Wetland Conservation Strategy for the South Fork and Middle Fork Clearwater Subbasins, Idaho

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McComas Meadows, Restoration Opportunity wetland complex. Photo by C. Murphy.

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ABSTRACT

Wetlands of high ecological integrity and restoration opportunity were identified in the South Fork and Middle Fork Clearwater subbasins of north-central Idaho. Wetland habitat diversity, biodiversity significance, condition, and landscape context were assessed at two spatial scales to determine priorities for conservation and restoration. The landscape-scale assessment was conducted for all 40 twelve-digit hydrologic units in the study area. The sub-watershed assessment occurred at the wetland complex scale using a combination of spatial and field collected data. This was done in the mid-upper South Fork Clearwater subbasin and adjacent Middle Fork HUC 12s. We used spatial analysis of digitized National Wetlands Inventory maps to identify the 50 largest wetland complexes for assessment. Detailed field data was collected at 15 of the 50. Field work was conducted during summer 2006. Wetlands were surveyed to identify environmental conditions, wetland patterns, vegetation types, and potential functions. At both spatial scales, indicators of condition were evaluated by spatial analysis. The abiotic and biotic wetland features, habitat diversity, biodiversity significance, condition, and landscape context of 15 wetland complexes is described. Conservation strategies, restoration opportunities, and management recommendations were included for both the landscape and wetland complex scales. Results of this assessment can assist governmental and non-governmental entities involved in wetland planning, conservation, management, and restoration.

KEY WORDS

South Fork Clearwater subbasin, conservation prioritization, conservation strategy, ecological restoration, landscape assessment, land management, Middle Fork Clearwater subbasin, riparian, watershed assessment, wetland

SUGGESTED CITATION

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INTRODUCTION

Wetlands provide positive functions and values greatly disproportionate to the small land area they occupy in the Intermountain West. From 1780 to 1980, approximately 56% (156,200 ha [386,000 ac]) of Idaho's wetlands were lost to drainage, dredging, filling, leveling, flooding, and other anthropogenic alterations (Dahl 1990). The South Fork and Middle Fork Clearwater subbasins of north-central Idaho have experienced even greater wetland losses (Quigley et al. 1997; USDA Forest Service 1998, 2003; Northwest Power and Conservation Council 2003). The Interior Columbia Basin Ecosystem Management Program estimated a decrease in wetland area from 2-2.4% historically to 0.04% currently across all subbasins of the Clearwater River. The majority of wetland losses occurred in portions of the Lower and South Fork Clearwater subbasins on the Camas Prairie where land was drained for agriculture (Quigley et al. 1997, Northwest Power and Conservation Council 2003). Due to conservation efforts, the rate of wetland loss has decreased during the last 20 years (Dahl 2000, 2006).

Wetland functions and values are well recognized by ecologists and economists (Adamus et al. 1991, Brinson 1993, National Research Council 1995, Novitzki et al. 1996). Functions can be broadly grouped as hydrologic (e.g. surface and groundwater discharge, recharge, and storage), biogeochemical (e.g. food chain support; nutrient, toxicant, and sediment removal or transformation), and habitat. The South Fork and Middle Fork Clearwater subbasins support a diverse wetland types, from low elevation riverine forest, to montane meadows and marshes, to fens—all providing a broad array of functions (USDA Forest Service 1998, IDDWR 2004). While wetlands with high ecological integrity and function still exist, many remaining wetlands in the South and Middle Fork subbasins have been degraded by hydrologic alteration, pollution, land uses, and other impacts (Quigley et al. 1997; USDA Forest Service 1998, 2003; IDDEQ 2003; Northwest Power and Conservation Council 2003; IDDWR 2004). Values derived from wetland function, including those that can be assigned substantial monetary value, can be negatively affected by various impacts (National Research Council 1995, Novitzki et al. 1996). Values include: aesthetics; cultural, historical, and archeological; education and research; floodwater attenuation and storage; open space and recreation; sediment and shoreline stabilization; stream flow augmentation; wastewater treatment; water quality protection; and water supply.

Greater recognition of these benefits and functions of wetlands has led to strengthened wetland regulations, policies, and conservation (USFWS 1990, 1991). Disincentives for wetland drainage, agricultural conservation programs (e.g., the Wetland Reserve Program), land preservation and retirement programs, wetlands education, ecological research, governmental wetland management programs, impact mitigation (e.g., Northwest Power and Conservation Council's (NPCC) fish and wildlife program), and community involvement have all contributed to slowing wetlands loss (Dahl 2006). Additionally, active wetland restoration, creation, and enhancement have increased acreage of certain wetland types in recent years (Dahl 2006).

Despite progress, losses and degradation of wetlands continue. Threats to wetland functions and values can be broadly grouped under hydrologic alteration, water quality

impairment, habitat degradation, and alteration of watershed processes. Existing federal wetland protection laws and regulations are often limited in their ability to decrease these threats to specific wetland types (i.e., as determined by recent U. S. Supreme Court decisions). This has left isolated wetlands (including some fens and springs), vernal pools, and some created wetlands vulnerable (Tiner et al. 2002). Other non-jurisdictional wetlands, including some riparian areas and ephemerally moist camas (*Camassia quamash*) meadows, are degraded by certain land uses and improper management. In addition, land use planning at state and local levels is often inadequate in preventing wetland loss and degradation.

Certain land uses and improper management clearly cause direct and indirect effects on wetlands in the South Fork and Middle Fork Clearwater subbasins. These do not always result in wetland losses, but can cause shifts in wetland type and changes in function (sometimes increasing net wetland area for certain types, including open water ponds). Human-caused impacts to wetlands can be magnified by processes including mass earth movement, wildfire, extended drought, and climate change. The following are documented causes of wetlands impacts in the South and Middle Fork Clearwater subbasins (Quigley et al. 1997; USDA Forest Service 1998, 2003; IDDEQ 2003, 2006; Northwest Power and Conservation Council 2003; IDDWR 2004):

- accidental or intentional introduction of introduced species
- agricultural activities
- beaver (*Castor canadensis*) removal
- dam, dike, levee, diversion construction and maintenance
- discharge of biologic and chemical pollutants
- disposal of dredge spoils or other solid waste
- fire suppression
- flood control and shoreline erosion protection
- groundwater pumping
- livestock grazing
- mining in or near wetlands
- nutrient loading in effluent and runoff
- recreation access improvements
- residential, commercial, industrial development
- road and highway construction and maintenance
- sediment accumulation
- timber harvest

It has long been recognized that conservation and restoration planning can reduce wetland losses and degradation South Fork and Middle Fork Clearwater subbasins. Most plans have focused on aquatic and watershed integrity in the South Fork subbasin with limited attention given to terrestrial wetland characteristics. Assessments limited to a single scale or few indicators can yield inadequate or misleading conclusions (Bdour et al. 2001). To address this, the Idaho Department of Fish and Game (IDFG), Idaho Conservation Data Center (IDCDC), received wetland protection grant funding from the

Environmental Protection Agency (EPA) under Section 104 (b)(3) of the Clean Water Act. The goal of this project is to provide high quality information pertaining to wetland characteristics, condition, and function at multiple spatial scales in the South and Middle Fork Clearwater subbasins. The focus was on identifying wetlands of relatively high ecological integrity, and hence high conservation value. We also documented wetlands with on-going conservation or restoration management and high restoration opportunity. The purpose is to provide field-derived wetland information to entities involved in planning, conservation, and restoration. While this project is not a full functional assessment of wetlands, indicators for several functions were assessed. It was not a delineation of jurisdictional wetlands.

This study borrows from and complements numerous mid to broad-scale analyses and management plans addressing, in part, the biophysical characteristics and condition of aquatic and terrestrial wetland habitat within the South Fork and Middle Fork Clearwater subbasins. Landscape analyses related to ecosystem integrity (Quigley et al. 1997, Oechsli and Frissell 2003) and conservation planning (The Nature Conservancy 2000, Northwest Power and Conservation Council 2003) were valuable. Pertinent federal management plans (USDA Forest Service 2007a, 2007b) were also consulted. Several other state analyses of habitat conditions and species needs (including wetlands and wetland dependent species) were utilized. These include bird conservation and monitoring (Moulton et al. 2004) and a statewide conservation strategy for at-risk species with high conservation needs (IDFG 2005).

In the South Fork Clearwater subbasin, the long-term decline of anadromous fish populations and identification of obvious aquatic and riparian habitat degradation have resulted in numerous assessment, planning, and restoration efforts. Commonly recognized causes of degraded habitat were improper livestock grazing, road-related slope failure, fish migration barriers, and dredge and hydraulic mining. Assessments and plans include a complete subbasin review (USDA Forest Service 1998), a Red River watershed ecosystem analysis (USDA Forest Service 2003), a subbasin water quality assessment (IDDEQ 2003), a water quality improvement implementation plan (IDDEQ 2006), and a water resource protection plan (IDDWR 2004). Implementation of these plans has led to numerous aquatic and terrestrial wetland restoration projects in the South Fork subbasin during the last 25 years (Siddall 1992, Klein 2004). Few assessments, plans, or large-scale restoration projects have been completed in the Middle Fork subbasin. The Clearwater National Forest and Nez Perce Tribe have partnered to complete watershed restoration and road obliteration projects across the Clearwater and Lochsa subbasins. The Middle Fork Clearwater is specifically addressed in Clearwater National Forest Proposed Land Management Plan (USDA Forest Service 2007a) and Clearwater Subbasin Assessment (Northwest Power and Conservation Council 2003). The Nez Perce Tribe has inventoried wetlands on tribal lands, including a few parcels within area of this study.

Many of the above assessments and plans reach similar conclusions regarding the value of functioning wetlands for providing critical aquatic and terrestrial species habitat. They also describe similar threats to wetlands and generally concur that extant wetlands

are often in degraded condition. However, only this study and the Nez Perce Tribe's inventory (mostly on land outside our study area) have focused specifically on wetland quantity, type, and condition. The only mid to broad-scale analysis of wetlands that integrates information on wetland community richness, habitat diversity, rare species, biodiversity and recreation significance, threats, and condition is the "Idaho Wetland Conservation Prioritization Plan" (Hahn et al. 2005). This study builds upon Hahn et al. (2005). It increases our knowledge of wetland resources through field inventory and by using U. S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps to summarize the types and extent of wetlands.

At the sub-watershed scale, this study assessed the ecological significance of specific wetland sites by documenting ecological systems, plant associations, rare plant and animal occurrence data, and observations of wetland condition and landscape context. Such mid and fine-scale information is important for land management (Jankovsky-Jones 1996). For example, ecological systems and plant associations can be indicators of environmental or site attributes (i.e., hydrologic functions). They can also be used as a coarse filter for preservation of biodiversity and provide a reference baseline for planning and monitoring restoration (Jankovsky-Jones 1996). This information complements watershed and sub-watershed management plans for the South Fork and Middle Fork Clearwater study area related to habitat, ecological restoration (USDA Forest Service 1998, 2003), and water quality improvement (IDDEQ 2003, 2006a).

STUDY AREA

Environmental Setting

The study area included the South Fork Clearwater and Middle Fork Clearwater subbasins (Figure 1). From northwest to southeast in the study area, there is a transition from canyon and plateau to mountainous terrain. Relief is extreme environmental and climatic gradients strong (Figure 2). Hydrologic and geomorphic variation is also high. Four distinct hydrologic and geomorphic zones are identified: high elevation mountains, mid elevation rolling uplands, low elevation breaklands and canyons, and low elevation plateaus (USDA Forest Service 1998).

About 75% of the South Fork and 50% of the Middle Fork subbasins occur within the Idaho Batholith ecoregional section (Bailey 1980) (Figure 2). Mid to high elevation granitic or metamorphic mountains, interspersed with occasional broad alluvial valleys (such as at Elk City), characterize the landscape in this section. Slopes are highly dissected by drainages dropping through foothill breaks to the South and Middle Fork canyons. The westernmost 25% of the South Fork and northwestern 50% of the Middle Fork fall within the Palouse Prairie section (Figure 2). This section is characterized by basaltic plateaus (such as at Grangeville on the Camas Prairie) with drainages dropping through extremely steep breaklands into the deep and wide canyons of the lower South and Middle Fork. A small area in the northern portion of the Middle Fork subbasin is in the Bitterroot Mountains section (similar to the Idaho Batholith in this area). The lowest elevation in the study area is Kooskia (383 m [1,257 ft]), located in a 500 m (1,640 ft) deep canyon at the confluence of the South and Middle Fork. The highest elevation in

the Middle Fork subbasin is 2,015 m (6,613 ft) at Baldy Mountain on the Middle-South Fork divide. The highest elevation in the South Fork subbasin is 2,724 m (8,938 ft) at the summit of Buffalo Hump on the South Fork-Salmon divide. The following geologic, hydrologic, and climate information is summarized from Bond and Wood (1978), USDA Forest Service (1998), IDDEQ (2003), Northwest Power and Conservation Council (2003), IDDWR (2004), and Idaho State Climate Services (2007).

High Elevation Mountains

Located along the southern edge of the South Fork Clearwater subbasin in the Gospel Hump Wilderness and adjacent areas, this mountainous zone mostly occurs at elevations above 1,525 to 1,830 m (5,000 to 6,000 ft). The geologic substrate varies from Idaho batholith granitics to older schists (meta-sedimentary) (Figure 3). Steep, glacier-scoured cirques and glacial trough valleys supporting numerous lakes and sloped wetlands characterize this area. There is deep snow accumulation and prolonged snowmelt due to the cool climate. This causes creeks with headwaters in these areas (e.g., Mill, Johns, Tenmile, Twentymile Creeks, Crooked River) to have peak flows in June. Cold springs also sustain baseflows in streams. Stream channels are variable, ranging from steep and confined headwater streams in avalanche chutes to relatively flat, meandering channels found in U-shaped trough valleys. Lower gradient streams provide spawning and rearing habitat for anadromous fish in some locations. Soils vary from coarse-textured on slopes to fine-textured in valley bottoms, with occasional peat deposits.

Mid Elevation Rolling Uplands

Encompassing the majority of the South Fork Clearwater subbasin, including the South Fork-Middle Fork and the South Fork-Selway River divides, this zone occurs at elevations mostly between 1,220 and 1,830 m (4,000 and 6,000 ft). It includes the headwaters of the Red and American Rivers, important tributaries to the South Fork Clearwater River. Most of the higher elevations in the Middle Fork Clearwater subbasin are also in this zone. Metamorphic schists form the dominant geologic substrate, although gneisses and granitics also occur (Figure 3). Slopes vary but are generally moderate to steep. Schist bedrock easily erodes, making steep slopes susceptible to mass wasting. Snowmelt and cold springs support small fens and sustain baseflows. Stream channels range in size, from relatively steep, confined V-shaped valleys to lower gradient, unconfined alluvial valley bottoms. Higher gradient streams carry spring flood flows to lower gradient, large order streams (e.g., Red River) that historically moderated floods with overflow channels and wide floodplains. Lower elevation basins support extensive wet meadows. Streams in these meadows provide important spawning, over-wintering, and rearing habitat for anadromous fish. Soils are typically fine textured, loamy or sandy. These soils often contain volcanic ash.

Breaklands and Canyons

This zone occurs in both the South and Middle Fork subbasins. Steep slopes and deep river canyons characterize this zone at elevations below 1,220 m (4,000 ft). Breaklands form the transition between plateaus and rolling uplands. Slope gradients typically

range from 60 to 80%. The geologic substrate varies across the study area (Figure 3). In the lower canyons of the South and Middle Fork near Kooksia, Miocene age basalt forms canyon walls. Upstream, the South Fork cuts through a complex characterized by erosion resistant metamorphosed volcanic, granitic, and gneissic rocks. The canyon is narrow and steep-walled. The Middle Fork mostly cuts through less resistant schist, resulting in a wider canyon. Canyon bottoms are filled with talus, alluvial fans, and recent floodplain deposits. The hydrologic regime of breakland streams is complex, with a mix of snowmelt, rain-on-snow, and heavy rain resulting in early spring, or occasionally mid winter, peak runoff. Breakland channels are confined in narrow V-shaped valleys. Floods can be rapid, or "flashy," leading to mass wasting and debris torrents. Base flows are minimally sustained in some streams through late summer. In larger canyons, the hydrologic regime is driven by snowmelt that feeds larger river tributaries. Other than floodplains, wetland and riparian habitat is uncommon.

Plateaus

Occurring at elevations between 820 and 1,220 m (2,700 and 4,000 ft), this zone is characterized by gently rolling topography. Plateaus are represented on the Camas Prairie in the South Fork subbasin and in the Maggie Creek area of the Middle Fork subbasin. Plateaus are underlain by Columbia River basalt flows (Figure 3). Soils on plateaus are mostly deep silty loams formed primarily from loess and ash deposits. They are well-defined areas, abruptly ending at steep breakland slopes of canyons. The hydrologic regime is a mix of snowmelt, rain-on-snow, and heavy rain resulting in early spring, or occasionally, mid winter peak runoff. Headwaters with snow accumulation are most likely to sustain perennial streams. These streams historically supported some spawning and rearing habitat for anadromous fish. Most streams are intermittent with "flashy" flood flows. These easily erode silty soils and form gullies. Wetlands formerly occurred in broader valleys and swales.

Climate

In general, relatively mild and moist Pacific weather systems influence the climate across the study area. As elevations increase to the south and east, the climate becomes cooler and drier, tending toward continental Rocky Mountain conditions. Throughout the area, December and January are the coldest months and July and August the warmest. Annual precipitation and the amount of precipitation received as snow generally increases with elevation from west to east (Figure 4). High annual rainfall also occurs at low elevations in the Middle Fork Clearwater canyon. With the exceptions of the Camas Prairie and canyon at Kooskia where precipitation is highest in May, the wettest month is January. The average elevation of persistent snow accumulation is between 1,070 and 1,220 m (3,500 and 4,000 ft). This elevation is where most rain-on-snow precipitation events occur. At about 1,980 m (6,500 ft) elevation, the late April snowpack typically contains about 64-91 cm (25 to 36 inches) of snow water equivalent. Climate can be highly variable due to local weather patterns resulting from topographic variation (e.g., mountain rain-shadow effects).

High Elevation Mountains

More than 40% of the annual precipitation in high elevation mountains along the South Fork Clearwater-Salmon River divide falls as snow. Due to cooler climate conditions, snow melt extends into early July. Average annual precipitation ranges from 71-122 cm (28-48 inches). The closest weather station in this zone is Dixie, which represents the lower elevation extent at 1,712 m (5,618 ft). Average annual precipitation is 71 cm (28 inches), over half of which falls between November and March. Occasional summer thunderstorms occur. Annual snowfall averages 500 cm (197 inches) and average accumulation depth is 107 cm (42 inches) by February. Average high temperatures for December and January are below 0 C (32 F), with lows about -15 C (5 F) and an average winter minimum of -23 C (-10 F) or less. Average high temperature in July and August is 24 C (76 F) with an average summer maximum of 29 C (85 F). Frost occurs during the summer months with average lows in July of 3 C (37 F).

Mid Elevation Rolling Uplands

Average annual precipitation in this zone is between 24-56 inches inches, 30 to 40% of which falls as snow. The higher elevations of the Middle Fork-South Fork Clearwater divide are the wettest parts of the study area (40-56 inches of precipitation). Lower sites, represented by the weather station at Elk City Ranger Station (elevation 1,214 m [3,982 ft]), are warmer in the summer and receive less precipitation (76 cm [30 inches]). Elk City averages 325 cm (128 inches) of snow per year that accumulates to 46 cm (18 inches) depth by February. January is the wettest month, but there is a secondary precipitation peak in May and June due to convectional storms. Occasional summer thunderstorms also occur. Due to cold air drainage, winter temperatures are cold but not extreme, with average lows in December and January of -11 C (12 F) and average winter minimum of -21 C (-6 F). Average high temperatures in July and August are mild (27 C [81 F]) with the average summer maximum 33 C (91 F). Frost can occur during the summer with average lows in July of 5 C (41 F).

Breaklands and Canyons

Seasonal climate variation can be extreme and local variation high. Winter and spring are influenced by warm, moist maritime air masses resulting in rains, fog, and high humidity. In contrast, summer can be extremely hot and droughty. This zone is represented by two contrasting weather stations, one at Kooskia (at the confluence of the South and Middle Fork Clearwater Rivers) and Fenn Ranger Station (on the lower Selway River just upstream of the Middle Fork). Near Kooskia average annual precipitation is 51 to 61 cm (20 to 24 inches). However, over only 25 km upstream through the Middle Fork canyon and lower Selway, precipitation dramatically increases (91 to 102 cm [36 to 40 inches]). These low elevation canyons can be cool (but not extreme) in the winter due to cold air drainage and minimal solar radiation. Snowfall can be common in December and January, especially in the Middle Fork canyon upstream of Kooskia. Snow accumulation is minimal with 15 cm (6 inches) or less on the ground by February. At Kooskia, the wettest months are April through June. At Fenn the wettest months are November through January, but spring rainfall is abundant accounting for over 25% of the yearly total. July and August are relatively dry. Average

winter low temperatures in December and January are -6 to -3 C (21 to 26 F) and rarely dip below -18 C (0 F). Spring arrives in March when average high temperatures are 11 to 13 C (51 to 55 F). Average high temperatures in July and August are 32 C to 33 C (89 to 92 F) with an average summer maximum of 37 C (99 F) or more.

