, the Federal Government, forestry, manufacturing, mining, and tourism. By 1997, only one-quarter of Montana's workers were employed in these industries. In Lake County, farming and ranching are still major contributors to the economy along with local and tribal governments and services.

In 2012, the labor force in Lake County was estimated at 11,256. The unemployment rate was 8.5 percent, meaning 956 individuals were unemployed. The service sector employs more workers and produces more personal income than any other sector in Lake County. Services do not typically make a "product," but use knowledge to generate income. Some examples are medical care, auto repair, legal representation, and tourism. This sector now employs one out of every three workers in Lake County (Lake County [no date]). Some of the largest employers in the study area include CSKT, Jore

Corporation, St. Luke Community Healthcare, and the school districts. CSKT employs an average of 1,100 workers, including seasonal employees, in several tribal programs. An additional 250 employees work at the tribal college, S&K Technologies, and the KuaTaqNuk Resort (both owned by CSKT). Of these CSKT employees, approximately 75 percent are tribal members.

The Sanders and Lake County portions of the National Bison Range Complex employs 9 permanent, full-time Federal employees; 2 term full-time positions (not to exceed 4 years); and an average of 2–6 seasonal employees (working 6 months or less). Except for some of the seasonal employees, all the staff at the refuge complex are permanent residents in the surrounding communities (primarily Lake County), owning or renting homes and purchasing goods from local businesses.

Sanders County Population and Demographics

Sanders County is Montana's seventeenth most populous county, with an estimated population in 2011 of 11,440. This number represents almost 1 percent of the State population (U.S. Census Bureau 2010). Between 2000 and 2010, the number of individuals living in Sanders County increased by 11.6 percent, which was higher than the State average of 8.6 percent (CSKT 2013a). In 2010, the population density for Sanders County was 4.1 people per square mile, lower than the State average of 6.8. Between 2007 and 2011, the median household income in Sanders County was $38,268, which is 16 percent below the State average. Approximately 68 percent of residents own their own homes. Future population projections for the study area and the State overall are expected to follow historical trends, increasing slowly.

In 2011, most of the residents in Sanders County were over 65, estimated at 22.6 percent. Persons under 18 years of age represented 19.9 percent of the population. In 2011, 91.6 percent of the study area population were white, 4.4 percent were American Indians, and 4 percent were other ethnic groups, including 2 percent Hispanic (CSKT 2013a).

Sanders County Employment

In Sanders County, farming and ranching are still major contributors to the economy along with local and tribal governments and services.

In 2010, the labor force in Sanders County was estimated at 4,384, and the unemployment rate was 14.6 percent, meaning 642 individuals were unemployed. The average annual salary in 2010 was $26,855. Services such as education, health care, and social services account for most (21.6 percent) of the employment opportunities (City-Data.com 2013). The other major employment industries are agriculture, forestry, fishing and hunting, and mining (12.8 percent) and construction (11.0 percent).

The largest employers in the study area include Clark Fork Valley Hospital, Avista Corporation, Quinn's Hot Springs Resort, Thompson River Lumber, and schools, banks, and grocery stores.

Flathead Indian Reservation Population and Demographics

In 2010, 28,359 individuals lived within the boundaries of the Flathead Indian Reservation. Of this population, 65 percent were white, 24 percent were American Indians, and 13 percent were other ethnic groups. When compared with the other 10 reservations in Montana, the Flathead Indian Reservation has the largest population. Most of the non-Indian residents live on nontribal lands, which

make up 38 percent of the reservation. Since 1934, CSKT has been actively buying back much of the lands lost to the Tribes during the Allotment Era. Today, CSKT owns 62 percent of the reservation lands, either in fee title or through the Tribal Land Trust (CSKT 2013b).

PUBLIC USE OF THE REFUGE COMPLEX (LAKE AND SANDERS COUNTIES)

Wildlife observation, photography, and hiking account for 94 percent of visits to the refuge complex (FWS 2012b). Most wildlife observers visit in the spring, summer, and fall, when the greatest numbers of migratory birds inhabit the area and the full length of the Red Sleep Mountain Drive on the Bison Range is open.

Hunting accounts for less than 1 percent of visitation to the refuge complex. The only hunting permitted is on the waterfowl production areas for waterfowl and upland gamebirds, such as ducks and pheasants. Big game hunting and trapping is permitted, but the hunting and trapping regulations of the Flathead Indian Reservation only permit tribal members to harvest big game and trap within the boundaries of their reservation.

The only units that support a viable fishery are the Bison Range, the Ninepipe Refuge, the Pablo Refuge, and three waterfowl production areas. In 2012, approximately 11,350 visitor use days were dedicated to fishing these areas. Some of the units, like Ninepipe Refuge, are popular for fishing; nevertheless, this number only accounts for 6 percent of the annual visitation.

The refuge complex has a visitor center located in its headquarters. Approximately 120,000 visitors pass through this visitor center annually. Our supervisory outdoor recreation planner develops programs, designs displays, and conducts school programs and events. We recruit two to four seasonal employees to run the visitor center, interact with visitors, and help with programs. In addition, the visitor center has a bookstore, supported by the Glacier National Park Conservancy, that generates sales, a portion of which remains at the refuge complex for visitor services programs and facilities. This organization also collects donations for refuge operations, all of which are given to the refuge complex. The Service collects an entrance fee from all visitors during the summer season. These collected fees are used for visitor services programs and facilities on the refuge complex.

We do not allow camping on the refuge complex; however, there are several privately owned campgrounds, including recreational vehicle campgrounds, in the surrounding communities. There are also several motels, restaurants, and gift shops located near the refuge complex.

Visitation Levels

Annual visitation to the refuge complex is an estimated 203,500 visitor use days, according to our counts, and is most heavily concentrated during wildlife-viewing seasons, spring through fall. According to the Banking on Nature Report (Carver 2013), 83 percent of visitors are non-residents.

BASELINE ECONOMIC ACTIVITY

The refuge complex affects the economy through the resident and nonresident visitor spending it generates, the employment it supports, and the value it adds to surrounding property values.

The refuge complex employs nine full-time equivalent employees and 4–6 seasonal employees, with a payroll of $495,887, excluding benefits. Using the Bureau of Labor Statistics Consumer Expenditure Survey data for individuals in these income categories, roughly 79 percent of annual income is spent locally. Under this assumption, the refuge complex contributes $391,750 to the local economy in employee spending.

Visitors to the refuge complex, particularly nonresidents, contribute significantly to the State and local economy. It is estimated that nonresidents spend an average of $133.72 per day while residents who travel more than 50 miles spend $32.55 per day (personal communication, Kara Grau, Assistant Director of Economic Analysis, University of Montana, March 4, 2013). Based on these figures, it is estimated that visitors to the refuge complex contribute approximately 18 million dollars to the State and local tourism economy. These expenditures primarily include food, gas, transportation, souvenirs, lodging, and associated supplies.

In addition, the presence of these refuge units adds value to neighboring and surrounding landowners. The presence of natural areas like wildlife refuges near residential areas is a desirable trait for most buyers, particularly in Montana. The presence of the refuge complex adds value to the associated communities and private lands.