Plateaus

Like the breaklands and canyons, the winter and spring climate on the Camas Prairie is heavily influenced by warm, moist air masses from the Pacific. Extended rainy periods, fog, and high humidity are common. Overall temperatures are moderated by the maritime influence. This zone averages 51 to 71 cm (20 to 28 inches) of precipitation per year, nearly half of which falls as rain between March and June. At the Grangeville weather station, which averages 61 cm (24 inches) of annual precipitation, the months are April through June, although monthly precipitation is relatively consistent from September through March. With the exceptions of higher elevation buttes (e.g., Cottonwood Butte, 1,747 m [5,730 ft]) and areas of wind drift, snow only accumulates in very small amounts for short periods. Average winter low temperature is -6 C (22 F) with an average winter minimum of -18 C (0 F). Average summer high temperature is 28 C (82 F) with an average summer maximum of 33 C (91 F).

Vegetation and Land Status

High Elevation Mountains

Subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmannii*), and lodgepole pine (*Pinus contorta*) dominated extensive areas of Rocky Mountain subalpine forested ecological systems in this zone (Figures 5, 6). These ecological systems mixed with Northern Rocky Mountain montane mixed conifer forest (characterized by grand fir [*Abies grandis*], western larch [*Larix occidentalis*], and Douglas fir [*Pseudotsuga menziesii*]) at lower elevations. On higher elevation mountains and ridges, subalpine forests graded to whitebark pine (*Pinus albicaulis*) and subalpine fir parklands interspersed with dwarf shrublands or grasslands. Wet sedge (*Carex* spp.) meadows and small fens occurred at headwater springs and around lakes in high cirque basins (Figure 7). They extended through glacial trough bottoms, forming mosaics with riparian woodlands dominated by subalpine fir, Engelmann spruce, and Labrador tea (*Ledum glandulosum*) or willow (*Salix* spp.) shrublands. This zone was almost entirely managed by the Nez Perce NF and the majority was protected within the Gospel Hump Wilderness (Figures 8, 9). Water quality was usually not impaired. Due in part to the lack of surveys in wilderness and roadless areas, relatively few at-risk species are known from this zone (Figures 10, 11).

Mid Elevation Rolling Uplands

Grand fir, western larch, ponderosa pine (*Pinus ponderosa*), and Douglas fir dominated extensive Northern Rocky Mountain montane mixed conifer forest in this zone (Figures 5, 6). Ponderosa pine and Douglas fir dominated southerly aspects. Grand fir and Douglas fir, with locally abundant Pacific yew (*Taxus brevifolia*), dominated mesic sites in the South Fork Clearwater subbasin. Western redcedar and western white pine

(*Pinus monticola*) were commonly intermixed in the moister and warmer Middle Fork subbasin. Subalpine forest ecological systems occurred in mosaic with grand fir in cold air drainages and on high snowy ridges. Sitka alder (*Alnus viridis* ssp. *sinuata*) glades occurred on ridge top areas of deep snow accumulation. Small fens and wet meadows occurred on sloped springs at stream headwaters. Mixed conifer riparian woodland and mountain alder (*Alnus incana*) or willow-dominated shrublands formed narrow bands along streams. Wetland complexes formed in alluvial valleys and broad basins (e.g., McComas Meadows, American River, Elk City, Red River, etc.) (Figure 7). Historically, these wetlands supported extensive wet meadows dominated by sedges and tufted hairgrass (*Deschampsia caespitosa*). Seasonally moist, grass-dominated mesic meadows ringed wetter meadows.

Large areas of meadow and riparian habitat have altered hydrology and degraded function. Hydraulic and dredge mining between 1861 and 1960 was the most significant negative impact to aquatic and riparian integrity (USDA Forest Service 1998). Impacts from mining are still widespread. Meadows have been converted to non-native grass species for livestock pasture and hay production around ranches. Small quaking aspen (*Populus tremuloides*) groves occasionally formed around meadow margins. With the exception of private and BLM-managed land around Elk City (population 550), private land along Red River, and sections of Idaho endowment land, this zone is managed by the Nez Perce NF. The primary land use is for wood production, although residential, recreation, and livestock grazing were also common (Figures 8, 9). Water quality was impaired by excessive sediment and/or temperatures. Protected areas included the Upper Newsome Creek Research Natural Area (RNA) and the Red River Wildlife Management Area (WMA) managed by IDFG. Due to surveys in Nez Perce-managed forest areas, numerous at-risk species are known from this zone (Figures 10, 11).

Breaklands and Canyons

On the hot and dry canyon slopes near Kooskia (population 670), and extending up the lower South Fork Clearwater, ponderosa pine savannah in mosaic with bluebunch wheatgrass (*Pseudoroegneria spicata*)-Idaho fescue (*Festuca idahoensis*) canyon grassland historically dominated (Figures 5, 6). Deciduous shrublands occurred in ravines, on talus, and some canyon slopes. Many of these sites have converted to grass and forb vegetation dominated by invasive non-native annual bromes (*Bromus tectorum*, *B. japonicus*), noxious weeds such as yellow starthistle (*Centaurea solstitialis*), introduced shrubs (e.g., sweetbriar rose [*Rosa eglanteria*]), and fruit trees. Columbia Basin riparian woodland and shrubland occurred in floodplains and on adjacent wide alluvial bars of the lower South and Middle Fork Clearwater Rivers (Figure 7). Coyote willow (*Salix exigua*) bars, black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) and ponderosa pine groves, and black hawthorn (*Crataegus douglasii*) patches were characteristic. Further up the South Fork canyon, ponderosa pine and Douglas fir woodland dominated southerly aspects while mixed conifer forests of grand fir, western larch, ponderosa pine, Douglas fir dominated northerly aspects. Mesic deciduous shrubland is also common. These forest and shrub species, combined with paper (*Betula papyrifera*) and water birch (*Betula occidentalis*), also formed extensive riparian woodlands. The floodplain was constrained by the narrow canyon.

In the Middle Fork Clearwater canyon, the main ecological system was Northern Rocky Mountain lower montane riparian woodland and shrubland. Grand fir and western redcedar (*Thuja plicata*), characteristic of mesic mixed conifer forest, dominated both lower canyon slopes and riparian areas. Western larch, western white pine, Douglas fir, and Pacific yew were intermixed. Dusky (*Salix melanopsis*) and other willow species dominated extensive alluvial cobble bars in the wide riverine floodplain. Land along the lower South and Middle Fork Clearwater Rivers was privately owned and managed for residential, livestock grazing, or dryland agriculture uses (Figures 8, 9). Water quality was impaired by excessive sediment and/or temperatures. Land along the South Fork Clearwater east of Grangeville was managed by the Nez Perce NF mainly for recreation and habitat. Clearwater NF land along the Middle Fork east of Kooskia was also managed for recreation and habitat. This reach was federally protected as a Recreation River under the Wild and Scenic Rivers Act. Surveys in National Forest-managed sections have documented numerous at-risk species in this zone (Figures 10, 11).

Plateaus

Historically, bluebunch wheatgrass and Idaho fescue dominated Columbia Basin Palouse prairie steppe and grassland on the Camas Prairie and adjacent plateaus above the lower Middle Fork Clearwater canyon (Figures 5, 6). On the Camas Prairie, deciduous shrublands of common snowberry (*Symphoricarpos albus*), Wood's rose (*Rosa woodsii*), or other species, with occasional ponderosa pine or Douglas fir groves, occurred on northerly aspects of hills and in draws. Mixed conifer forest dominated most of the higher plateau zone in the Middle Fork subbasin. Ephermerally moist mesic and wet meadows were once common in swales and valleys where camas, other forbs, and graminoid species proliferated (Figure 7). Black cottonwood, black hawthorn, and other shrubs dominated narrow stringers of Columbia Basin riparian woodland and shrubland. With the exception of Nez Perce Tribe lands and a few small parcels of state and BLM land, this zone was almost entirely privately owned (Figure 8). Nearly all the former prairie and wetland meadow habitats have been converted to cultivated cropland, primarily for grain, legume, hay, and pasture production (Figure 9). The towns of Cottonwood (population 1,050) and Grangeville (population 3,200) have impacted wetlands and riparian areas in this zone. Water quality was impaired by excessive sediment and/or temperatures. Riparian habitats were degraded and invaded by reed canarygrass. Although reduced in extent, shrubland and woodland persisted in some areas. Camas meadows only remained in areas of shallow soil unsuitable for crop production. Due to the lack of surveys on private land, relatively few at-risk species are known from this zone (Figures 10, 11).

METHODS

Wetland Assessment

We used the USFWS wetland definition in this study:

> Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

> . . . wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes, (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year. (Cowardin et al. 1979)

The USFWS definition is broad enough to include jurisdictional wetlands and a range of important habitats including aquatic ecosystems, floodplains and most riparian areas, marshes, peatlands, springs, swamps, most vernal pools and isolated wetlands, and wet meadows and pastures. This definition does not include some ephemeral or isolated wetland types, such as mesic meadows, intermittent streams, playas, seeps, and drier riparian areas. We chose to include these transitional areas because of their importance as habitat linkages between wetlands and uplands (Tiner et al. 2002).

Coarse Filter Assessment

We used a coarse filter analysis to identify wetlands for field survey. Potential wetland complexes for survey were identified by GIS analysis of topographic, NWI, ecological system, hydrologic, land use and cover, and other layers. Ecological systems represent recurring groups of biological communities found in similar physical environments which are influenced by similar dynamic ecological processes, such as fire or flooding (NatureServe 2004). Maps of ecological systems are useful for mid-scale analyses and conservation planning (IDFG 2005) (Figure 6). Digitized NWI maps were available for the Nez Perce National Forest portion of the South Fork Clearwater subbasin (Figure 7). Based on initial map inspection, it was clear that thousands of small wetlands were scattered across the study area and only a small portion could be visited. We decided to focus survey efforts on larger complexes of mapped wetlands in the mid to upper South Fork subbasin and smaller wetlands in the remainder of the study area (i.e., the Middle Fork Clearwater subbasin and Camas Prairie). While smaller wetland complexes and isolated wetlands are functionally important (especially as amphibian habitat; Monello and Wright 1999, Davis and Verrell 2005), we assumed larger wetland complexes had a higher likelihood of having intact functions and landscape connectivity necessary for supporting native biodiversity (i.e., Pilliod et. al 2002, Hruby 2004).

We also reviewed the Idaho Wetland Information System (IWIS) (Hahn et al. 2005) and queried IDCDC conservation site (IDCDC 2007) and at-risk species databases (IDFG 2007) (Figures 10, 11). The IWIS is a comprehensive relational database that contained statewide information on wetland classification, size, ownership, potential partners for conservation, recreation value, unique features, potential threats, and public access (Hahn et al. 2005). Conservation sites represented a variety of ecosystems with intact ecological processes, exemplary native plant communities, unique geology, or important habitat for species (e.g. Important Bird Areas). Each site record contained information pertaining to location, biological significance, ecological processes and functions, ecological condition and integrity, conservation status, and stewardship. The at-risk species database (IDFG 2006) was also queried to identify wetlands supporting high concentrations of species of concern. We also consulted with land managers, biologists, and governmental and non-governmental individuals knowledgeable of

wetlands in the study area. Input was sought on the condition and biological significance of known wetlands as well as suggestions for surveys.

Fine Filter Assessment

We then conducted fine-filter field assessments of wetlands identified in the coarse assessment. Field work was conducted during summer 2006. Wetlands were surveyed to identify general environmental conditions, wetland patterns, and major vegetation types. At larger wetland complexes, we used the eastern Washington rating system for evaluating potential wetland function (Hruby 2004). Site level information, including restoration opportunities, was recorded. Wetlands with indicators of severe degradation or conversion to non-wetlands (e.g., extensive noxious weed invasion, conversion of vegetation to hay or irrigated farmland, concentrated livestock pasturing, development, hydrologic alteration, etc.) were considered non-functioning and restorable only with extraordinary efforts. These sites were less thoroughly surveyed.

At intact wetlands, we sampled vegetation types representing the mosaic of wetland habitats. We collected composition, structure, environmental setting (i.e., hydrology, geomorphology, etc.) data, key processes, and condition. Relatively homogeneous vegetation was sampled by estimating species cover in 50 to 100 m^2 plots. Stand-level observations were used to document vegetation types where composition and structure was well known, when time was limited, and in perturbed areas. Methods followed Bourgeron et al. (1992) and IDCDC (2006). Plots and observations were then classified to plant association and ecological system. We used existing classifications applicable in north-central Idaho to determine associations (Asherin and Orme 1978; Cooper et al. 1991; Lichthardt 1992; Hansen et al. 1995; Kerr 2000; Pierce and Jensen 2002; Crawford 2003; Christy 2004; Cooper and Jones 2004; Crowe et al. 2004; Hayes 2004; Kovalchick and Clausnitzer 2004; Wells 2006; NatureServe 2004, 2007). At-risk plant or animal species observed during assessments were recorded.

Conservation Prioritization

Indicators of wetland habitat diversity, biodiversity significance, condition, and landscape context were assessed at both the landscape and wetland complex scale to determine priorities for conservation and restoration (Bdour et al. 2001). At both spatial scales, indicators were evaluated by spatial analysis, supplemented by field observation at sampled wetland complexes. The set of indicators chosen are commonly used in wetland assessment methodology (Table 1) (Hruby 2004, Hahn et al. 2005, IDCDC 2006). We determined the relative conservation priority of watersheds and wetland complexes by summing the scores for all applicable indicators. Scoring was designed to give roughly equal weight to the combined habitat diversity and biodiversity significance values as the combined condition and landscape context values.

Landscape scale

The mid to broad-scale (landscape) assessment was conducted for all 40 6^{th} level, 12-digit hydrologic units (HUC 12) (Seaber et al. 1987) in the study area. Existing spatial data from a variety of sources (IDCDC 2007, IDDEQ 2007, IDFG 2007, IDDWR 2007)

was used. Values for 11 different indicators were scored. Habitat diversity in each HUC 12 was assessed by spatially analyzing the richness of wetland ecological systems. The distribution and abundance of at-risk wetland-dependent species and sensitive, irreplaceable (i.e., peatlands), or functionally important wetlands (i.e., beaver complexes, marshes, springs, black cottonwood bottomland forests) were analyzed for determining landscape patterns of biodiversity significance and rarity. Similarly, distribution and abundance of hydrologic alterations (e.g. dams and diversions, mine sites), water quality impairments, land use classes, livestock grazing, and road density were assessed to determine ecological condition and integrity. Methods are analogous to those used in USDA Forest Service (1998), and Oechsli and Frissell (2003).

We used the results to identify high priority HUC 12s to target for conservation and restoration. This was the only method used for prioritization on the Camas Prairie and in the majority of Middle Fork Clearwater subbasin watersheds. HUC 12s in poor to fair ecological condition (i.e., those with condition totals less than 10) were categorized as Restoration Opportunity HUC 12s. For HUC 12s with condition totals 10 or greater, those scoring 40 or more were ranked as High Priority, 30 to 39 as Medium Priority, and less than 30 as Low Priority. Restoration Opportunity HUC 12s represent watersheds suitable for wetland restoration.

Sub-watershed Scale

The sub-watershed assessment occurred at the wetland complex scale using a combination of spatial and field collected data. This was done in the mid-upper South Fork Clearwater subbasin and adjacent Middle Fork HUC 12s where digitized NWI maps were available. We used spatial analysis to identify wetland complexes from NWI maps by first buffering all mapped polygons and lines by 100 m. The 100 m buffer is the minimum necessary to maintain ecological processes linking wetland and upland habitats (Hruby 2004). Buffered wetland polygons allowed for merging of closely occurring small wetlands into larger wetland complexes that had hydrological and/or habitat connectivity. We then identified the 50 largest wetland complexes for assessment. Detailed field data was collected at 15 of the 50.

Values for 18 different indicators of habitat diversity, biodiversity significance, condition, and landscape context were scored as for HUC 12s. We assigned each wetland complex to a category of relative conservation priority similar to Jankovsky-Jones (1996), Hruby (2004), and IDCDC (2006). Class I wetlands were the highest scoring and highest priority. These wetlands often support unique or rare types; are sensitive to disturbance; are relatively undisturbed; are often impossible to replace within a human lifetime; and provide high levels of functions. Class II, Reference, and Habitat wetlands, in decreasing priority, have less of these characteristics. Complexes in poor to fair ecological condition (i.e., those with condition totals of 13 or less) were categorized as Restoration Opportunity wetlands. For wetland complexes with condition totals 14 or greater, those scoring 45 or more were ranked as Class I, 39 to 44 as Class II, 31 to 38 as Reference, and 30 or less as Habitat sites. In addition, the potential and opportunity of wetland complexes to provide beneficial water quality, hydrologic, and habitat functions was assessed in the field using methods in Hruby (2004).

Conservation Prioritization Scoring

Habitat diversity and richness: For each wetland complex we tallied the number of NWI classes and plant associations present. For both, we scored 1-2 = 1; 3-4 = 2; >4 = 3. We also tallied the number of wetland or riparian ecological systems in each HUC 12 and wetland complex.

Biodiversity significance and rarity: For each HUC 12 and wetland complex, we tallied the number of at-risk animals that use wetlands, at-risk wetland plants, and globally rare (G1-G3) wetland plant associations (NatureServe 2007). We also tallied each type of highly sensitive and/or irreplaceable, or functionally very important wetland present. We scored 0 = 0; 1 = 2; and $\geq$2 = 4.

Condition, Quality, and Integrity: For each HUC 12 and wetland complex, the presence or absence of livestock grazing was also evaluated. Presence was scored 0 and absence 1. The total number of hydrologic alterations (indicated by dams) was tallied. We scored $\geq$3 dams = 0; 2 = 1; 1 = 2; and 0 = 3. The total number of mine sites was tallied. We scored $\geq$3 = 0; 2 = 1; 1 = 2; and 0 = 3. We summed the number of unique water quality impairments and scored $\geq$3 = 0; 2 = 1; 1 = 2; and 0 = 3. We calculated the percentage of land area in agricultural land use class. For agriculture, we scored >10% = 0; 10%$\geq$n$\geq$5% = 1; 5%>n>0 = 2; and 0 = 3. We also calculated the total length of roads per area (multiplied by 1,000) and scored >1.5 = 0; 1.5$\geq$n$\geq$1.0 = 1; 1.0>n>0.5 = 2; and 0-0.5 = 3. At the wetland complex scale only, we calculated the mean percent cover of introduced plant species in wetland vegetation samples. We scored >15.0% = 0; 15.0%$\geq$n$\geq$10.0% = 1; 10.0%>n>5.0% = 2; and $\leq$5.0% = 3. For wetland complexes not visited, the score was estimated based on conditions observed in the HUC 12.

Landscape context and viability: We evaluated these indicators only at the wetland complex scale. The presence or absence of agricultural land use, dams, mines, and roads upstream of the wetland complex in the same HUC 12 was determined. For each, presence = 0 and absence = 1.

RESULTS

Landscape Scale

Across the study area, 3 HUC 12s were ranked as High priority for conservation, 10 Medium, 12 Low, and 15 Restoration Opportunity (Table 2). HUC 12 condition data and scoring is in Table 2. Habitat diversity and biodiversity significance data for all 40 HUC 12s is in Table 3. Nineteen HUC 12s were surveyed during field work in 2006. Wetland data was available from IDCDC databases for 5 additional HUC 12s not visited in 2006.

Camas Prairie

Nearly total conversion to agricultural land characterized HUC 12s on the Camas Prairie. They often had high road density, impaired water quality, abundant introduced species (especially Canada thistle [*Cirsium arvense*]), and low wetland habitat diversity

(Table 2). Of the 9 HUC 12s in this geographic area, 3 were ranked as Low priority for conservation and 6 as Restoration Opportunity (Table 2, Figure 12). Four of the Restoration Opportunity HUC 12s (South Fork Clearwater River-Rabbit Creek, Threemile Creek, South Fork Cottonwood Creek, and Butcher Creek) had higher total rank scores than the Low priority HUC 12s. Although their ecological condition was poor, these HUC 12s scored relatively high for habitat diversity and biodiversity significance (Tables 2, 3). Threemile Creek was impacted by urban and rural housing development around Grangeville. Upper Cottonwood Creek was impacted by the town of Cottonwood and adjacent rural houses. Both Stockney Creek and Red Rock Creek HUC 12s had relatively low scores for condition, habitat diversity, and biodiversity significance. Lower Cottonwood had the best condition of any HUC 12 on the Camas Prairie, with low road density and better water quality. Water quality was better in the Low priority HUC 12s than in Restoration Opportunity HUC 12s. Canyons and riverine habitat in the South Fork Clearwater River-Rabbit Creek HUC 12 supported the most at-risk animal and plant species of any HUC 12 on the Camas Prairie. The town of Kooskia and rural houses upstream to Stites, impacted the lower portion of this HUC 12.

The Columbia Basin Foothill Riparian Woodland and Shrubland ecological system was well-represented in Camas Prairie HUC 12s (Table 3). Black cottonwood and black hawthorn plant associations characterized this system. The system is important habitat for mountain quail (historically observed from 2 HUC 12s) and songbirds. This and other ecological systems were degraded due to current and past land uses (e.g., agricultural clearing, introduced species invasion, livestock grazing, and roads). Three wetland restoration sites were surveyed in 2006. The Rylaarsdam project, on Threemile Creek (Threemile HUC 12), restored 850 m of streambanks. Riparian woodland and shrubland were restored by planting native shrubs (e.g., black hawthorn, mountain alder, red-osier dogwood [*Cornus sericea*], yellow willow [*Salix lutea*]) and trees (e.g., quaking aspen, ponderosa pine) (http://www.pcei.org/water/restoration.htm). The Mennet Wildlife Habitat Incentives Program project and Wilkins Conservation Reserve Enhancement Program project (in the Threemile Creek and South Fork Cottonwood Creek HUC 12s, respectively) restored aquatic bed and emergent marsh habitat, a rare system in the landscape. The Mennet site consisted of 3 interconnected cells, covering about 4 ha. Broadleaf cattail (*Typha latifolia*), softstem bulrush (*Schoenoplectus tabernaemontani*), and common spikerush (*Eleocharis palustris*) dominated these emergent wetlands. Northern water plantain (*Alisma triviale*) and narrowleaf burreed (*Sparganium angustifolium*) dominated shallow open water areas. The Wilkins site consisted of several shallow ponds ringed by broadleaf cattail and common spikerush.

Middle Fork Clearwater Subbasin

HUC 12s in the Middle Fork Clearwater subbasin had relatively high habitat diversity and supported numerous at-risk species and globally rare plant associations (Table 2). Ecological condition varied, mainly due to differences in road density. Introduced species invasion was also commonly observed, especially in lower stream reaches. Of the 6 HUC 12s in the Middle Fork subbasin, 1 was ranked High priority for conservation (Middle Fork Clearwater River-Big Smith Creek), 2 Medium (South Fork Clear Creek and Maggie Creek), 2 Low (Lower Clear Creek and Upper Clear Creek), and 1

Restoration Opportunity (Middle Fork Clearwater River-Sutler Creek) (Table 2, Figure 13). The Middle Fork Clearwater River-Big Smith Creek HUC 12, with its low-elevation, mild and moist maritime-influenced climate, had high habitat diversity. It supported 5 at-risk plant species, 5 globally rare plant associations, and 11 known at-risk wildlife species (Table 3). Maggie Creek, Lower Clear Creek, and Middle Fork Clearwater River-Sutler Creek HUC 12s had the lowest condition totals, having 30, 60, and 70% agricultural land use, respectively, and relatively high road density. Water quality information was not available for most HUC 12s. Based on observed watershed conditions, a water quality assessment would likely identify impairments in most HUC 12s. If water quality impairments were documented, Maggie Creek and Lower Clear Creek would be better ranked as Restoration Opportunity HUC 12s.

The low elevation canyons of the Middle Fork Clearwater and its tributaries supported diverse habitats important for many wetland-dependent species (Tables 2, 3). In addition, the Middle Fork was fed by numerous low-order, moderate to high gradient creeks some dropping about 1,000 m in elevation from their headwaters. Land uses (e.g., agricultural, recreational, residential, and ranch developments; roads and U. S. Highway 12 in valley bottoms; rip-rap on river shorelines; livestock grazing; logging) negatively impacted HUC 12s, especially Middle Fork Clearwater River-Sutler Creek. The hydrologic regime of the Middle Fork Clearwater River was, however, mostly unaltered and riverine floodplain habitat still extensive. The potential and opportunity of the Middle Fork for improving water quality and reducing flooding and erosion originating in tributary streams is high.

Throughout the study area, the Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland ecological system was only well-represented in the Middle Fork subbasin (Table 3). Globally rare floodplain plant associations dominated by black cottonwood, mature to old growth western redcedar, herbaceous species (creeping spikerush, Indianhemp [*Apocynum cannabinum*], lakeshore sedge [*Carex lenticularis*], large boykinia [*Boykinia major*], reed canarygrass [*Phalaris arundinacea*]), and willows distinguished this system. It was characteristic along the Middle Fork Clearwater River and its lower elevation tributaries in the Middle Fork Clearwater River-Big Smith Creek HUC 12. This system supported numerous rare plant species and excellent habitat for at-risk amphibians, gastropods, birds, and native fish. The Columbia Basin Foothill Riparian Woodland and Shrubland ecological system was also common in the Middle Fork subbasin. It was well-represented on canyon floodplains of the Middle Fork near Kooskia and along larger streams in the Lower Clear Creek, Maggie Creek, and Middle Fork Clearwater River-Sutler Creek HUC 12s. Black cottonwood (with black hawthorn and common snowberry) and herbaceous (creeping spikerush, Indianhemp, reed canarygrass) plant associations characterized this system. Along headwater streams on plateaus in the Maggie Creek and Middle Fork Clearwater River-Sutler Creek HUC 12s the black hawthorn/common snowberry plant association characterized this system. These scrub-shrub wetlands were interspersed with occasional marshes (i.e., broadleaf cattail in farm ponds), springs with fowl mannagrass (*Glyceria striata*) and bigleaf sedge (*Carex amplifolia*), small meadows of water sedge (*Carex aquatilis*), and timothy (*Phleum pretense*) pasture.

The South Fork Clear Creek HUC 12 had the highest ecological condition, mainly because it encompassed a roadless area and had low road density (Tables 2, 3). Two large wetland complexes were present, both in the headwaters. The Kay Creek wetland complex (Reference priority) was surveyed in 2006. The South Fork Clear Creek - Confluence West and South Fork (Habitat priority) was not surveyed. Wetlands in this HUC 12 included riparian and spring-fed wetlands in narrow to broad, flat bottomed, low gradient alluvial valleys. These areas supported patches of the Rocky Mountain Subalpine-Montane Riparian Woodland ecological system. Seeps emanated from toeslopes, supporting Rocky Mountain Subalpine-Montane Riparian Shrubland with interspersed herbaceous wetlands. Forested wetlands provided habitat for evergreen kittentail (*Synthyris platycarpa*) a regionally endemic rare plant. Wetlands occurred in a matrix of the Northern Rocky Mountain Western Hemlock-Western Red-cedar Forest ecological system. Clearcut logging and roads impacted integrity. Introduced weeds and native early seral species were common in areas disturbed by cattle and/or elk herds. Similar ecological systems occurred in the Upper Clear Creek HUC 12 which included the Upper Clear Creek - Browns Springs Creek (Habitat priority).

South Fork Clearwater Subbasin

Of the 25 HUC 12s in the South Fork Clearwater subbasin (other than those on the Camas Prairie), 2 were ranked High priority for conservation (Upper American River, Meadow Creek), 8 Medium, 7 Low, and 8 Restoration Opportunity (Table 2; Figure 14). The ecological condition of HUC 12s generally increased with elevation. Headwater HUC 12s often had the highest ecological condition scores. Most HUC 12s with the highest ecological condition ranks were in roadless (or nearly roadless) areas (e.g., East Fork American River, Gospel Creek, and Upper Johns Creek) (Table 2). Other HUC 12s in good to excellent ecological condition had some roads but relatively few other impacts (e.g., Lower Johns Creek, Silver Creek, South Fork Red River, Twentymile Creek, and Upper American River). In contrast, HUC 12s with the highest habitat diversity and biodiversity significance were located in mid-elevation, broad alluvial valleys that supported the largest wetland complexes in the study area (Meadow Creek, South Fork Clearwater River-Grouse Creek, Upper American River, and Upper Red River). Other than Upper American River (in good condition), these HUC 12s were in only fair ecological condition.

HUC 12s with extensive areas (10 to 20% of the HUC 12) of hay production were Middle Red River and Elk Creek, respectively. These and several other HUC 12s (including Meadow Creek, at McComas Meadows; South Fork Clearwater River-Grouse Creek, at Earthquake Meadows; Upper American River; and Upper Red River) had historic and/or current ranches where wet meadows have been converted (wholly or partially) to seeded grasses for livestock forage. In contrast to ranching, which characterized land use in broad alluvial valleys, hydraulic and dredge mining was more often associated with narrower valleys. HUC 12s with historical mining (hydraulic, dredge, etc.) were Elk Creek, Lower American River, Lower Crooked River, Lower Newsome Creek, Lower Red River, Middle Red River, South Fork Clearwater River-Leggett Creek, Upper American River, Upper Crooked River, and Upper Newsome Creek. Several HUC 12s with both mining and ranching activities also had high road

densities. HUC 12s with high road density, often an indicator of high logging intensity in the watershed, were Lower Red River, Meadow Creek, South Fork Clearwater River-Grouse Creek, South Fork Clearwater River-Peasley Creek, and Upper Newsome Creek. Elk Creek and Lower American River were also impacted by home development around Elk City. Recent and past home construction at the margins of wet meadows was observed in the Elk Creek, Middle Red River, and Upper Red River HUC 12s.

Several HUC 12s in the South Fork subbasin had been affected by recent wildfires. Impacts to wetlands from fire or suppression activities were either not noticeable or unknown. The total percentage area of HUC 12s burned during the last 20 years was low. In summer 2007, the Rattlesnake Complex wildfire burned the southwest edge of the Upper Crooked River HUC 12, affecting a small portion of the East Fork Crooked River Headwaters wetland complex. About 2,400 ha in the western portion of this HUC 12 burnt in 1945. In late summer 2006, the Meadow Creek wildfire burned the southeast edge of the Upper Red River HUC 12. The China Ten wildfire (approximately 600 ha) burned the divide between the Meadow Creek, Silver Creek, and South Fork Clearwater River-Peasley Creek HUC 12s in 2005. It affected a small portion of the Silver Creek - China Point Sloped Wetlands complex. The main potential impact to fen, meadow, and forested wetlands in these headwater wetland complexes would be decreased tree cover and increased dominance by low shrubs and herbaceous species. Post fire erosion would likely be low in wetlands with organic soils.

In 2005, the Blackerby wildfire (approximately 2,500-ha) burned canyon slopes at the border of the South Fork Clearwater River-Lightning Creek and South Fork Clearwater River-Grouse Creek HUC 12s. It affected a 1.8-km portion at the upstream end of the South Fork Clearwater River - Mile 18 to Farrens Creek wetland complex. This area burnt several times between the 1940's and 1980's. Upstream of this area, about 900 ha of canyon slope in the South Fork Clearwater River-Peasley Creek HUC 12 (adjacent to the South Fork Clearwater River - Blue Ridge to Mile 40.5 wetland complex) burnt in 1973. The main potential impact to riverine wetlands would be increased sediment deposition from soil erosion on recently burnt slopes. Decreased cover of riparian conifer trees would be expected. Riparian deciduous trees (e.g., paper birch, black cottonwood) and shrubs often resprout relatively quickly after fire.

Ecological systems in the South Fork subbasin were representative of those throughout central Idaho (Table 3). Wet or mesic meadows and riparian shrub and woodland, often bordered by mesic forest, were widespread. These diverse habitats were important for numerous at-risk species. Species included amphibians (e.g., Idaho giant salamander [*Dicamptodon aterrimus*]); carnivores (e.g., Canada lynx [*Lynx canadensis*], fisher [*Martes pennanti*], gray wolf [*Canis lupus*], and wolverine [*Gulo gulo*]); fish (e.g., bull trout [*Salvelinus confluentus*], chinook salmon [*Oncorhynchus tshawytscha*], steelhead [*Oncorhynchus mykiss gairdneri*], and westslope cutthroat trout [*Oncorhynchus clarki lewisi*]); gastropods; and regionally endemic plants (e.g., Case's corydalis [*Corydalis caseana* ssp. *hastata*], evergreen kittentail, and Idaho strawberry [*Waldsteinia idahoensis*]). Two ecological systems, Rocky Mountain Subalpine-Montane Fen and Rocky Mountain Subalpine-Montane Seasonally Flooded Pool, were only observed in

the South Fork subbasin. Fens were widely scattered across the subbasin. They occurred as small patch inclusions within larger wetland complexes on mineral or mucky soil. Small fens are functionally important for supporting base flows of streams in summer and fall and as habitat for rare mosses and plants (e.g., Blandow's helodium [*Helodium blandowii*], *Sphagnum mendocinum*, swamp willow-weed [*Epilobium palustre*]). They were observed both on high elevation headwater slopes and at mid-elevation toeslope springs in areas of cold air drainage. Fens occurred in the Silver Creek, Tenmile Creek, Upper American River, Upper Crooked River, and Upper Red River (HUC 12s). Fen-like areas of peaty muck soil, functionally similar to true fens, were observed in these and other HUC 12s (i.e., South Fork Red River). Seasonally flooded pools, important for amphibians and migratory waterbirds, were observed within meadow complexes only in the Meadow Creek and Middle Red River HUC 12s.

Sub-watershed Scale

In 2006, 28 wetlands were surveyed across the entire study area. Fifteen of the surveyed wetlands were included in the 50 largest wetland complexes assessed for prioritization in the South Fork Clearwater subbasin (Figure 15). Of the 50 complexes prioritized, none were ranked Class I, 5 were ranked Class II, 11 Reference, 15 Habitat, and 19 Restoration Opportunity (Tables 4, 5, 6). All 5 Class II, 4 Reference, 1 Habitat, and 5 Restoration Opportunity wetland complexes were surveyed in 2006. Descriptions for the 15 surveyed wetlands are included below. Biodiversity and habitat information for the 35 wetland complexes not surveyed in 2006 is in Table 7.

American River Meadows - Table Meadows (Class II)

Habitat diversity and richness: This large wetland complex was located along Lick Creek, American River, and West Fork American River, within the Upper American River HUC 12 (Appendices 1, 2). It was in mid-elevation rolling uplands at elevations between 1,300-1,550 m (4,265-5,000 ft). The complex included first, second, and third-order streams originating mostly from sloped springs on ridges, such as those found at Table Meadows. Mountain sedge (*Carex scopulorum*), few-flower spikerush (*Eleocharis quinqueflora*), white marsh marigold (*Caltha leptosepala*), and other herbs dominated sloped, fen-like wetlands (Table 5). Streams dropped from headwaters into narrow to moderately-wide v-shaped valleys. They then entered broad, low gradient alluvial valleys that supported extensive wet meadows. Bluejoint reedgrass (*Calamagrostis canadensis*), fowl bluegrass (*Poa palustris*), and/or water sedge dominated meadows. They were interspersed by and/or bordered by subalpine fir, Engelmann spruce, and grand fir-dominated forested wetlands. Streams meandered through valleys with floodplains of variable width depending on the extent of channel incision. Springs emanating from toeslopes fed larger order streams. Springs supported panicled bulrush (*Scirpus microcarpus*) and forb communities. The wetland had high habitat diversity.

Wetland ecological systems
Rocky Mountain Alpine-Montane Wet Meadow
Rocky Mountain Montane-Foothill Springs

Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland
Seeded Perennial Grassland

Wetland plant associations

arrow-leaf groundsel	*Senecio triangularis*	G3?
bladder sedge	*Carex utriculata*	G5
bluejoint reedgrass	*Calamagrostis canadensis*	G4
few-flowered spikerush	*Eleocharis quinqueflora*	G4
fowl bluegrass	*Poa palustris*	GNR
mountain sedge	*Carex scopulorum*	G5
Nebraska sedge	*Carex nebrascensis*	G4
panicled bulrush	*Scirpus microcarpus*	G4
subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
subalpine fir/twisted-stalk, Canbys licorice-root phase	*Abies lasiocarpa/Streptopus amplexifolius, Ligusticum canbyi* phase	G4
water sedge	*Carex aquatilis*	G5
white marsh marigold	*Caltha leptosepala*	G4
wood-rush sedge	*Carex luzulina*	GNR

Biodiversity significance and rarity:

At-risk wetland plants

Blandow's helodium	*Helodium blandowii*	G5
Case's corydalis	*Corydalis caseana* ssp. *hastata*	G5T3
Idaho strawberry	*Waldsteinia idahoensis*	G3
tall swamp onion	*Allium validum*	G4

At-risk wetland animals

bull trout	*Salvelinus confluentus*	G3
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
fisher	*Martes pennanti*	G5
Idaho giant salamander	*Dicamptodon aterrimus*	G3
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
harlequin duck	*Histrionicus histrionicus*	G4

Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
short-eared owl	*Asio flammeus*	G5
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: Condition was fair to good (Table 6). At Table Meadows, recent 4-wheeled off-highway vehicles (OHVs) had created 15-cm deep ruts in mucky soil in two wetland patches. The tracks went through a rare moss (Blandow's helodium) population. OHV-damaged wetlands were adjacent to a gravel road and a developed USFS campground. In response, the Nez Perce NF posted signs prohibiting off-road travel. The campground was located within the wetland complex and abutted wetlands, often with no buffer. High temperatures impaired water quality in the wetland complex. Brook trout were present. Livestock grazing was evident. Agriculture was not observed, however, a large wet meadow in the lower portion of the wetland complex had been seeded with fowl bluegrass, presumably for livestock forage at a former ranch site. A private cabin and barn were adjacent to this meadow. Recent OHV tracks were observed in the meadow, but no soil damage was observed. Road density was low.

Landscape context and viability: The Nez Perce NF managed most surrounding land, with a parcel of private land along the confluence of Lick Creek and American River. Land management included livestock grazing and logging. No dams, mines, or agriculture occurred upstream of the wetland complex (Table 6). It was functionally connected to the Upper American River Meadows wetland complex (Appendices 1, 2). Both of these wetland complexes occurred mostly within (although at the edge of) an approximately 3,900-ha roadless area.

Upper Red River - Red River Hotsprings Meadows (Class II)

Habitat diversity and richness: This large wetland complex occurred in mid-elevation rolling uplands in the Upper Red River HUC 12 (Appendices 1, 2). Elevations were between 1,410-1,620 m (4,620-5,320 ft). Red River was moderately sinuous, low to moderate gradient, and somewhat incised. Although relatively wide (+/- 6 m), the floodplain was confined and most terraces infrequently flooded. Bluejoint reedgrass, creeping bentgrass (*Agrostis stolonifera*), introduced bluegrasses (Canada, fowl, Kentucky), panicled bulrush, reed canarygrass, and water sedge, with numerous mesic forbs and occasional Canada thistle, dominated terraces and streambanks (Table 5). However, seasonally high groundwater, toeslope seeps and springs, and flood overflow supported wet meadows throughout the broad alluvial valley. Numerous low to mid-order perennial streams also fed Red River and wetlands in the complex (e.g., Bridge, Baston, Otterson, Shissler, Soda, and Trail Creeks). Most of these meandered through wet meadows formed in alluvial valleys on their lower reaches.

Bluejoint reedgrass, water sedge, and tall forbs (e.g., California false-hellebore [*Veratrum californicum*], arrowleaf ragwort [*Senecio triangularis*]) dominated wet meadows in the upper portion of the wetland complex (i.e., near Bridge Creek and Red River Hot Springs) (Table 5). Although willows were relatively rare, patches of alderleaf buckthorn (*Rhamnus alnifolia*), dwarf birch (*Betula nana*), and pink spiraea (*Spiraea*

douglasii) scrub-shrub wetland were interspersed. Tall swamp onion (*Allium validum*) (a rare plant) occurred at the shrub-meadow ecotone. An extensive wet meadow in the middle of the complex supported a stand of the tufted hairgrass-timber oatgrass (*Danthonia intermedia*) association. Most of the meadow was heavily grazed and seeded with introduced forage grasses. The highest quality remaining native wet meadow was located along lower Trail Creek. Wetlands also extended up narrower valleys and onto sloped, spring-fed areas. Engelmann spruce, subalpine fir, and lodgepole pine, with understories dominated by bluejoint reedgrass, mesic forbs, and sometimes western Labrador tea, characterized alluvial terraces at or above the floodprone zone of narrower valley tributaries and sometimes also Red River. A relatively large, spring-fed, sloped fen about 1 km south of Red River Hot Springs supported extensive *Sphagnum* with bladder sedge (*Carex utriculata*), dwarf birch, and star sedge (*Carex echinata*), each locally dominant. Wetland habitats were diverse and the potential and opportunity of wetland to provide habitat for species high. Three globally rare wetland plant associations were present. Ungulate sign was common. Old beaver sign was observed in the upper portion of the wetland complex.

Wetland ecological systems

Rocky Mountain Alpine-Montane Wet Meadow
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
Rocky Mountain Subalpine-Montane Fen
Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations

subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
dwarf birch/mesic forbs-mesic graminoids	*Betula nana/*mesic forbs-mesic graminoids	G3G4
dwarf birch/peatmoss	*Betula nana/Sphagnum* spp.	GU
bluejoint reedgrass	*Calamagrostis canadensis*	G4
water sedge	*Carex aquatilis*	G5
star sedge/peatmoss	*Carex echinata/Sphagnum* spp.	GNR
mountain sedge	*Carex scopulorum*	G5
Northwest territory sedge/peatmoss	*Carex utriculata/Sphagnum* spp.	G1G2
tufted hairgrass-timber oatgrass	*Deschampsia caespitosa-Danthonia intermedia*	GQ
reed canarygrass	*Phalaris arundinacea*	G5
alder buckthorn	*Rhamnus alnifolia*	G3
panicled bulrush	*Scirpus microcarpus*	G4
pink spiraea	*Spiraea douglasii*	G5

Biodiversity significance and rarity:

At-risk wetland plants

tall swamp onion	*Allium validum*	G4

At-risk wetland animals

bull trout	*Salvelinus confluentus*	G3
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarkii lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: Condition varied from fair to good throughout the wetland complex depending on the proximity to roads, recreation sites, and other developments (Table 6). Improved gravel roads, dispersed and developed campgrounds, recreation trails (motorized and non-motorized, constructed and informal), wood cutting, livestock pastures, and areas of ranch and cabin construction occurred throughout the complex. While some impacts were buffered from wetlands, direct impacts were present. The most common impact was alteration of wetland hyrology by roadbeds. Livestock use was historically more widespread, but is now confined to several ranches. Introduced forage grasses (e.g., bentgrasses, bluegrasses, timothy) were most abundant on private ranchland. Occasional Canada thistle patches also occurred. Water quality was impaired by high temperatures and areas of apparent sediment accumulation were observed. Brook trout were present. No recent beaver activity was observed, but old sign was documented. Riverine wetlands have moderate potential and opportunity for improving water quality, but high potential and opportunity for reducing flooding and erosion in the watershed. Sloped wetlands have high potential and opportunity for improving water quality and headwater springs and fens function to support base of streams in summer and fall.

Landscape context and viability: The majority of meadows in the middle portion of the wetland complex were privately owned. The Nez Perce NF managed the remainder of the area. Land was managed as forest, with logging and recreational activities present. The Meadow Creek fire was burning at the edge of the HUC 12 at the time of survey. Several logged areas occurred adjacent to the wetland complex. No dams, mines, or agricultural activities were present upstream of the wetlands, but numerous roads and a

development at Red River Hot Springs do occur (Table 6). This wetland was immediately downstream of the Upper Red River - East Fork Trail Creek, Upper Red River - Trail Creek Headwaters, and Upper Red River - South of Alberta Mine wetland complexes (Figure 15). It was immediately upstream of the Upper Red River - Ditch Creek Campground wetland complex. While functional connectivity was occasionally impacted by roads and some housing development, these 5 wetland complexes form the most extensive wetland landscape in the study area. The headwaters of Bridge, Otterson, and Trail Creeks were within an approximately 54,000-ha roadless area.

Silver Creek - China Point Sloped Wetlands (Class II)

Habitat diversity and richness: This wetland complex was located near China Point, along Silver Creek and an unnamed creek within the Silver Creek HUC 12 (Appendices 1, 2). The wetland complex was in mid-elevation rolling uplands at elevations between 1,700-1,800 m (5,500-5,900 ft). The complex occurred predominantly along first order streams. Many sloped springs contributed to the series of wet meadows and fens in moderately-wide, low-gradient valleys along the ridge. Mountain sedge, water sedge, and/or forbs (especially white marsh marigold) dominated meadow habitats (Table 5). Alpine laurel (*Kalmia microphylla*), few-flower spikerush, mountain sedge, and peatmoss (*Sphagnum* spp.) dominated on peat soil. Bluejoint reedgrass often bordered wet meadows and fens. Patches of Sitka alder shrubland and subalpine fir and Engelmann spruce dominated forested wetlands were interspersed. The wetland complex had high potential and opportunity to provide habitat for species. The wetland complex had high habitat diversity, including 3 globally rare wetland plant associations.

Wetland ecological systems

- Rocky Mountain Alpine-Montane Wet Meadow
- Rocky Mountain Montane-Foothill Springs
- Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
- Rocky Mountain Subalpine-Montane Fen
- Rocky Mountain Subalpine-Montane Riparian Shrubland
- Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations

alpine laurel/peatmoss	*Kalmia microphylla/Sphagnum* spp.	G3G4
bluejoint reedgrass	*Calamagrostis canadensis*	G4
bluejoint-mountain edge/mountain bluebells	*Calamagrostis canadensis-Carex scopulorum/Mertensia ciliata*	GUQ
few-flower spikerush-mountain sedge	*Eleocharis quinqueflora-Carex scopulorum*	G3G4
large boykinia	*Boykinia major*	GNR
mountain sedge	*Carex scopulorum*	G5
mountain sedge/peatmoss species	*Carex scopulorum/Sphagnum* spp.	G5
mountain sedge/white marsh marigold	*Carex scopulorum/Caltha leptosepala*	G4
Sitka alder/mesic forbs	*Alnus viridis ssp. sinuata*/mesic forbs	G3G4

subalpine fir/bluejoint reedgrass, western Labrador tea phase	*Abies lasiocarpa/Calamagrostis canadensis, Ledum glandulosum* phase	G4
subalpine fir/rusty menziesia	*Abies lasiocarpa/Menziesia ferruginea*	G5
subalpine fir/twisted-stalk, Canbys licorice-root phase	*Abies lasiocarpa/Streptopus amplexifolius, Ligusticum canbyi* phase	G4
subalpine fir-Engelmann spruce/ western Labrador tea/mountain sedge	*Abies lasiocarpa-Picea engelmannii/Ledum glandulosum/Carex scopulorum*	G4
water sedge	*Carex aquatilis*	G5
white marsh marigold	*Caltha leptosepala*	G4
wood-rush sedge	*Carex luzulina*	GNR

Biodiversity significance and rarity:

At-risk wetland animals

bull trout	*Salvelinus confluentus*	G3
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
harlequin duck	*Histrionicus histrionicus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
short-eared owl	*Asio flammeus*	G5
Townsend's big-eared bat	*Corynorhinus townsendii*	G4
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: The condition was good to excellent (Table 6). No dams, mines, or agriculture were observed within the wetland complex and relatively low cover of introduced plant species. Most of the introduced species infestation was at or near the historic way-station at Mountain House. High temperatures impaired water quality. Livestock grazing was evident and road density was relatively high. A wildfire burned the western edge of the wetland complex in 2005. Impacts to the wetland complex from the fire or suppression activities were unknown. Overall, the complex has moderate potential and opportunity for improving water quality in the watershed. Potential and opportunity for reducing flooding and erosion was moderate. Headwater springs and fens function to support base flows of streams in summer and fall.

Landscape context and viability: The Nez Perce NF managed the entire wetland complex. Land was managed as forest, which included livestock grazing and logging

activities. No dams, mines, or agriculture occurred upstream of the wetland complex, however there were roads (Table 6). The wetland complex occurred mostly within (although at the edge of) an approximately 6,000-ha roadless area.

East Fork Crooked River Headwaters (Class II)

Habitat diversity and richness: This wetland complex was located in the upper East Fork Crooked River drainage within the Upper Crooked River HUC 12 (Appendices 1, 2). It occurred in headwaters of high elevation mountains between 2,080-2,210 m (6,820-7,240 ft). This wetland supported scattered mountain sedge and forb-dominated wet meadows fed by seeps, springs, and snow-melt. These meadows were closely juxtaposed with numerous small, spring-fed peatlands. Few-flowered spikerush dominated saturated swales, sometimes with soils transitional between meadow and fens (Table 5). Stair-stepped fens had patterned microtopography with few-flowered spikerush, mountain sedge, and green *Sphagnum* species in swales and red *Sphagnum* species and heath (Ericaceae spp.) shrubs on hummocks. Small patches of intermediate oatgrass mesic meadow occurred on better drained benches at edges of wetter meadows and fens. Subalpine fir, Engelmann spruce, and lodgepole pine, with western Labrador tea in the understory, dominated small forested islands throughout the wetland complex. Forest cover was discontinuous and graded into openings, increasing habitat complexity. In swampy areas, trees and Ericads primarily occurred on hummocks while herbs dominated swales. Additional forested wetlands and fens also occurred upstream along the East Fork Crooked River, a low gradient, sinuous Rosgen E-type stream. The wetland complex has high potential and opportunity to provide habitat for species.

Wetland ecological systems

Rocky Mountain Alpine-Montane Wet Meadow
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
Rocky Mountain Subalpine-Montane Fen
Rocky Mountain Subalpine-Montane Mesic Meadow
Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations

subalpine fir/bluejoint reedgrass, western Labrador tea phase	*Abies lasiocarpa/Calamagrostis canadensis, Ledum glandulosum* phase	G4
subalpine fir-Engelmann spruce/ western Labrador tea/mountain sedge	*Abies lasiocarpa-Picea engelmannii/Ledum glandulosum/Carex scopulorum*	G4
mountain sedge	*Carex scopulorum*	G5
mountain sedge/white marsh marigold	*Carex scopulorum/Caltha leptosepala*	G4
mountain sedge/peatmoss	*Carex scopulorum/Sphagnum* spp.	G5
timber oatgrass	*Danthonia intermedia*	G2G3
few-flowered spikerush	*Eleocharis quinqueflora*	G4

few-flowered spikerush/peatmoss	*Eleocharis quinqueflora/Sphagnum* spp.	G4

Biodiversity significance and rarity:

At-risk wetland animals

bull trout	*Salvelinus confluentus*	G3
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarkii lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: Condition was excellent, with no introduced weedy species documented (Table 6). This wetland complex had the second best condition of those surveyed, with no human-caused disturbances observed. The northern edge of the wetland complex burned in the Rattlesnake Complex wildfire in late summer 2007. Impacts to the wetland complex from fire or suppression activities are unknown. East Fork Crooked River water quality was impaired by high temperature (measured far downstream). Because of the wetland's position high in the watershed, potential and opportunity for improving water quality in the watershed is high. The headwater springs and fens function to support base flows of streams in summer and fall.

Landscape context and viability: The Nez Perce NF managed the entire wetland. Land was managed as forest, with no recent logging or livestock grazing evident. No dams, mines, roads, or agriculture were observed upstream of the wetland (Table 6). The complex occurred entirely within an approximately 5,500-ha roadless area.

West Fork Red River - South Fork Red River Confluence (Class II)

Habitat diversity and richness: The wetland complex occurred in mid-elevation rolling uplands in the South Fork Red River HUC 12 (Appendices 1, 2). Elevations were between 1,540-1,710 m (5,060-5,600 ft). Wetlands were best developed in the low to moderate gradient alluvial valley bottoms, but also extended up valley slopes where small spring-fed tributaries enter. The majority of the complex was comprised of riparian forested wetlands that extend from below the confluence of the West and South Fork Red Rivers up each fork until valleys become narrow and steep. Subalpine fir, Engelmann spruce, and lodgepole pine, with understories dominated by western Labrador tea or Ericad shrubs, bluejoint reedgrass, water sedge, and mesic forbs, characterized forested wetlands in the broader valleys (Table 5). Stands occurred on

both alluvial terraces and higher benches where groundwater was high. Stands were sometimes swampy, with hummocks, downed wood, and seasonally flooded swales. Small patches of pink spiraea and Eastwood's willow (*Salix eastwoodiae*) occurred in gaps on stream terraces. Grand fir and mesic forbs were most common on side slope spring channels. Several wet meadows, dominated by water sedge, and mesic meadows of bluejoint reedgrass on drier soil, were interspersed. A raised, spring-fed area of quaking saturated peaty muck soil occurred in the West Fork drainage. Water sedge, bladder sedge, few-flowered spikerush, and a rare moss, Blandow's helodium, dominated this fen-like area. Habitat diversity was high. Much ungulate sign, old beaver sign, and songbirds were observed.

Wetland ecological systems

Rocky Mountain Alpine-Montane Wet Meadow
Rocky Mountain Subalpine Mesic Meadow
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations

grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
subalpine fir/western Labrador tea	*Abies lasiocarpa/Ledum glandulosum*	G4
water sedge	*Carex aquatilis*	G5
bladder sedge	*Carex utriculata*	G5
Engelmann spruce/water sedge	*Picea engelmannii/Carex aquatilis*	GNR

Biodiversity significance and rarity:

At-risk wetland plants

swamp willow-weed	*Epilobium palustre*	G5
Blandow's helodium	*Helodium blandowii*	G5

At-risk wetland animals

bull trout	*Salvelinus confluentus*	G3
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarkii lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4

Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: The condition was good, but several minor impacts were present (Table 6). A paved road paralleled the edge of the wetland complex in the South Fork Red River valley and several logging roads traversed slopes near the confluence. A maintained recreation trail followed the West Fork. A dispersed campsite occurred next to the road at the confluence. Overall, the complex was adequately buffered from clearcuts, roads, trails, and campsites. Trace amounts of introduced species were observed (including Canada thistle, fowl bluegrass, Kentucky bluegrass [*Poa pratensis*], and white clover [*Trifolium repens*]), mainly on mesic soils where trails and roads crossed wetlands. Hydrologic regimes appeared intact. No livestock grazing, mines, or dams were observed. High temperatures impaired water quality.

Landscape context and viability: The Nez Perce NF managed the entire wetland. Land was managed as forest, with logging and recreational activities present. Several clearcuts and roads occurred adjacent to the wetland complex. No mines, dams, or agricultural activities were present upstream of the wetlands (Table 6). The headwaters of West Fork Red River occurred in an approximately 5,500-ha roadless area.

Lower Twentymile Meadows (Reference)

Habitat diversity and richness: This wetland complex was within the Twentymile Creek HUC 12 (Appendices 1, 2). It is in mid-elevation rolling uplands with elevations between 1,300-1,440 m (4,200-4,700 ft). This relatively large wet meadow was fed by several ephemeral and perennial first and second order creeks, including West Fork Twentymile Creek, along with a series of springs. These water sources combined to form the larger order Twentymile Creek, which meandered through the flat bottomed alluvial valley. Bluejoint reedgrass and areas of seeded forage grasses dominated wet meadows (Table 5). Grand fir, subalpine fir, and Engelmann spruce associations characterized riparian forestes and meadow margins. The wetland complex has high potential and opportunity for providing habitat for species. Ungulate bedding, trailing, and sign were common. Habitat diversity included 3 globally rare wetland plant associations.

Wetland ecological systems

Rocky Mountain Alpine-Montane Wet Meadow
Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland
Seeded Perennial Grassland

Wetland plant associations

alder buckthorn	*Rhamnus alnifolia*	G3
bluejoint reedgrass	*Calamagrostis canadensis*	G4
few-flowered spikerush	*Eleocharis quinqueflora*	G4

grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
mountain alder/bladder sedge	*Alnus incana/Carex utriculata*	G3
subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
timothy	*Phleum pratense*	GNR

Biodiversity significance and rarity:

At-risk wetland animals

bull trout	*Salvelinus confluentus*	G3
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
fisher	*Martes pennanti*	G5
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
short-eared owl	*Asio flammeus*	G5
Townsend's big-eared bat	*Corynorhinus townsendii*	G4
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: The mesic meadow and adjacent wetland forest were intact, but high cover of introduced forage grasses and patchy Canada thistle (*Cirsium arvense*) decreased overall functional condition (Table 6). High temperatures impaired water quality. Road density was moderately high, but surrounding roads have been closed by the Nez Perce NF. Recreation use occurred, with access via the gated gravel road and a maintained trail bisecting the meadow. No lasting impacts were observed. Recent livestock grazing was not observed. No dams, mines, or agriculture occurred within the wetland. The complex has moderate potential and opportunity for improving water quality and reducing flooding and erosion in the watershed.

Landscape context and viability: The Nez Perce NF managed the entire wetland complex. Land was managed as forest, which included past logging activities. No dams, mines, or agriculture occurred upstream of the wetland complex, however there were roads (Table 6). The headwaters of Twentymile Creek are protected, occurring within the Gospel Hump Wilderness. The upper half of the wetland complex occurred within an approximately 27,000 ha roadless area.

Upper American River Meadows (Reference)

Habitat diversity and richness: The wetland was within the Upper American River HUC 12 (Appendices 1, 2) in mid-elevation rolling uplands between 1,335-1,480 m (4,380-4,860 ft). It occurred in the moderately wide, low gradient alluvial valley of the American River but also included riparian areas of several steeper gradient, low order tributaries (e.g., Limber Luke Creek). These relatively low elevation wetlands appeared influenced by cold air drainage. The complex consisted of extensive wet and mesic meadows in wider valleys, with riparian scrub-shrub (e.g., mountain alder, alderleaf buckthorn) interspersed in narrower sections and forested wetlands at meadow margins and in steeper gradient riparian zones (Table 5). Water sedge and mesic forbs dominated the American River floodplain and adjacent wet meadows. Patchy mesic meadow occurred on drier soil, dominated by introduced bentgrass (*Agrostis*) species, bluejoint reedgrass, and mesic forbs. Several toeslope springs were present, sometimes supporting small areas of peat accumulation. Lodgepole pine, Engelmann spruce, and subalpine fir, with western Labrador tea (sometimes), bluejoint reedgrass, mesic forbs, and ladyfern (*Athyrium filix-femina*) in the understory, dominated forested communities. The potential and opportunity of the complex to provide habitat for species was somewhat reduced due to wetland impacts such as livestock grazing. Habitat diversity was relatively high, with spruce grouse, ungulate, and gray wolf sign observed.

Wetland ecological systems
- Rocky Mountain Alpine-Montane Wet Meadow
- Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
- Rocky Mountain Subalpine-Montane Fen
- Rocky Mountain Subalpine-Montane Riparian Shrubland
- Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations

subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
water sedge	*Carex aquatilis*	G5
aquatic sedge/peatmoss	*Carex aquatilis/Sphagnum* spp.	G2G3
mountain sedge	*Carex scopulorum*	G5

Biodiversity significance and rarity:

At-risk wetland plants

Idaho strawberry	*Waldsteinia idahoensis*	G3

At-risk wetland animals

bull trout	*Salvelinus confluentus*	G3
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarkii lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
harlequin duck	*Histrionicus histrionicus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: Condition was fair (Table 6). Cattle were on the wetland complex during the survey. Overall livestock use appeared moderate, but localized impacts from trailing and streambank trampling were observed. The main cause of degradation was invasion by seeded forage grasses, especially introduced bentgrass and bluegrass species (*Poa* spp.), and Canada thistle (patchy). An old cabin, probably used by ranchers, occurred in the upper portion of the wetland complex. No dams or mines were observed in the wetland complex, and road density was moderate. American River's water quality was impaired by high temperatures. Brook trout were present. Potential and opportunity for improving water quality in the watershed was moderate, but potential and opportunity for reducing flooding and erosion high.

Landscape context and viability: The Nez Perce NF managed the entire wetland complex. Land was managed as forest, with logging, livestock grazing, roads, and dispersed camping on ridges above the wetland complex. No dams, mines, or agriculture occurred upstream of the wetland (Table 6). The wetland was located immediately upstream from the American River Meadows – Table Meadows wetland complex, separated only by a 0.2 km-long, narrow valley of limited wetland (Appendices 1, 2). Both of these wetland complexes occurred mostly within (although at the edge of) an approximately 3,900-ha roadless area.

Upper Johns Creek - Square Mountain (Reference)

Habitat diversity and richness: The wetland complex was located in a gentle gradient hanging valley on top of a mountain ridge at the headwaters of Hegen Creek, a tributary to Johns Creek. This high elevation glacial trough was located between 2,195-2,320 m (7,200-7,600 ft) in the Upper Johns Creek HUC 12 (Appendices 1, 2). Wetlands included wet and mesic meadows with bluejoint reedgrass, mountain sedge, and black alpine sedge (*Carex nigricans*) and two small ponds (Table 5). Other wetland habitats included Sitka alder scrub-shrub and forested wetlands dominated by subalpine fir, Engelmann spruce, and lodgepole pine with bluejoint reedgrass and western Labrador-tea. The wetland complex has high potential and opportunity to provide habitat.

Wetland ecological systems

Rocky Mountain Subalpine Mesic Meadow

Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland

Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations*

subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
subalpine fir/bluejoint reedgrass, western Labrador-tea phase	*Abies lasiocarpa/Calamagrostis canadensis, Ledum glandulosum* phase	G4
Sitka alder/mesic forbs	*Alnus viridis* ssp. *sinuata*/mesic forbs	G3G4
bluejoint reedgrass	*Calamagrostis canadensis*	G4

* = known from Square Mountain, just outside the wetland complex.

Biodiversity significance and rarity:

At-risk wetland animals

chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
long-billed curlew	*Numenius americanus*	G5
peregrine falcon	*Falco peregrinus*	G4T3
short-eared owl	*Asio flammeus*	G5
Townsend's big-eared bat	*Corynorhinus townsendii*	G4
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: The condition was excellent (Table 6). This wetland complex had the best condition of the 50 evaluated, with no human-caused disturbances. Because of the wetland's position high in the watershed, potential and opportunity for improving water quality in the watershed is high. The headwaters function to support base flows of streams in summer and fall.

Landscape context and viability: The Nez Perce NF managed the entire wetland complex. It was completely protected within the Gospel Hump Wilderness. Hegen Creek was officially protected by IDDWR (2004) as a Natural River. Land was managed as wilderness forest, with no recent logging, mining, or livestock grazing (Table 6). Trails originating on nearby roads provided good recreational access to the ridge at the edge of the wetland complex. The Square Mountain Creek RNA, representative of exemplary subalpine woodland and wetland communities, was located in the next drainage to the west, immediately adjacent to the wetland complex.

Kay Creek (Reference)

Habitat diversity and richness: This wetland complex was located in the headwaters of Kay Creek in the South Fork Clear Creek HUC 12 (Appendices 1, 2). It occurs in mid-elevation rolling uplands at elevations between 1,330-1,510 m (4,370-4,950 ft). The complex included riparian and spring-fed wetlands in the moderately broad, flat bottomed, low gradient alluvial valley of Kay Creek. Wetlands also extended up narrower riparian areas of first order tributary streams. Kay Creek was incised, having low to moderate sinuosity and a relatively narrow floodplain (6 m wide). The stream does not appear to be currently down cutting. Plentiful large woody debris created aquatic habitat diversity and reduced erosion of stream banks. Mountain alder and a diverse mix of herbaceous species dominated riparian vegetation on alluvial terraces and floodplains along Kay Creek and its largest tributary (Table 6). Engelmann spruce, grand fir, and subalpine fir, with mesic forb-dominated understory, dominated patchy forested wetlands. Several springs and seeps emanated from toeslopes, supporting an extensive mosaic of scrub-shrub and herbaceous wetlands. Mountain alder, bigleaf sedge, panicled bulrush, and other mesic graminoids characterized these habitats. Both native and introduced mesic forbs dominated weedy gaps on terraces. Overall habitat diversity was moderate, but potential and opportunity of wetland to provide habitat for species is high. Three globally rare plant associations were observed. Ungulate sign and a redtail hawk were noted.

Wetland ecological systems

Northern Rocky Mountain Western Hemlock-Western Red-cedar Forest
Rocky Mountain Montane-Foothill Springs
Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations

mountain alder/bigleaf sedge	*Alnus incana/Carex amplifolia*	G3
bigleaf sedge	*Carex amplifolia*	G3
panicled bulrush	*Scirpus microcarpus*	G4
arrow-leaf groundsel	*Senecio triangularis*	G3?

Biodiversity significance and rarity:

At-risk wetland animals

chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3

At-risk wetland animals predicted to occur (excluding fish)

black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
Coeur d'Alene salamander	*Plethodon idahoensis*	G4
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4

harlequin duck	*Histrionicus histrionicus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
long-billed curlew	*Numenius americanus*	G5
peregrine falcon	*Falco peregrinus*	G4T3
short-eared owl	*Asio flammeus*	G5
Townsend's big-eared bat	*Corynorhinus townsendii*	G4
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: The Kay Creek wetland complex was in fair to good ecological condition (Table 6). The area was trampled by cattle and/or elk. Openings on stream terraces were early seral due to both grazing/trampling disturbance and past deposition of gravelly-sandy alluvium. Many plant species that increase in areas disturbed by cattle and/or elk herds were present. These included Canada thistle, Kentucky bluegrass, orchard grass (*Dactylis glomerata*), and reed canarygrass. Kay Creek was incised due to a past downcutting episode. No dams, mines, or agriculture were present and road density was relatively low. Riparian and wetland areas were usually adequately buffered from nearby clearcuts and logging roads. The wetland complex has moderate potential and opportunity for improving water quality and high potential and opportunity for reducing flooding and erosion in the watershed.

Landscape context and viability: The Nez Perce NF managed the entire wetland complex. No dams, mines, or agriculture were present upstream of the wetland complex (Table 6). Land was managed as forest with recent livestock grazing and logging evident to the east and south. Numerous clearcuts and roads occurred in the landscape, although stands of unlogged mature to old western redcedar/queencup beadlily (*Clintonia uniflora*) and grand fir/Pacific yew habitat types (24 to 48 inch dbh trees) were observed on ridges surrounding the headwaters of Kay Creek. This wetland complex is located 3 km east of the South Fork Clear Creek - Confluence West and South Fork wetland complex (Figure 15). Both of these wetland complexes occurred mostly within (although at the edge of) an approximately 6,000-ha roadless area.

Tenmile Creek Sloped Wetlands (Reference)

Habitat diversity and richness: This wetland complex was within the Tenmile Creek HUC 12 in the headwaters of an unnamed tributary to Tenmile Creek. Located in high elevation mountains at elevations between 2,080-2,195 m (6,840-7,200 ft), these snowmelt and spring-fed wetlands occurred on an upper ridge slope of a glacial trough valley (Appendices 1, 2). The complex included bladder sedge-dominated wet meadows, with occasional few-flowered spikerush, mountain sedge, and bluejoint reedgrass patches (Table 5). Meadows were in mosaic with fens and swampy forested wetlands. *Sphagnum* cover was high where bladder sedge dominated on peat. Fens were poor to intermediate (pH of 4.8-5.2). Engelmann spruce, subalpine fir, and lodgepole pine with western Labrador tea and mountain sedge in the understory, dominated swampy forested communities. The wetland complex has high potential and opportunity of wetland to provide habitat for species. It was apparently important elk and moose habitat, as sign and wallowing holes were observed in all wet areas. No at-risk species were observed, or are known from, this wilderness wetland.

Wetland ecological systems
Rocky Mountain Alpine-Montane Wet Meadow
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland
Rocky Mountain Subalpine-Montane Fen
Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations

subalpine fir-Engelmann spruce/western Labrador tea/mountain sedge	*Abies lasiocarpa-Picea engelmannii/Ledum glandulosum/Carex scopulorum*	G4
bladder sedge	*Carex utriculata*	G5
bladder sedge/peatmoss	*Carex utriculata/Sphagnum* spp.	G1G2

Biodiversity significance and rarity:

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: The condition was excellent, with no introduced weedy species documented (Table 6). This wetland complex had the second best condition of those surveyed, with no human-caused disturbances. Heavy elk use was heavy, including a 7-m diameter elk wallow with much bare soil and trailing in one wet meadow. High temperatures impaired water quality in Tenmile Creek (measured far downstream of the wetland). Because of the wetland's position high in the watershed, potential and opportunity for improving water quality in the watershed is high. The headwater springs and fens function to support base flows of streams in summer and fall.

Landscape context and viability: The Nez Perce NF managed the entire wetland complex. It was completely protected within the Gospel Hump Wilderness. Land was managed as wilderness forest, with no recent logging, mining, or livestock grazing evident (Table 6). The Tenmile Meadows wetland complex (not surveyed) occurred 2.4 km to the west in the glacial trough valley of Tenmile Creek (Appendices 1, 2). No dams, mines, roads, or agriculture occurred upstream of the wetland. A very old historic cabin and possible mining site, now overgrown, occurred outside the wetland complex.

Buck Meadows (Habitat)

Habitat diversity and richness: This wetland complex was within Lower Johns Creek HUC 12, near Hungry Ridge (Appendices 1, 2). It occurs in mid-elevation rolling uplands at elevations between 1,330-1,390 m (4,360-4,560 ft). This moderately wide, flat-bottom alluvial valley was feddseveral ephemeral creeks and toeslope springs that combine to form the first order American Creek. The wetland complex supported extensive water sedge-dominated wet meadows that are now excluded from livestock grazing (Table 5). Patches of weedy mesic meadow, apparently disturbed by past livestock congregation (i.e., salt block site and trailing) were interspersed. Narrow bands of mesic mixed conifer forest bordered the meadow. The low gradient, moderately sinuous American Creek meandered through the wet meadow complex. Although incised, the stream supported an extensive stringer of mountain alder in the narrow floodplain and on adjacent terraces. Overall habitat diversity was not high, but ungulate bedding and old gray wolf sign were observed.

Wetland ecological systems
Rocky Mountain Alpine-Montane Wet Meadow
Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations

mountain alder/mesic graminoids	*Alnus incana/*mesic graminoids	G3
mountain alder/water sedge	*Alnus incana/Carex aquatilis*	G2?
water sedge	*Carex aquatilis*	G5

Biodiversity significance and rarity:

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
short-eared owl	*Asio flammeus*	G5
Townsend's big-eared bat	*Corynorhinus townsendii*	G4
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: The condition of sedge-dominated wet meadows was good (Table 6). The largest wet meadow in the complex has been fenced to exclude livestock grazing. Historic grazing impacts were common in mesic meadows where introduced plant infestations included hound's tongue (*Cynoglossum officinale*), oxeye daisy (*Leucanthemum vulgare*), common St. John's wort (*Hypericum perforatum*), Deptford pink (*Dianthus armeria*), and forage grass species. A well-maintained trail

paralleled the exclosure fence and light grazing occurred immediately outside the exclosure. The trail was non-motorized designated, but motorcycle tracks were present. The trail was mostly in the upland. No dams, mines, or agriculture within the wetland complex. High temperatures impaired water quality. Road density was low to moderate. A nearby road was gated to prevent motorized access to wetlands.

Landscape context and viability: The Nez Perce NF managed the entire wetland complex. Land was managed as forest, which included livestock grazing and logging activities. Occasional clearcut and selective cut logging have occurred in the surrounding landscape, especially on ridges along nearby roads, but valleys were mostly not recently logged. No dams, mines, or agriculture occurred upstream of the wetland complex, however there were roads (Table 6). It was located 0.8 km downstream from the Lower Johns Creek - American Creek wetland complex, and over 2 km north of both Lower Johns Creek - American Creek Headwaters and Mill Creek - Merron Creek Melton Creek Confluence complexes (Figure 15).

McComas Meadows (Restoration Opportunity)

Habitat diversity and richness: The wetland complex was within the Meadow Creek HUC 12 (Appendices 1, 2). It occurred in mid-elevation rolling uplands at elevations between 965-1,020 m (3,165-3,345 ft). This wetland complex had the lowest elevation large wet meadow in the study area. Slightly drier mesic meadow, dominated by introduced grass species, noxious weeds, and native mesic graminoids, ringed the wet meadow. The sedge and grass-dominated wet meadow was fed by several ephemeral and perennial first and second order creeks (Whitman, Swede, Farris, Orchard, and Covert Creeks), along with a series of springs (Table 5). Black hawthorn patches and native mesic graminoid stringers occurred in these areas and on adjacent toeslopes. These water sources combined to form the third order Meadow Creek, which bisected the broad, flat-bottomed alluvial valley. An extensive stringer of mountain alder occurred on the floodplain and alluvial terraces along Meadow Creek. Wet depressions (vernal pool-like areas), dominated by inflated sedge (*Carex vesicaria*) and creeping spikerush, were occasionally interspersed throughout the meadow. Potential and opportunity of wetland to provide habitat for species was somewhat reduced due to past wetland impacts. However, in-part due to habitat restoration, the wetland currently supports high habitat diversity, including 5 globally rare wetland plant associations. Ungulate bedding was abundant throughout the meadow.

Wetland ecological systems
- Open Water
- Rocky Mountain Alpine-Montane Wet Meadow
- Rocky Mountain Subalpine-Montane Mesic Meadow
- Rocky Mountain Subalpine-Montane Riparian Shrubland
- Rocky Mountain Subalpine-Montane Riparian Woodland
- Rocky Mountain Subalpine-Montane Seasonally Flooded Pool
- Seeded Perennial Grassland

Wetland plant associations

American mannagrass	*Glyceria grandis*	G2?
bigleaf sedge	*Carex amplifolia*	G3
black hawthorn/cow parsnip	*Crataegus douglasii/Heracleum maximum*	G1
bluejoint reedgrass	*Calamagrostis canadensis*	G4
creeping bentgrass	*Agrostis stolonifera*	GNR
creeping spikerush (lentic)	*Eleocharis palustris* (lentic)	GNR
fowl bluegrass	*Poa palustris*	GNR
inflated sedge	*Carex vesicaria*	G4Q
mountain alder/mesic graminoids	*Alnus incana/*mesic graminoids	G3
panicled bulrush	*Scirpus microcarpus*	G4
slenderbeak sedge	*Carex athrostachya*	GNR
timothy	*Phleum pratense*	GNR
water sedge	*Carex aquatilis*	G5

Biodiversity significance and rarity:

At-risk wetland plants

least moonwort	*Botrychium simplex*	G5

At-risk wetland animals

bald eagle	*Haliaeetus leucocephalus*	G4
bull trout	*Salvelinus confluentus*	G3
Canada lynx	*Lynx canadensis*	G5
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
harlequin duck	*Histrionicus histrionicus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
long-billed curlew	*Numenius americanus*	G5
peregrine falcon	*Falco peregrinus*	G4T3
short-eared owl	*Asio flammeus*	G5
Swainson’s hawk	*Buteo swainsoni*	G5
Townsend's big-eared bat	*Corynorhinus townsendii*	G4
yellow-billed cuckoo	*Coccyzus americanus*	G5

Condition, quality, and integrity: The wetland is currently the focus of long-term riparian and aquatic ecosystem restoration by the Nez Perce Tribe (in cooperation with the Nez Perce NF). Riparian shrub plantings were extensive. Livestock grazing was excluded by an extensive exclosure around the meadow and riparian area. Cattle occasionally breach the exclosure, as observed in August 2006. Condition of the grass-dominated meadow was poor, but restoration potential high (Table 6). Non-native graminoid and forb infestation is significant, including extensive patches of oxeye daisy (*Leucanthemum vulgare*), Canada thistle (*Cirsium arvense*), and seeded haygrasses, and less commonly, bull thistle (*Cirsium vulgare*), hound's tongue (*Cynoglossum officinale*), common St. Johnswort (*Hypericum perforatum*), and spotted knapweed (*Centaurea biebersteinii*). Evidence of wood cutting was observed on meadow edges, along with old road beds. No dams, mines, or agriculture occurred within the wetland complex, but road density was relatively high. High temperatures impaired water quality. A headcut was observed along the creek. The stream was also laterally cutting, indicative of floodplain widening. Brook trout were present. The wetland complex has moderate potential and opportunity for improving water quality and reducing flooding and erosion in the watershed. Both of these functions are expected to increase over time as restoration progresses.

Landscape context and viability: The Nez Perce NF managed the entire wetland complex. Land was managed as forest, which included livestock grazing and logging. No dams, mines, or agriculture occurred upstream of the wetland complex, however roads were numerous and dispersed recreation present (Table 6). The HUC 12 has been intensively managed for timber products.

Middle Red River - Red River WMA (Restoration Opportunity)

Habitat diversity and richness: The wetland complex was within the Middle Red River HUC 12 (Appendices 1, 2). It was in mid-elevation rolling uplands at elevations between 1,280-1,330 m (4,200-4,360 ft). It supported a large and biologically significant meadow complex fed by several ephemeral and perennial first and second order creeks (Cartwright, Sixty-six, Loon, Cole, Galena, and Siegel Creeks), along with a series of toeslope seeps and springs. These water sources combined to form the 4th-order Red River which bisected the broad, flat bottomed alluvial valley. A mosaic of water sedge, tufted hairgrass, and Baltic rush (*Juncus balticus*) characterized wet meadows (Table 5). Slightly drier California oatgrass (*Danthonia californica*) and seeded forage grass mesic meadow bordered wet meadows in the Red River WMA parcel. Meadows were interspersed with moist swales (several created during restoration) and seasonally flooded abandoned river meanders that supported bladder and inflated sedge communities. Most meadow communities had been partially or completely converted to hay grass pasture on adjacent ranches. Mixed conifer mesic forest and occasional quaking aspen groves bordered the meadow complex. Floodplain communities occurred along Red River, with dusky and Drummond's willow (*Salix drummondiana*) establishing on recent point and side channel alluvial bars. Reed canarygrass dominated streambanks and whitewater crowfoot (*Ranunculus aquatilis*) formed aquatic beds in slowly moving water. Riparian restoration included extensive plantings of native shrubs and some lodgepole pines. Shrub survival was patchy and scrub-shrub plant

communities were still forming. Although the potential and opportunity of the wetland to provide habitat for species had been somewhat reduced due to past wetland impacts, increased use of restored areas by terrestrial wildlife and fish were observed during monitoring. The site was intensively browsed by elk and moose, slowing establishment of scrub-shrub riparian communities. Rodent burrows and digging were also commonly seen throughout the Red River WMA.

Wetland ecological systems

Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland
Rocky Mountain Alpine-Montane Wet Meadow
Rocky Mountain Montane-Foothill Aquatic Bed and Emergent Marsh
Rocky Mountain Subalpine-Montane Mesic Meadow
Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland
Rocky Mountain Subalpine-Montane Seasonally Flooded Pool
Seeded Perennial Grassland

Wetland plant associations

Baltic rush	*Juncus balticus*	G5
bladder sedge	*Carex utriculata*	G5
California oatgrass	*Danthonia californica*	GNR
creeping spikerush (lentic)	*Eleocharis palustris* (lentic)	GNR
inflated sedge	*Carex vesicaria*	G4Q
needle spikerush	*Eleocharis acicularis*	G4?
reed canarygrass	*Phalaris arundinacea*	G5
timothy	*Phleum pratense*	GNR
tufted hairgrass-California oatgrass	*Deschampsia caespitosa-Danthonia californica*	G2
water sedge	*Carex aquatilis*	G5
whitewater crowfoot	*Ranunculus aquatilis*	GU

Biodiversity significance and rarity:

At-risk wetland plants

Idaho strawberry	*Waldsteinia idahoensis*	G3

At-risk wetland animals

bull trout	*Salvelinus confluentus*	G3
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4

fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
harlequin duck	*Histrionicus histrionicus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
short-eared owl	*Asio flammeus*	G5
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: Condition of the wetland complex varied from poor to good, but restoration potential was high (Table 6). The mid-upper section of the wetland occurred within the Red River WMA (owned and managed by IDFG). Starting in 1993, this section has been the focus of long-term aquatic, riparian, and wetland habitat restoration (Klein 2004). Prior to restoration, Red River had been straightened during historic ranching and mine dredging activities. The channel became incised due to the increased channel gradient. This lowered groundwater (reducing wetlands), decreased floodplain width, eliminated beneficial riparian vegetation, increased streambank instability, and degraded aquatic habitat (e.g., less woody debris, spawning gravels, etc.) (Klein 2004). High temperatures and excessive sediment impaired water quality. Brook trout invaded. Several homes and barns occurred within the wetland complex. Terrestrial wetland vegetation was also degraded by past land management, with infestations of introduced species, such as seeded forage grasses, patchy Canada thistle, and reed canarygrass, all common.

The primary restoration goal was to reconnect the river with its former floodplain and meanders and restore riparian habitat and improve water quality for the purpose of improving habitat for native fish and wildlife. This was accomplished by recreating the meandering riffle-glide pattern expected in this Rosgen C-type stream using a series of grade control structures and redirecting the channel into cut off meanders. The project also created seasonally flooded depressions supporting marsh and aquatic species. Livestock grazing was excluded, however cattle occasionally breached the exclosure, as seen in September 2006. Restoration efforts included extensive native shrub plantings, though many were heavily browsed by ungulates. Throughout much of the wetland complex outside the WMA, livestock grazing and agriculture were present. Reaches of Red River on private land, both upstream and downstream of the restored WMA, still have straightened, incised channel morphology and degraded habitat. Two old mine sites are within the complex. Road density is moderately. Potential and opportunity for improving water quality and reducing flooding and erosion in the watershed is moderate. Both of these functions are expected to increase over time as restoration progresses.

Landscape context and viability: The wetland complex was mostly privately owned, with about one-third managed by the IDFG and margins managed by the Nez Perce National Forest. Privately owned land was primarily managed as pasture. IDFG managed land as wildlife habitat. A former ranch on the northeast border of the wetland complex had recently been subdivided and logged for cabin and home development. No dams

occurred upstream of the wetland complex, however, roads (both paved and gravel), homes, logging, mining, and agriculture were present (Table 6).

Upper Red River - Red River Ranger Station (Restoration Opportunity)

Habitat diversity and richness: The wetland complex was located at the downstream end of the Upper Red River HUC 12 (Appendices 1, 2). It occurred at elevations between 1,320-1,520 m (4,330-5,000 ft) in mid elevation rolling uplands. This wetland occurred in the moderately broad, flat bottomed, alluvial valley of the Red River. This reach of the river supported riffle-run aquatic habitat and was low gradient (+/- 2%), moderately sinuous, and somewhat incised. Scrub-shrub wetlands, relatively rare in the valleys immediately downstream, were common in this narrower valley reach. Long stringer patches of mountain alder-dominated riparian shrubland characterized floodplains and alluvial terraces in the wetland complex (Table 5). Reed canarygrass was the most common mesic graminoid in the understory. Occasional small patches of willow also occurred on the floodplain, especially at the confluence with the South Fork Red River (adjacent to the Red River Ranger Station) at the lower end of the complex. Species included Booth's (*Salix boothii*), Drummond's, dusky, Lemmon's (*Salix lemmonii*), and Sitka willow (*Salix sitchensis*). Patches of black hawthorn, common snowberry, mesic forbs, weedy graminoids, and occasional conifers formed a mosaic on drier alluvial terraces, at or above the floodprone zone. While overall habitat diversity was relatively low, the wetland complex supported 2 globally rare wetland plant associations and spawning habitat for chinook salmon.

Wetland ecological systems

Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations

mountain alder/mesic graminoids	*Alnus incana*/mesic graminoids	G3
black hawthorn/common snowberry	*Crataegus douglasii/Symphoricarpos albus*	G2

Biodiversity significance and rarity:

At-risk wetland animals

bull trout	*Salvelinus confluentus*	G3
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarkii lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5

gray wolf	*Canis lupus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: Condition of the wetland was fair, but opportunities for restoration exist (Table 6). Wetlands are mostly intact but fragmentation has occurred due to past developments. A heavily used gravel road parallels the edge of the wetland complex on the toeslope of the Red River valley and several logging roads traverse slopes. The roadbed occasionally crosses wetlands. Dispersed recreation occurs and stream bank trampling occasionally occurs. A quarry for road gravel appears to have filled a small area of wetlands. Wetlands around the Red River Ranger Station housing facilities at the lower end of the wetland complex are also altered. No recent disturbances to the stream channel were observed, but sections appear to have decreased sinuosity and increased incisement. The channel geomorphology possibly reflects historic impacts. Dredging and channelization immediately downstream in the Middle Fork Red River HUC 12 likely lowered the base level resulting in upstream incision. No dams occur in the wetland complex. Livestock grazing was not observed. Historic soil disturbance has likely led to locally high cover of introduced species including Canada thistle, creeping bentgrass, fowl bluegrass, Kentucky bluegrass, and reed canarygrass. High temperatures impaired water quality. Brook trout are present. The wetland complex has moderate potential and opportunity for improving water quality but high potential and opportunity for reducing flooding and erosion in the watershed. Restoration and enhancement would likely enhance these functions.

Landscape context and viability: The Nez Perce NF managed the entire wetland. Land was managed as forest, with logging and recreational activities present. The Meadow Creek fire was burning at the edge of the HUC 12 at the time of survey. Several logged areas occurred adjacent to the wetland complex. No dams or agricultural activities are present upstream of the wetlands, but old mines, numerous roads, and houses did occur (Table 6). This wetland was immediately upstream of the Middle Red River - Red River Ranch Meadows wetland complex (Appendices 1, 2). Functional connectivity had been impacted by channelization near the Red River Ranger Station.

Middle Red River - Red River Ranch Meadows (Restoration Opportunity)

Habitat diversity and richness: This large wetland complex was within the Middle Red River HUC 12 (Figures 40, 41). It was in mid-elevation rolling uplands at elevations between 1,310-1,440 m (4,290-4,720 ft). It supported a large meadow fed by perennial first and second order creeks (Blanco, Little Moose, Moose Butte), along with several ephemeral streams. These water sources fed the Red River which bisected the broad, flat bottomed alluvial valley. The river was moderately sinuous and somewhat incised. It supported riffle-glide habitat and had a cobble dominated channel. Large areas of the wetland complex were managed for hay production, but the majority was used as seasonally moist to wet cattle pasture. Consequentially, introduced seeded hay and forage grasses, with locally abundant noxious weeds, dominated most meadow habitat. Relict water sedge-dominated wet meadow occurred in wet swales and abandoned river

meander scars. A reach of the river in the lower half of the wetland complex had been restored (Siddall 1992). Scrub-shrub wetlands were relatively rare in the wetland complex. Small patches of shrubs occurred on the floodplain and adjacent alluvial terraces near the Red River Ranger Station at the upper end of the complex. Species included mountain alder and Booth's, Drummond's, dusky, Lemmon's, and Sitka willow (Table 5). Some of these species were planted in the restored reach along with several introduced shrub species. Reed canarygrass was the most common mesic graminoid on streambanks and floodplain terraces. Dusky willow, lakeshore sedge, Coville's rush (*Juncus covillei*), and swordleaf rush (*Juncus ensifolius*) had colonized recently formed floodplain sand and cobble point and side bars. Whitewater crowfoot formed aquatic beds in slowly moving water. Habitat diversity was moderate, but as restored areas develop diversity is expected to increase. The restored reach supported chinook salmon spawing (6 pairs observed). Spotted frog and bald eagle were observed.

Wetland ecological systems

Rocky Mountain Alpine-Montane Wet Meadow
Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations

reed canarygrass	*Phalaris arundinacea*	G5
dusky willow/cobble bar	*Salix melanopsis*/cobble bar	G3G4

Biodiversity significance and rarity:

At-risk wetland animals

bull trout	*Salvelinus confluentus*	G3
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarkii lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

bald eagle	*Haliaeetus leucocephalus*	G4
black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
harlequin duck	*Histrionicus histrionicus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
short-eared owl	*Asio flammeus*	G5
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: Condition of the wetland complex varied from poor to fair, but restoration potential is high (Table 6). Starting in 1984, this section became the focus of active long-term aquatic, riparian, and wetland habitat restoration (Siddall

1992). Red River (downstream of the Ranger Station through the Red River Ranch reach) was dredge-mined and channelized in the 1940's and 1950's (Siddall 1992). The channel became incised due to the increased channel gradient. This lowered groundwater (reducing wetlands), decreased floodplain width, eliminated beneficial riparian vegetation, increased streambank instability, and degraded aquatic habitat (e.g., less woody debris, spawning gravels, pools, etc.). High temperatures and excessive sediment impaired water quality. Brook trout were present. About 5 small ranches, with homes and associated buildings, were present in the wetland complex. A landing strip and both paved and gravel roads also occurred. Road density was moderately high and agricultural activities (hay production) occurred in the wetland complex. Streambanks and wetlands were heavily grazed in some areas. Patchy infestations of introduced species, such as seeded forage grasses, Canada thistle, oxeye daisy, reed canarygrass, and spotted knapweed were common.

Prior to 1991, restoration included in-stream habitat improvements (e.g., (such as log weirs and boulders) (Siddall 1992). In 1991, restoration of a natural channel geomorphology and meander pattern began in the Red River Ranch reach. The goal was to improve riparian habitat to reduce streambank erosion and improve native fish habitat (e.g., increase pool-riffle component and overhanging bank cover) (Siddall 1992). This was done by reconnecting the river with its former floodplain and restoring processes that move excess sediment from the system. Restoration included placement of constructed large woody debris revetments on eroding banks and in-stream boulder drop structures to control grade. At the time of survey, point bars on the inside of meanders were being colonized by native species and outside banks appeared stable and functioning as designed. Adjacent terraces were planted with a mix of native and introduced woody species and seeded with a mix of introduced forage grasses and legumes. Livestock grazing was excluded. Intense ungulate browsing has reduced growth of planted shrubs.

Landscape context and viability: The meadow portion of the wetland complex was nearly all privately owned. The Nez Perce NF managed the remainder. Private land was managed for pasture (both wetland and upland), hay production, rural housing, and wood production. The restored riparian area was managed as wildlife habitat. No dams were present upstream of the wetlands, but old mines, numerous roads, and houses and other developments occurred (Table 6). The wetland complex was immediately downstream of the Upper Red River - Red River Ranger Station and 2.6 km upstream of Middle Red River - Red River WMA wetland complexes (Figures 38, 39).

Elk Creek - Elk City Meadows (Restoration Opportunity)

Habitat diversity and richness: This large wetland complex was within the Elk Creek HUC 12 (Figure 42, 43). It was in mid-elevation rolling uplands at elevations between 1,210-1,365 m (3,975-4,480). It supported a large meadow fed by several perennial creeks (Big Elk Creek, Little Elk Creek, Monroe Creek, Swale Creek), along with ephemeral streams. These water sources flowed through broad, flat bottomed alluvial valleys. These creeks often had reduced sinuosity and were incised relative to the channel morphology expected for this valley type (i.e., Rosgen C or E-type streams).

Large areas of the wetland complex were managed for hay production or used as seasonally moist to wet cattle pasture. Introduced seeded hay and forage grasses (especially bentgrasses), with locally abundant noxious weeds, dominated most meadow habitat. Relict wet meadow vegetation was occasionally present. Forested and scrub-shrub wetlands were relatively rare in the wetland complex. Small patches of shrubs, including Lemmon's willow, and occasionally Engelmann spruce were present (Table 5). Habitat diversity was relatively low. The current potential and opportunity of the wetland to provide habitat for species is reduced due to wetland impacts.

Wetland ecological systems
Rocky Mountain Subalpine-Montane Riparian Shrubland
Rocky Mountain Subalpine-Montane Riparian Woodland

Wetland plant associations

Lemmon's willow/mesic graminoids	*Salix lemmonii*/mesic graminoids	GNR

Biodiversity significance and rarity:

At-risk wetland animals

bull trout	*Salvelinus confluentus*	G3
chinook salmon	*Oncorhynchus tshawytscha*	G5T1
steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
westslope cutthroat trout	*Oncorhynchus clarkii lewisi*	G4T3

At-risk wetland animals predicted to occur (excluding fish)

black swift	*Cypseloides niger*	G4
boreal owl	*Aegolius funereus*	G5
fisher	*Martes pennanti*	G5
gray wolf	*Canis lupus*	G4
harlequin duck	*Histrionicus histrionicus*	G4
Idaho giant salamander	*Dicamptodon aterrimus*	G3
peregrine falcon	*Falco peregrinus*	G4T3
short-eared owl	*Asio flammeus*	G5
wolverine	*Gulo gulo*	G4T4

Condition, quality, and integrity: Large areas of wetlands have been converted to hay fields, pasture, and ranch developments (Table 6). Seeded grasses, including bentgrasses, Canada bluegrass, reed canarygrass, and timothy, and noxious weeds (especially Canada thistle) were common. Road density was high. No dams or evidence of mines were observed in the wetland complex (although it is likely that placer mining took place historically). High temperatures impaired water quality. Brook trout were present. However, numerous opportunities for restoration exist. Small areas of riparian habitat have been fenced to exclude livestock and planted with willows. Overall, the wetland complex has moderate potential and opportunity for improving water quality, but high potential and opportunity for reducing flooding and erosion. These functions would be expected to improve with large-scale watershed restoration.

Landscape context and viability: The meadow portion of the wetland complex was nearly all privately owned. The Bureau of Land Management managed the remainder, mostly upland forested edges. Private land was managed for pasture (both wetland and upland), hay production, rural housing, and wood production. The surrounding landscape had low density rural housing. The township of Elk City occurred on hills at the margin of the wetland. Dams, old mines, numerous roads, logging, houses, and other developments occurred upstream of the wetland complex (Table 6). The complex was 0.4 km upstream of the Elk Creek - West Elk City Valley wetland complex (Figure 15). A limited area of riparian zone had been fenced to exclude livestock grazing as part of a community-based restoration project.

DISCUSSION

Conservation and Restoration Assessment

Wetlands greatly varied in quantity, type, and condition across the South Fork and Middle Fork Clearwater subbasins. Most wetland losses in the study area were historical (Quigley et al. 1997), but on-going degradation was observed. A major cause of wetland loss and degradation in the South Fork Clearwater subbasin was historic dredge and hydraulic mining. Across the study area, 25% of HUC 12s were impacted by dredge and hydraulic mining (all in the South Fork subbasin). Conversion of wetlands to agricultural land and livestock pasture was the primary cause of historical wetland loss on the Camas Prairie. Across the study area, 38% of HUC 12s had agricultural land use with impacts concentrated in the Camas Prairie and lower portion of the Middle Fork subbasin. Road construction and maintenance, especially related to past and recent timber harvest, was an important impact in about 75% of HUC 12s. Encroachment of highways into former floodplains was common along both the South Fork and Middle Fork Clearwater Rivers. Noxious weed and other introduced species invasion impacted about 34% of wetland complexes assessed. Other current impacts to wetlands tended to be localized. These included improper livestock grazing and OHV travel. Currently, housing and urban developments impact more wetlands nationwide and in Idaho than any other land use (Dahl 2006). Based on surveys, housing development was an occasional threat to wetlands in the study area.

Ten percent of the 50 wetlands evaluated for this project were formally protected by their location in the Gospel Hump Wilderness. These were all Reference priority. Of 14 wetland complexes that had no protection, 6 were in roadless areas. The remaining 62% wetland complexes, including all Class II complexes, were partially protected. Protections included livestock exclusion, management for wildlife, and in-stream protective designation. About 54 miles of stream channel in the South Fork Clearwater subbasin have been designated by the Idaho Water Resource Board as Natural Rivers and Recreational Rivers (IDDWR 2004). While not affecting terrestrial wetlands, designation does protect streams from construction or expansion of dams or impoundments; construction of hydropower projects; dredge or placer mining; and mineral or sand and gravel extraction. In the Middle Fork subbasin, the main stem of

the Middle Fork Clearwater is federally designated as a Recreational River under the Wild and Scenic Rivers Act.

MANAGEMENT IMPLICATIONS

Opportunities for wetland conservation exist in both the South Fork and Middle Fork Clearwater subbasins. Ten percent of wetland complexes and 8% of HUC 12s assessed were identified as high priorities for wetland conservation. General strategies for wetland conservation across the study area include:

- Avoid negative impacts from land management in high priority wetlands of the Middle Fork Clearwater River-Big Smith Creek, Silver Creek, South Fork Red River, Upper American River, Upper Crooked River, and Upper Red River HUC 12s. Adequately buffer wetland complexes from new roads, other developments, and logging to prevent disruption of hydrologic and habitat functions.
- Designate protected streams in the Middle Fork Clearwater subbasin under Idaho's stream protection program.
- Evaluate existing roads and OHV trails for impacts to wetlands. Enforce current Travel Plan regulations and take action to prevent road and trail-related sediment input to streams. This could include fencing or other barriers.
- Implement grazing management to maintain or restore proper functioning condition of riparian habitat. Monitor wetland and riparian conditions. Evaluate the need for grazing exclosures in sensitive areas (i.e., fens, springs), Class II priority wetland complexes, and around at-risk wetland plant occurrences.
- Implement conservation and restoration recommendations outlined in Nez Perce National Forest assessments for the South Fork Clearwater subbasin (USDA Forest Service 1998, 2003)
- Prevent and control infestations of noxious weeds and other highly invasive introduced species (both terrestrial and aquatic). Use multiple approaches for weed control (e.g., chemical, biological, and mechanical) and focus on early detection of, and rapid response to, new infestations. Wetland complexes being restored (e.g., McComas Meadows, Middle Red River - Red River Ranch Meadows, Middle Red River – Red River WMA) need extra weed control effort. Wetland complexes disturbed by livestock grazing (e.g., American River Meadows - Table Meadows, Kay Creek, Upper American River Meadows) or with trails and roads through them are also susceptible.
- Promote beaver reintroduction and conservation. A closed beaver trapping season is recommended until populations are completely reestablished.
- Protect existing roadless areas. This would enhance conservation of 24% of the wetland complexes assessed.
- Protect springs and fens in upper watersheds that function to support base flows of streams through summer and fall.
- Pursue conservation easements for, or acquisition of, wetlands in HUC 12s with a high proportion of privately owned land or where important wetland habitat is privately owned. HUC 12s with functioning or restorable wetlands that might benefit from these efforts include Maggie Creek, Lower Cottonwood Creek,

Stockney Creek, and Red Rock Creek on the Camas Prairie; Lower Clear Creek and Middle Fork Clearwater River-Sutler Creek in the Middle Fork subbasin; and Elk Creek, Middle Red River, Upper American River, Upper Red River in the South Fork subbasin.

- Special designations, such as Wild and Scenic Rivers, Research Natural Areas, Areas of Critical Environmental Concern, or Special Interest Areas, can conserve ecologically significant wetlands on federal lands.

Across the study area, 38% of HUC 12s and wetland complexes were identified as Restoration Opportunity. Numerous programs provide opportunities for wetland restoration on both private and public lands. Technical and restoration assistance for privately-owned wetlands is available through the USFWS (e.g., Partners for Wildlife Program), IDFG (e.g., Habitat Improvement Program [HIP], Wildlife Habitat Incentives Program) and Natural Resources Conservation Service (NRCS) (e.g., Wetland Reserve Program). Information on these and other assistance programs is at http://fishandgame.idaho.gov/cms/wildlife/landowners/. Projects involving multiple cooperators are given higher priority. HIP also provides assistance for projects on federal lands such as fencing and restoring wetlands and riparian areas. The Nez Perce Tribe and others have effectively utilized funding from Bonneville Power Administration (through NPCC) and National Oceanic and Atmospheric Administration for restoration. The Palouse-Clearwater Environmental Institute (PCEI), a Moscow-based non-profit environmental education and ecological restoration organization, has utilized IDDEQ funding through Section 319 of the Clean Water Act for restoration. Wetland conservation and restoration can also be accomplished through and Idaho Transportation Department wetland mitigation programs. Wetland mitigation banking opportunities may exist in the study area. Monitoring the effectiveness of restoration projects is necessary for ensuring complete and proper implementation of plans. Importantly, future management should be adaptive to results of monitoring. Long-term monitoring of restoration projects is critical for determining the efficacy of various methods and whether or not wetlands are functioning as desired.

MANAGEMENT IMPLICATIONS

Landscape Conservation Strategy

Landscape-scale assessments can be used to set basin-wide or county-wide goals for wetlands protection, enhancement, and restoration. Results of our landscape-scale wetland assessment complement previous analyses of ecosystem integrity across the Clearwater basin (Quigley et al. 1997, The Nature Conservancy 2000, Northwest Power and Conservation Council 2003, Oechsli and Frissell 2003). Our results are also comparable to South Fork Clearwater subbasin assessments (USDA Forest Service 1998, Bdour et al. 2001, USDA Forest Service 2003, IDDWR 2004). Collaboration involving a broad spectrum of stakeholders (i.e., watershed advisory groups) is necessary for successful wetland conservation and restoration. Land managers should strive to mesh plans and collaborate on projects so that upper watershed (i.e., primarily USFS) and lower watershed management (i.e. Bureau of Land Management, Nez

Perce Tribe, county soil and water conservation districts, private) will benefit wetlands across the whole landscape.

The Restoration Opportunity HUC 12s identified in this study can guide conservation and restoration project planning toward creation of functioning landscape-scale wetland complexes. Wetland creation and enhancement projects often focus on common wetland types and are usually limited to small portions of the landscape. In contrast to small-scale wetland creation, a network of restoration sites designed to represent the full range of habitat diversity and existing functions can be more cost efficient in the long-term. New projects should strive to have hydrological connection to previous projects in order to create landscape linkages between functioning wetlands. Large, viable wetland complexes can result, with cumulative functional benefits.

Specific wetland conservation and restoration recommendations for landscapes in the study area are below.

Camas Prairie

Lower Cottonwood Creek had the highest ecological integrity of any HUC 12 on the Camas Prairie (Oechsli and Frissell 2003, IDDWR 2004). Although a low priority for conservation across the entire study area, this HUC 12 was the highest priority on the Camas Prairie for conservation and restoration of riparian habitat. Restoration in the South Fork Clearwater River-Rabbit Creek and Threemile Creek HUC 12s would most benefit the most species and riparian habitat (USDA Forest Service 1998, IDDWR 2004). Other HUC 12s where restoration could benefit a diverse group of species and habitats were Butcher Creek and South Fork Cottonwood Creek. On the Camas Prairie, restoration in agricultural areas has included creation of sediment retention wetlands (i.e., IDFG HIP and NRCS Farm Bill program projects). Threemile Creek has been the focus of several watershed restoration efforts aimed at improving water quality. The Rylaarsdam project, on Threemile Creek restored 850 m of streambanks. The Mennet Wildlife Habitat Incentives Program project created 4 ha of emergent wetlands.

Middle Fork Clearwater Subbasin

Middle Fork Clearwater River-Big Smith Creek had moderately good ecological integrity (Oechsli and Frissell 2003), but the second highest biodiversity significance of any HUC 12 in the entire study area. It was the highest priority for conservation in the Middle Fork subbasin. This HUC 12 would benefit from minimizing impacts to tributary riparian habitat outside the designated Recreational River corridor. Additional highway and recreation impacts to the floodplain in the Recreational River corridor should be avoided. Protection of the Middle Fork Face roadless area would benefit this HUC 12. Conservation in Maggie Creek and South Fork Clear Creek HUC 12s would benefit numerous wetland dependent species and communities. In the Maggie Creek HUC 12, conservation easements could be pursued for wetlands on private lands and management improved (e.g., larger buffers) for wetlands on Idaho state endowment land. Protection of the Clear Creek roadless area would benefit the South Fork Clear

Creek HUC 12. Conservation in the Middle Fork Clearwater River-Sutler Creek HUC 12 could restore a continuous riparian habitat corridor from Lowell to Kooskia for the benefit of biodiversity. This HUC 12 is a conservation target for The Nature Conservancy (TNC 2000).

South Fork Clearwater Subbasin

The highest priority HUC 12 for wetland conservation is Upper American River (USDA Forest Service 1998, Oechsli and Frissell 2003, IDDWR 2004). Actions to protect springs, fens, and meadows are recommended. These include monitoring livestock grazing, introduced species, and OHV use and taking protective action (i.e., excluding incompatible uses) if negative impacts to wetlands are detected. Conservation easements for wet meadows on private land should be pursued. Protection of the Lick Point roadless area would benefit this HUC 12. HUC 12s where numerous wetland species and sensitive habitats would benefit from conservation efforts include (USDA Forest Service 1998, Oechsli and Frissell 2003, IDDWR 2004):

- Lower Johns Creek
- Mill Creek
- Silver Creek
- South Fork Clearwater River-Peasley Creek
- South Fork Red River
- Tenmile Creek
- Twentymile Creek
- Upper Crooked River
- Upper Red River

Protection of roadless areas would conserve portions of all the above HUC 12s except Mill Creek. Johns Creek is eligible for federal designation as a Wild River and the South Fork Clearwater as a Recreational River under the Wild and Scenic Rivers Act (USDA Forest Service 2007b). Designation would add protection for riparian wetlands in Lower Johns Creek, South Fork Clearwater River-Peasley Creek, and other HUC 12s.

Implementing recommendations in the subbasin review (USDA Forest Service 1998), Red River watershed ecosystem analysis (USDA Forest Service 2003), water quality improvement implementation plan (IDDEQ 2006), and water resource protection plan (IDDWR 2004) has resulted in numerous collaborative ecological restoration projects in the South Fork subbasin over the last 25 years. These include small-scale culvert replacements, fish migration barrier removals, and riparian fencing in some montane meadows. Numerous partners (e.g., Idaho County Soil and Water Conservation District, IDFG, Nez Perce National Forest (NF), Nez Perce Tribe, private landowners, and others) have implemented large-scale hydrologic, geomorphic, and riparian restoration in incised and dredge mined areas along Red River and Crooked River (Siddall 1992, Klein 2004). The Nez Perce Tribe has restoration projects in Meadow Creek (McComas Meadows), Mill Creek, Newsome Creek, and Red River (http://www.nezperce.org/content/Programs/fisheries_habitat_watershed_divi.htm).

In addition to on-going work (i.e., Klein 2004), new restoration projects would benefit biodiversity in the Meadow Creek and Middle Red River HUC 12s (USDA Forest Service 1998, IDDWR 2004). Control of noxious weeds and invasive introduced species should be a priority in the Meadow Creek HUC 12. Restoration in the South Fork Clearwater River-Grouse Creek HUC 12 would also benefit numerous aquatic and terrestrial species (USDA Forest Service 1998, IDDWR 2004). PCEI is stabilizing and restoring 140 m of South Fork Clearwater streambank in this HUC 12 (http://www.pcei.org/water/restoration.htm). Wetlands and springs in and around Earthquake Meadows would also be suitable for restoration in this HUC 12.

Riparian habitats historically heavily impacted by historical dredge and hydraulic placer mining would benefit from restoration (USDA Forest Service 1998). HUC 12s needing restoration of mined areas include Lower American, Lower Red River, Lower Crooked, Lower Newsome, South Fork Clearwater River-Leggett Creek, South Fork Clearwater River-Lightning Creek, and South Fork Clearwater River-Wing Creek. A dredge mined reach in the Lower Crooked HUC 12 was restored in the late 1980s. Stream channel geomorphology and meander pattern was restored for the purpose of improving riparian and aquatic habitat (Siddall 1992). This was done by removing dredge fill and creating a new stream base level. Adjacent terraces were planted with a mix of native and introduced woody species and seeded with a mix of introduced forage grasses and legumes (Siddall 1992). This type of restoration is expensive but can significantly improve habitat conditions. Lower American and South Fork Clearwater River-Lightning Creek would be the highest priority for HUC 12s needing mine-site restoration in terms of overall benefit to species and habitat (Oechsli and Frissell 2003, IDDWR 2004).

Sub-watershed Conservation Strategy

At the sub-watershed scale, prioritization of the most ecologically significant functioning wetlands is important for conservation planning, identifying restoration needs, and mapping reference sites (Hruby 2004). Stakeholders, including federal, state, county, and municipal agencies and regulators, private businesses, organizations, and individuals, can use this information in a variety of ways. They can assess the relative conservation value of individual wetlands, analyze impacts of projects or permit activities, and better direct resources for protection, mitigation, and restoration. The approach is proactive because it makes such information available at the early stages of land-use planning, prior to regulatory actions (IDCDC 2006). This information complements watershed and sub-watershed scale management plans that exist in the South Fork related to habitat, ecological restoration (USDA Forest Service 1998, 2003), and water quality improvement (IDDEQ 2003, 2006). It can also be used to leverage additional public and private resources for wetlands conservation. Lists of at-risk wetland animals and systems predicted to occur in complexes can be used to implement the Idaho Comprehensive Wildlife Conservation Strategy (IDFG 2005).

This project assessed the ecological significance of specific wetland complexes at the sub-watershed scale using plant association information, rare plant and animal occurrence data, and observations of wetland condition and landscape context. Plant

associations nest into the hierarchical NWI classification and provide fine-scale information relative to land management (Jankovsky-Jones 1996). The plant association can be used as an indicator of environmental or site attributes, such as hydrologic functions, and as a coarse filter for preservation of biodiversity. Additionally, plant association descriptions, stand tables, and reference site information provide a baseline for planning and monitoring restoration efforts (Jankovsky-Jones 1996).

Specific conservation and restoration recommendations for wetland complexes are highlighted below.

Class II wetlands

Class II wetland complexes are difficult, though not impossible, to restore, and provide very valuable wetland functions. They are often significant for biodiversity. They occur more commonly than Class I wetlands, but still need a relatively high level of protection (Hruby 2004, IDCDC 2006). In the South Fork Clearwater subbasin, Class II wetland complexes were partially protected, but site-level management varied. With the exception of the East Fork Crooked River Headwaters wetland complex, located in high elevation mountains, complexes with the highest habitat diversity and biodiversity significance were located in mid-elevation, broad alluvial valleys. These valleys were also where most mining, logging, ranching, home development, roads, and recreation activities occurred, cumulatively threatening wetland function. All Class II complexes in the South Fork Clearwater subbasin supported sensitive and/or functionally important wetland habitats. Sensitive fens, fen-like wet meadows, springs, and swampy forested wetlands occurred in all Class II complexes. Protection of roadless areas would provide partial protection to all Class II complexes.

East Fork Crooked River Headwaters had the highest ecological condition score. The upper watershed encompassing the complex and adjacent wetlands would be suitable for RNA designation. This wetland complex would provide good representation for upper montane fens, wet meadows, springs, and swampy forests. Upper Red River - Red River Hotsprings Meadows had the highest biodiversity significance score. It was the most threatened wetland, mainly due to construction of summer homes at the margin of meadows in the center of the complex, but also from road and recreation impacts. Conservation easements or acquisition should be pursued for wet meadows and adjacent uplands on private land in this complex, especially in lower Trail Creek. The privately owned meadow at the confluence of Spring Creek, Lick Creek, and American River in the American River Meadows - Table Meadows complex might also benefit from a conservation easement. Except for East Fork Crooked River Headwaters, located entirely within a roadless area, complexes were impacted by roads that traversed wetland margins. Roads increased wetland vulnerability to OHV intrusion (observed at Table Meadows), trampling from dispersed recreation, and hydrologic disturbance. Existing roads, OHV trails, dispersed recreation, and livestock grazing should be evaluated for impacts to Class II wetlands and management regulations enforced. Fencing of wetlands to exclude incompatible activities might be needed at Table Meadows, Silver Creek - China Point Sloped Wetlands, or elsewhere.

Reference wetlands

Ideally, a reference wetland should represent the full range of abiotic and biotic characteristics that were present prior to significant disturbance of the environment. However, in the current environment of the study area, few undisturbed sites were found. The least disturbed reference wetlands were located in high elevation mountains in wilderness or roadless areas. For the purpose of this study, we use the term reference broadly. Reference wetland complexes are examples of properly functioning wetland and riparian systems representing a diversity of mostly high-quality ecological systems and aquatic and terrestrial communities. They are defined within the context of actual watershed condition and land management. The use of a reference area as a model for restoration or enhancement projects is the best way to potentially replicate wetland functions and the distribution and composition of native plant communities.

Lower Johns Creek - Canyon Mouth was the highest priority wetland complex at low elevations (732 to 1,097 m [2,400 to 3,600 ft]) in the South Fork subbasin. It is a reference area for restoration of Columbia Basin Foothill Riparian Woodland and Shrubland and lower elevation expressions of Rocky Mountain Subalpine-Montane Riparian Shrubland and Woodland ecological systems. Tenmile Creek Sloped Wetlands and Upper American River Meadows complexes are reference areas for mid to high elevation fens, fen-like wet meadows, springs, and swampy forested wetlands.

Reference wetland complexes were relatively well protected in the study area. Five of 11 Reference wetland complexes were protected in the Gospel Hump Wilderness. Protection of roadless areas would provide partial or complete conservation for all 6 unprotected complexes. The Kay Creek wetland was the highest priority complex with no protection. It was vulnerable to cattle trampling impacts. Livestock should be managed to minimize impacts to springs and riparian areas in the Kay Creek complex. Additional road building in the upper watershed around Kay Creek is discouraged. Johns Creek is eligible for federal designation as a Wild River under the Wild and Scenic Rivers Act (USDA Forest Service 2007b). Designation would add protection for riparian areas in the Lower Johns Creek - Canyon Mouth complex.

Habitat wetlands

Habitat wetland complexes support a variety of wetland communities and are important for biodiversity or various functions. However, they are sometimes ecologically degraded and require more intensive management to maintain or restore wetland functions. These complexes can provide valuable linkages, both hydrological and biological, between higher priority wetlands across a landscape. Habitat complexes were not well protected in the study area. Forty percent were partially protected and none were completely protected. The majority of the Buck Meadows complex was protected from livestock grazing by a fenced exclosure. Protection of roadless areas would provide partial or complete conservation for all 9 unprotected complexes. All Habitat wetlands would benefit from the same conservation and restoration recommendations described for Class II and Reference complexes.

Restoration Opportunity wetlands

Restoration Opportunity wetlands are sites where recommendations outlined in subbasin reviews, plans, and assessments (e.g., USDA Forest Service 1998, USDA Forest Service 2003, IDDEQ 2006) can be implemented. It is widely recognized that mitigating wetland loss by creation of wetlands or intensive restoration is more costly than conservation or management-driven restoration (Dahl 2006). The ecological condition of most degraded riparian vegetation can be improved through changes in land management and use of volunteers in supplemental planting of native species. These activities cost significantly less than wetland creation or restoration projects requiring engineered channel or complex design work involving heavy machinery. Such a community-based approach has been used for several restoration projects in the South Fork subbasin. In the South Fork Clearwater River - Mile 18 to Farrens Creek Restoration Opportunity wetland complex, PCEI has stabilized and restored about 140 m of river bank (http://www.pcei.org/water/restoration.htm). In the Elk Creek - Elk City Meadows Restoration Opportunity complex, Framing Our Communities, an Elk City-based community development and restoration non-profit organization, has restored riparian habitat by fencing streambanks to exclude livestock and planting woody species (http://www.framingourcommunity.org/).

Based on our results, the two highest priority wetlands for restoration in the South Fork subbasin were McComas Meadows and Middle Red River - Red River WMA. Restoration of these wetlands benefits a diverse array of at-risk species and habitats not well represented in other complexes. Both complexes already have significant restoration efforts, including engineered channel reconstruction, extensive riparian plantings, weed management, and fencing (Klein 2004). Nearly all the McComas Meadows complex has been fenced. Control of noxious weeds and invasive introduced species should be a priority for wetland restoration at McComas Meadows. About 40% of the Middle Red River - Red River WMA wetland complex has been restored. Opportunities for restoration occur both upstream and downstream of the WMA. Restoration upstream of the WMA would provide landscape linkage with the restored section of the Middle Red River - Red River Ranch Meadows wetland complex.

All Restoration Opportunity wetlands would benefit from the same conservation and restoration recommendations described for Class II, Reference, and Habitat complexes. About 80% of Restoration Opportunity wetland complexes were partially protected, either by livestock exclosures and/or Idaho stream protection designation. The South Fork Clearwater River - Allison Creek, Elk Creek - West Elk City Valley, Mill Creek - Merron Creek Melton Creek Confluence, and South Fork Clearwater River - Santiam Creek complexes were not protected. Long-term restoration site protection is important for ensuring the restored functions and values are maintained.

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Table 1. Indicators used to rank HUC 12s and wetland complexes.

Indicator	Habitat Diversity and Richness	Biodiversity Significance and Rarity	Condition, Quality, and Integrity	Landscape Context and Viability
richness of plant associations	W[1]			
richness of mapped NWI classes	W			
richness of wetland/riparian ecological systems	L, W			
richness of at-risk wetland-dependent animals		L, W		
richness of at-risk wetland-dependent plants		L, W		
richness of globally rare (G1-G3) wetland plant associations		L, W		
rare, sensitive, irreplaceable, or very functionally important wetlands*		L, W		
area in agricultural land use classes			L, W	
cover of introduced plant species			W	
number of dams and diversions			L, W	
number of mine sites			L, W	
number of water quality impairments			L, W	
recent livestock grazing*			L, W	
roads density			L, W	
agricultural land use upstream of wetland in same HUC 12*				W
dams and diversions upstream of wetland in same HUC 12*				W
roads upstream of wetland in same HUC 12*				W
mines upstream of wetland in same HUC 12*				W

[1] 'L' denotes indicators assessed for each HUC 12 at the landscape scale and 'W' denotes indicators assessed at the wetland complex scale.

* presence/absence

Table 2. Ranking data and scores for condition, habitat, and biodiversity indicators and conservation prioritization for all HUC 12s in study area.

Location	HUC 12 Name	Livestock Grazing	Dams Count	Dams Score	Mines Count	Mines Score	Water Quality Impairments Count	Water Quality Impairments Score	% Agriculture	Agriculture Score	Road Density	Road Density Score	Total Condition	Total Habitat Diversity & Biodiversity Significance	Total	Priority
Camas Prairie	Lower Cottonwood Creek	0	0	3	0	3	0	3	1.0	0	0.5	3	12	7	19	Low
Camas Prairie	Stockney Creek	0	0	3	0	3	0	3	1.0	0	1.2	1	10	6	16	Low
Camas Prairie	Red Rock Creek	0	0	3	0	3	1	2	1.0	0	0.8	2	10	5	15	Low
Camas Prairie	South Fork Clearwater River-Rabbit Creek	0	0	3	0	3	6	0	0.9	0	1.2	1	7	18	25	Restoration Opportunity
Camas Prairie	Threemile Creek	0	1	2	0	3	6	0	0.9	0	1.3	1	6	18	24	Restoration Opportunity
Camas Prairie	South Fork Cottonwood Creek	0	0	3	0	3	1	2	1.0	0	1.4	1	9	14	23	Restoration Opportunity
Camas Prairie	Butcher Creek	0	0	3	0	3	4	0	0.9	0	1.1	1	7	12	19	Restoration Opportunity
Camas Prairie	Shebang Creek	0	0	3	0	3	1	2	1.0	0	1.1	1	9	5	14	Restoration Opportunity
Camas Prairie	Upper Cottonwood Creek	0	0	3	0	3	0	3	1.0	0	1.7	0	9	5	14	Restoration Opportunity
Middle Fork	Middle Fork Clearwater River-Big Smith Creek	0	0	3	0	3	0	3	0.0	3	1.2	1	13	29	42	High
Middle Fork	South Fork Clear Creek	0	0	3	0	3	0	3	0.0	3	0.4	3	15	19	34	Medium
Middle Fork	Maggie Creek	0	0	3	0	3	0	3	0.3	0	1.2	1	10	22	32	Medium
Middle Fork	Lower Clear Creek	0	0	3	0	3	0	3	0.6	0	1.2	1	10	18	28	Low
Middle Fork	Upper Clear Creek	0	0	3	0	3	0	3	0.0	3	1.0	2	14	14	28	Low
Middle Fork	Middle Fork Clearwater River-Sutler Creek	0	0	3	0	3	2	1	0.7	0	1.1	1	8	21	29	Restoration Opportunity
South Fork	Upper American River	0	0	3	0	3	1	2	0.0	3	0.8	2	13	30	43	High
South Fork	Meadow Creek	0	0	3	0	3	1	2	0.0	3	1.5	1	12	28	40	High
South Fork	South Fork Clearwater River-Peasley Creek	0	0	3	0	3	2	1	0.0	3	1.4	1	11	25	36	Medium

Table 2
continued.

Location	HUC 12 Name	Livestock Grazing	Dams Count	Dams Score	Mines Count	Mines Score	Water Quality Impairments Count	Water Quality Impairments Score	% Agriculture	Agriculture Score	Road Density	Road Density Score	Total Condition	Total Habitat Diversity & Biodiversity Significance	Total	Priority
South Fork	Upper Red River	1	0	3	4	0	1	2	0.0	3	0.7	2	10	25	35	Medium
South Fork	Mill Creek	0	0	3	0	3	2	1	0.0	3	0.9	2	12	22	34	Medium
South Fork	Silver Creek	0	0	3	0	3	1	2	0.0	3	0.2	3	14	19	33	Medium
South Fork	Lower Johns Creek	0	0	3	0	3	2	1	0.0	3	0.3	3	13	19	32	Medium
South Fork	South Fork Red River	1	0	3	0	3	1	2	0.0	3	0.6	2	13	19	32	Medium
South Fork	Twentymile Creek	1	0	3	0	3	2	1	0.0	3	0.5	3	13	18	31	Medium
South Fork	Upper Crooked River	1	0	3	11	0	1	2	0.0	3	0.5	3	11	20	31	Medium
South Fork	East Fork American River	0	0	3	0	3	1	2	0.0	3	0.1	3	14	14	28	Low
South Fork	Tenmile Creek	1	0	3	7	0	2	1	0.0	3	0.2	3	10	18	28	Low
South Fork	South Fork Clearwater River-Wing Creek	0	0	3	2	1	2	1	0.0	3	0.4	3	11	15	26	Low
South Fork	Upper Johns Creek	1	0	3	0	3	1	2	0.0	3	0.1	3	14	12	26	Low
South Fork	Gospel Creek	1	0	3	0	3	1	2	0.0	3	0.0	3	14	11	25	Low
South Fork	Lower American River	0	0	3	1	2	2	1	0.0	2	0.8	2	10	15	25	Low
South Fork	Lower Crooked River	0	0	3	2	1	2	1	0.0	3	0.8	2	10	11	21	Low
South Fork	South Fork Clearwater River-Grouse Creek	0	0	3	1	2	2	1	0.0	3	1.6	0	9	22	31	Restoration Opportunity
South Fork	Middle Red River	0	0	3	1	2	2	1	0.1	1	0.9	2	9	19	28	Restoration Opportunity
South Fork	Upper Newsome Creek	0	1	2	2	1	1	2	0.0	3	1.4	1	9	17	26	Restoration Opportunity
South Fork	Lower Red River	0	0	3	10	0	2	1	0.0	3	1.5	1	8	16	24	Restoration Opportunity

Table 2. continued.

Location	HUC 12 Name	Livestock Grazing	Dams Count	Dams Score	Mines Count	Mines Score	Water Quality Impairments Count	Water Quality Impairments Score	% Agriculture	Agriculture Score	Road Density	Road Density Score	Total Condition	Total Habitat Diversity & Biodiversity Significance	Total	Priority
South Fork	Elk Creek	0	1	2	2	1	1	2	0.2	0	1.0	2	7	16	23	Restoration Opportunity
South Fork	South Fork Clearwater River-Leggett Creek	0	0	3	16	0	2	1	0.0	3	1.1	1	8	15	23	Restoration Opportunity
South Fork	South Fork Clearwater River-Lightning Creek	0	0	3	1	2	2	1	0.4	0	1.2	1	7	16	23	Restoration Opportunity
South Fork	Lower Newsome Creek	0	0	3	3	0	2	1	0.0	3	0.8	2	9	13	22	Restoration Opportunity

Table 3. Ecological systems, plant associations, and at-risk plants and animals for HUC 12's in study area.

Butcher Creek (170603050801)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	Constance's Bittercress	Cardamine constancei	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bald eagle	*Haliaeetus leucocephalus*	G5
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	Townsend's big-eared bat	*Corynorhinus townsendii*	G4
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
East Fork American River (170603050202)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	California sedge	*Carex californica*	G5
	Case's corydalis	*Corydalis caseana* ssp. *hastata*	G5T3
	deer-fern	*Blechnum spicant*	G5
	evergreen kittentail	*Synthyris platycarpa*	G3
	Idaho strawberry	*Waldsteinia idahoensis*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Elk Creek (170603050204)			
Ecological Systems			
	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
	Lemmon's willow/mesic graminoids	*Salix lemmonii/mesic graminoids*	GNR
	subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
	subalpine fir/bluejoint reedgrass, dwarf huckleberry phase	*Abies lasiocarpa/Calamagrostis canadensis, Vaccinium caespitosum* phase	G5
	subalpine fir/twisted-stalk	*Abies lasiocarpa/Streptopus amplexifolius*	G4

	subalpine fir/twisted-stalk, Canbys licorice-root phase	*Abies lasiocarpa/Streptopus amplexifolius, Ligusticum canbyi* phase	G4
	subalpine fir/twisted-stalk, twisted-stalk phase	*Abies lasiocarpa/Streptopus amplexifolius, Streptopus amplexifolius* phase	G4
	western redcedar/common ladyfern	*Thuja plicata/Athyrium filix-femina*	G3G4
	western redcedar/common ladyfern, common ladyfern phase	*Thuja plicata/Athyrium filix-femina, Athyrium filix-femina* phase	G3
	western redcedar/common ladyfern, maidenhair fern phase	*Thuja plicata/Athyrium filix-femina, Adiantum pedatum* phase	G3
Plants	**Common Name**	**Scientific Name**	**Rank**
	Idaho strawberry	*Waldsteinia idahoensis*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Gospel Creek (170603050602)			
Ecological Systems			
	Open Water		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	peatmoss	*Sphagnum mendocinum*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
	wolverine	*Gulo gulo*	G4T4
Lower American River (170603050203)			
Ecological Systems			
	Open Water		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	California sedge	*Carex californica*	G5
	Case's corydalis	*Corydalis caseana* ssp. *hastata*	G5T3
	Idaho strawberry	*Waldsteinia idahoensis*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Lower Clear Creek (170603040203)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		

	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	black cottonwood/mountain alder	*Populus balsamifera* ssp. *trichocarpa/Alnus incana*	G3
	dusky willow/cobble bar	*Salix melanopsis*/cobble bar	G3G4
	western redcedar/common ladyfern	*Thuja plicata/Athyrium filix-femina*	G3G4
Plants	**Common Name**	**Scientific Name**	**Rank**
	tortured horsehair lichen	*Bryoria tortuosa*	G5
	evergreen kittentail	*Synthyris platycarpa*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bald eagle	*Haliaeetus leucocephalus*	G5
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Lower Cottonwood Creek (170603050905)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Open Water		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bald eagle	*Haliaeetus leucocephalus*	G5
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Lower Crooked River (170603050402)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	Idaho strawberry	*Waldsteinia idahoensis*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
	wolverine	*Gulo gulo*	G4T4
Lower Johns Creek(170603050603)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		

Plant Associations	Common Name	Scientific Name	Rank
	arrow-leaf groundsel	*Senecio triangularis*	G3?
	grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
	mountain alder/common ladyfern	*Alnus incana/Athyrium filix-femina*	G3
	mountain alder/fowl managrass	*Alnus incana/Glyceria striata*	G4?
	mountain alder/mesic graminoids	*Alnus incana*/mesic graminoids	G3
	mountain alder/water sedge	*Alnus incana/Carex aquatilis*	G2?
	panicled bulrush	*Scirpus microcarpus*	GU
	Sitka alder/common ladyfern	*Alnus viridis* ssp. *sinuata/Athyrium filix-femina*	G3G4
	subalpine fir/twisted-stalk	*Abies lasiocarpa/Streptopus amplexifolius*	G4
	water sedge	*Carex aquatilis*	G5
Plants	**Common Name**	**Scientific Name**	**Rank**
	peatmoss	*Sphagnum mendocinum*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	gray wolf	*Canis lupus*	G4
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Lower Newsome Creek (170603050502)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	evergreen kittentail	*Synthyris platycarpa*	G3
	Idaho strawberry	*Waldsteinia idahoensis*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
	wolverine	*Gulo gulo*	G4T4
Lower Red River(170603050104)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	bank monkeyflower	*Mimulus clivicola*	G4
	California sedge	*Carex californica*	G5
	Idaho strawberry	*Waldsteinia idahoensis*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5

	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	northern leopard frog	*Rana pipiens*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
	wolverine	*Gulo gulo*	G4T4
Maggie Creek (170603040103)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Montane-Foothill Aquatic Bed and Emergent Marsh		
	Rocky Mountain Montane-Foothill Springs		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
	Seeded Perennial Grassland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	black hawthorn/common snowberry	*Crataegus douglasii/Symphoricarpos albus*	G2
	common cattail	*Typha latifolia*	G5
	fowl mannagrass	*Glyceria striata*	G3
	timothy	*Phleum pratense*	GNR
Plants	**Common Name**	**Scientific Name**	**Rank**
	deer-fern	*Blechnum spicant*	G5
	tortured horsehair lichen	*Bryoria tortuosa*	G5
Animals	**Common Name**	**Scientific Name**	**Rank**
	bald eagle	*Haliaeetus leucocephalus*	G5
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Meadow Creek (170603050702)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
	Rocky Mountain Subalpine-Montane Seasonally Flooded Pool		
	Seeded Perennial Grassland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	American mannagrass	*Glyceria grandis*	G2?
	bigleaf sedge	*Carex amplifolia*	G3
	black hawthorn/cow parsnip	*Crataegus douglasii/Heracleum maximum*	G1
	blister sedge	*Carex vesicaria*	G4Q
	bluejoint reedgrass	*Calamagrostis canadensis*	G4
	creeping bentgrass	*Agrostis stolonifera*	GNR
	creeping spikerush (lentic)	*Eleocharis palustris* (lentic)	GNR
	fowl bluegrass	*Poa palustris*	GNR

	mountain alder/mesic graminoids	*Alnus incana*/mesic graminoids	G3
	panicled bulrush	*Scirpus microcarpus*	G4
	slenderbeak sedge	*Carex athrostachya*	GNR
	timothy	*Phleum pratense*	GNR
	water sedge	*Carex aquatilis*	G5
Plants	**Common Name**	**Scientific Name**	**Rank**
	bank monkeyflower	*Mimulus clivicola*	G4
	Constance's bittercress	*Cardamine constancei*	G3
	evergreen kittentail	*Synthyris platycarpa*	G3
	least moonwort	*Botrychium simplex*	G5
	nail lichen	*Pilophorus acicularis*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bald eagle	*Haliaeetus leucocephalus*	G4
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	mountain quail	*Oreortyx pictus*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Middle Fork Clearwater River-Big Smith Creek (170603040101)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	arrow-leaf groundsel	*Senecio triangularis*	G3?
	black cottonwood/alluvial bar	*Populus balsamifera* ssp. *trichocarpa*/alluvial bar	GNR
	black cottonwood/mixed herbs	*Populus balsamifera* ssp. *trichocarpa*/mixed herbs	G3?
	coyote willow/alluvial bar	*Salix exigua*/alluvial bar	G5
	creeping spikerush (lotic)	*Eleocharis palustris* (lotic)	G5
	Drummond's willow/mesic forbs	*Salix drummondiana*/mesic forbs	G4
	dusky willow/cobble bar	*Salix melanopsis*/cobble bar	G3G4
	Indianhemp	*Apocynum cannabinum*	GNR
	lakeshore sedge	*Carex lenticularis*	GNR
	large boykinia	*Boykinia major*	GNR
	ponderosa pine/Idaho fescue	*Pinus ponderosa/Festuca idahoensis*	G4
	reed canarygrass	*Phalaris arundinacea*	G5
	water sedge	*Carex aquatilis*	G5
	western redcedar/common ladyfern	*Thuja plicata/Athyrium filix-femina*	G3G4
	western redcedar/maidenhair fern	*Thuja plicata/Adiantum pedatum*	G2?
	willow/alluvial bar	*Salix*/alluvial bar	GNR
Plants	**Common Name**	**Scientific Name**	**Rank**
	bank monkeyflower	*Mimulus clivicola*	G4
	Constance's bittercress	*Cardamine constancei*	G3
	light hookeria	*Hookeria lucens*	G5

	Oregon bluebells	*Mertensia bella*	G4
	Pacific dogwood	*Cornus nuttallii*	G5
Animals	**Common Name**	**Scientific Name**	**Rank**
	bald eagle	*Haliaeetus leucocephalus*	G5
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	Coeur d'Alene salamander	*Plethodon idahoensis*	G4
	fisher	*Martes pennanti*	G5
	flammulated owl	*Otus flammeolus*	G4
	humped coin	*Polygyrella polygyrella*	G2G3
	Nimapuna tigersnail	*Anguispira nimapuna*	G1
	smoky taildropper	*Prophysaon humile*	G1G2
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Middle Fork Clearwater River-Sutler Creek (170603040102)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Montane-Foothill Aquatic Bed and Emergent Marsh		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	black cottonwood/alluvial bar	*Populus balsamifera* ssp. *trichocarpa*/alluvial bar	GNR
	black cottonwood/black hawthorn	*Populus balsamifera* ssp. *trichocarpa/Crataegus douglasii*	G1
	black cottonwood/common snowberry	*Populus balsamifera* ssp. *trichocarpa/Symphoricarpos albus*	G2?
	common cattail	*Typha latifolia*	G5
	creeping spikerush (lotic)	*Eleocharis palustris* (lotic)	G5
	dusky willow/cobble bar	*Salix melanopsis*/cobble bar	G3G4
	eastern cottonwood/alluvial bar	*Populus deltoides*/alluvial bar	GNR
	Indianhemp	*Apocynum cannabinum*	GNR
	reed canarygrass	*Phalaris arundinacea*	G5
Plants	**Common Name**	**Scientific Name**	**Rank**
	tortured horsehair lichen	*Bryoria tortuosa*	G5
Animals	**Common Name**	**Scientific Name**	**Rank**
	bald eagle	*Haliaeetus leucocephalus*	G5
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	flammulated owl	*Otus flammeolus*	G4
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Middle Red River (170603050103)			
Ecological Systems			
	Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland		
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Montane-Foothill Aquatic Bed and Emergent Marsh		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		

	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
	Rocky Mountain Subalpine-Montane Seasonally Flooded Pool		
	Seeded Perennial Grassland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	Baltic rush	*Juncus balticus*	G5
	bladder sedge	*Carex utriculata*	G5
	blister sedge	*Carex vesicaria*	G4Q
	California oatgrass	*Danthonia californica*	GNR
	creeping spikerush (lentic)	*Eleocharis palustris* (lentic)	GNR
	dusky willow/cobble bar	*Salix melanopsis*/cobble bar	G3G4
	needle spikerush	*Eleocharis acicularis*	G4?
	reed canarygrass	*Phalaris arundinacea*	G5
	timothy	*Phleum pratense*	GNR
	tufted hairgrass-California oatgrass	*Deschampsia caespitosa-Danthonia californica*	G2
	water sedge	*Carex aquatilis*	G5
	whitewater crowfoot	*Ranunculus aquatilis*	GU
Plants	**Common Name**	**Scientific Name**	**Rank**
	Idaho strawberry	*Waldsteinia idahoensis*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Mill Creek (170603050703)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	arrow-leaf groundsel	*Senecio triangularis*	G3?
	bladder sedge	*Carex utriculata*	G5
	grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
	mountain alder/bluejoint reedgrass	*Alnus incana/Calamagrostis canadensis*	G3
	mountain alder/mesic forbs	*Alnus incana*/mesic forbs	G3G4
	mountain alder/red-osier dogwood	*Alnus incana/Cornus sericea*	G3G4
	red-osier dogwood	*Cornus sericea*	G4
	Sitka alder/common ladyfern	*Alnus viridis* ssp. *sinuata/Athyrium filix-femina*	G3G4
	subalpine fir/twisted-stalk, rusty menziesia phase	*Abies lasiocarpa/Streptopus amplexifolius, Menziesia ferruginea* phase	G4
	water sedge	*Carex aquatilis*	G5
Plants	**Common Name**	**Scientific Name**	**Rank**
	peatmoss	*Sphagnum mendocinum*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3

	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	gray wolf	*Canis lupus*	G4
	humped coin	*Polygyrella polygyrella*	G2G3
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	Selway forestsnail	*Allogona lombardii*	G1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Red Rock Creek (170603050906)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Shebang Creek (170603050903)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
Silver Creek (170603050305)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Montane-Foothill Springs		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Fen		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	alpine laurel/peatmoss species	*Kalmia microphylla/Sphagnum* spp.	G3G4
	bluejoint reedgrass	*Calamagrostis canadensis*	G4
	bluejoint-mountain edge/mountain bluebells	*Calamagrostis canadensis-Carex scopulorum/Mertensia ciliata*	GUQ
	Engelmann spruce/water sedge	*Picea engelmanii/Carex aquatilis*	GNR
	few-flower spikerush-mountain sedge	*Eleocharis quinqueflora-Carex scopulorum*	G3G4
	grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
	large boykinia	*Boykinia major*	GNR
	mountain sedge	*Carex scopulorum*	G5
	mountain sedge/peatmoss species	*Carex scopulorum/Sphagnum* spp.	G5
	mountain sedge/white marsh marigold	*Carex scopulorum/Caltha leptosepala*	G4
	Sitka alder/mesic forbs	*Alnus viridis* ssp. *sinuata*/mesic forbs	G3G4
	subalpine fir/bluejoint reedgrass, western Labrador-tea phase	*Abies lasiocarpa/Calamagrostis canadensis, Ledum glandulosum* phase	G4
	subalpine fir/rusty menziesia	*Abies lasiocarpa/Menziesia ferruginea*	G5
	subalpine fir/twisted-stalk, Canbys licorice-root phase	*Abies lasiocarpa/Streptopus amplexifolius, Ligusticum canbyi* phase	G4

	subalpine fir/twisted-stalk, menziesia phase	*Abies lasiocarpa/Streptopus amplexifolius, Menziesia ferruginea* phase	G4
	subalpine fir-Engelmann spruce/western Labrador-tea/mountain sedge	*Abies lasiocarpa-Picea engelmannii/Ledum glandulosum/Carex scopulorum*	G4
	water sedge	*Carex aquatilis*	G5
	white marsh marigold	*Caltha leptosepala*	G4
	wood-rush sedge	*Carex luzulina*	GNR
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
South Fork Clear Creek (170603040202)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Rocky Mountain Montane-Foothill Springs		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	arrow-leaf groundsel	*Senecio triangularis*	G3?
	bigleaf sedge	*Carex amplifolia*	G3
	mountain alder/bigleaf sedge	*Alnus incana/Carex amplifolia*	G3
	panicled bulrush	*Scirpus microcarpus*	G4
	Rocky Mountain maple	*Acer glabrum*	GNR
	Sitka alder/mesic forbs	*Alnus viridis* ssp. *sinuata*/mesic forbs	G3G4
	western redcedar/common ladyfern	*Thuja plicata/Athyrium filix-femina*	G3G4
Plants	**Common Name**	**Scientific Name**	**Rank**
	evergreen kittentail	*Synthyris platycarpa*	G3
	Oregon bluebells	*Mertensia bella*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	gray wolf	*Canis lupus*	G4
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
South Fork Clearwater River-Grouse Creek (170603050701)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
	Seeded Perennial Grassland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	panicled bulrush	*Scirpus microcarpus*	G4
	red-osier dogwood	*Cornus sericea*	G4

	timothy	*Phleum pratense*	GNR
Plants	**Common Name**	**Scientific Name**	**Rank**
	bank monkeyflower	*Mimulus clivicola*	G4
	nail lichen	*Pilophorus acicularis*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bald eagle	*Haliaeetus leucocephalus*	G4
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	gray wolf	*Canis lupus*	G4
	Nimapuna tigersnail	*Anguispira nimapuna*	G1
	northern leopard frog	*Rana pipiens*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	Townsend's big-eared bat	*Corynorhinus townsendii*	G4
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
	wolverine	*Gulo gulo*	G4T4
South Fork Clearwater River-Leggett Creek (170603050301)			
Ecological Systems			
	Open Water		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	bank monkeyflower	*Mimulus clivicola*	G4
	deer-fern	*Blechnum spicant*	G5
	Idaho strawberry	*Waldsteinia idahoensis*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
	wolverine	*Gulo gulo*	G4T4
South Fork Clearwater River-Lightning Creek (170603050704)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	bank monkeyflower	*Mimulus clivicola*	G4
	Constance's bittercress	*Cardamine constancei*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bald eagle	*Haliaeetus leucocephalus*	G5
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	Selway forestsnail	*Allogona lombardii*	G1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3

	Townsend's big-eared bat	*Corynorhinus townsendii*	G4
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
South Fork Clearwater River-Peasley Creek (170603050306)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	arrow-leaf groundsel	*Senecio triangularis*	G3?
	grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
	Sitka alder/common ladyfern	*Alnus viridis* ssp. *sinuata/Athyrium filix-femina*	G3G4
	Sitka alder/mesic forbs	*Alnus viridis* ssp. *sinuata*/mesic forbs	G3G4
Plants	**Common Name**	**Scientific Name**	**Rank**
	bank monkeyflower	*Mimulus clivicola*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bald eagle	*Haliaeetus leucocephalus*	G4
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	flammulated owl	*Otus flammeolus*	G4
	gray wolf	*Canis lupus*	G4
	humped coin	*Polygyrella polygyrella*	G2G3
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	Nimapuna tigersnail	*Anguispira nimapuna*	G1
	pale jumping-slug	*Hemphillia camelus*	G3G4
	sheathed slug	*Zacoleus idahoensis*	G3G4
	smoky taildropper	*Prophysaon humile*	G1G2
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
South Fork Clearwater River-Rabbit Creek (170603050802)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	Constance's bittercress	*Cardamine constancei*	G3
	evergreen kittentail	*Synthyris platycarpa*	G3
	tortured horsehair lichen	*Bryoria tortuosa*	G5
Animals	**Common Name**	**Scientific Name**	**Rank**
	bald eagle	*Haliaeetus leucocephalus*	G5
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	Nimapuna tigersnail	*Anguispira nimapuna*	G1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	thinlip tightcoil	*Pristiloma idahoense*	G2

	western ridged mussel	*Gonidea angulata*	G3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
South Fork Clearwater River-Wing Creek (170603050303)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	gray wolf	*Canis lupus*	G4
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	pale jumping-slug	*Hemphillia camelus*	G3G4
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
	wolverine	*Gulo gulo*	G4T4
South Fork Cottonwood Creek (170603050904)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Montane-Foothill Aquatic Bed and Emergent Marsh		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	common cattail	*Typha latifolia*	G5
	creeping spikerush (lentic)	*Eleocharis palustris* (lentic)	GNR
Plants	**Common Name**	**Scientific Name**	**Rank**
	Douglas' clover	*Trifolium douglasii*	G2
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	long-billed curlew	*Numenius americanus*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	Townsend's big-eared bat	*Corynorhinus townsendii*	G4
South Fork Red River (170603050102)			
Ecological Systems			
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	bladder sedge	*Carex utriculata*	G5
	Drummonds willow/mesic graminoids	*Salix drummondiana*/mesic graminoids	G3Q
	Engelmann spruce/water sedge	*Picea engelmanii/Carex aquatilis*	GNR
	grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3

	Lemmon's willow/mesic graminoids	*Salix lemmonii*/mesic graminoids	GNR
	subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
	subalpine fir/western Labrador-tea	*Abies lasiocarpa/Ledum glandulosum*	G4
	water sedge	*Carex aquatilis*	G5
Plants	**Common Name**	**Scientific Name**	**Rank**
	Blandow's helodium	*Helodium blandowii*	G5
	spacious monkeyflower	*Mimulus ampliatus*	G1
	swamp willow-weed	*Epilobium palustre*	G5
Animals	**Common Name**	**Scientific Name**	**Rank**
	boreal owl	*Aegolius funereus*	G5
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
	wolverine	*Gulo gulo*	G4T4
Stockney Creek (170603050902)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	mountain quail	*Oreortyx pictus*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
Tenmile Creek (170603050302)			
Ecological Systems			
	Open Water		
	Rocky Mountain Alpine Dwarf-Shrubland		
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Fen		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	bladder sedge	*Carex utriculata*	G5
	Northwest Territory sedge/peatmoss species	*Carex utriculata/Sphagnum* spp.	G1G2
	subalpine fir-Engelmann spruce/western Labrador-tea/mountain sedge	*Abies lasiocarpa-Picea engelmannii/Ledum glandulosum/Carex scopulorum*	G4
Plants	**Common Name**	**Scientific Name**	**Rank**
	northern moonwort	*Botrychium pinnatum*	G4?
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	gray wolf	*Canis lupus*	G4
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3

	wolverine	*Gulo gulo*	G4T4
Threemile Creek (170603050803)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Disturbed and Invasive Grass and Forb		
	Open Water		
	Rocky Mountain Montane-Foothill Aquatic Bed and Emergent Marsh		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	common cattail	*Typha latifolia*	G5
	creeping spikerush (lentic)	*Eleocharis palustris* (lentic)	GNR
	reed canarygrass	*Phalaris arundinacea*	G5
	softstem bulrush	*Schoenoplectus tabernaemontani*	G4
Plants	**Common Name**	**Scientific Name**	**Rank**
	Constance's bittercress	*Cardamine constancei*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	a mayfly	*Paraleptophlebia jenseni*	G2G4
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	mountain quail	*Oreortyx pictus*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	Townsend's big-eared bat	*Corynorhinus townsendii*	G4
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Twentymile Creek (170603050304)			
Ecological Systems			
	Open Water		
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
	Seeded Perennial Grassland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	alder buckthorn	*Rhamnus alnifolia*	G3
	bluejoint reedgrass	*Calamagrostis canadensis*	G4
	few-flowered spikerush	*Eleocharis quinqueflora*	G4
	grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
	mountain alder/bladder sedge	*Alnus incana/Carex utriculata*	G3
	Sitka alder/mesic forbs	*Alnus viridis* ssp. *sinuata*/mesic forbs	G3G4
	subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
	timothy	*Phleum pratense*	GNR
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	gray wolf	*Canis lupus*	G4
	mountain quail	*Oreortyx pictus*	G5

	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Upper American River (170603050201)			
Ecological Systems			
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Montane-Foothill Springs		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Fen		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
	Seeded Perennial Grassland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	alder buckthorn	*Rhamnus alnifolia*	G3
	aquatic sedge/peatmoss species	*Carex aquatilis/Sphagnum* spp.	G2G3
	arrow-leaf groundsel	*Senecio triangularis*	G3?
	bladder sedge	*Carex utriculata*	G5
	bluejoint reedgrass	*Calamagrostis canadensis*	G4
	few-flowered spikerush	*Eleocharis quinqueflora*	G4
	fowl bluegrass	*Poa palustris*	GNR
	mountain sedge	*Carex scopulorum*	G5
	Nebraska sedge	*Carex nebrascensis*	G4
	panicled bulrush	*Scirpus microcarpus*	G4
	skyline bluegrass	*Poa epilis*	G3
	subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
	subalpine fir/twisted-stalk	*Abies lasiocarpa/Streptopus amplexifolius*	G4
	subalpine fir/twisted-stalk, Canbys licorice-root phase	*Abies lasiocarpa/Streptopus amplexifolius, Ligusticum canbyi* phase	G4
	water sedge	*Carex aquatilis*	G5
	white marsh marigold	*Caltha leptosepala*	G4
	wood-rush sedge	*Carex luzulina*	GNR
Plants	**Common Name**	**Scientific Name**	**Rank**
	Blandow's helodium	*Helodium blandowii*	G5
	Case's corydalis	*Corydalis caseana* ssp. *hastata*	G5T3
	evergreen kittentail	*Synthyris platycarpa*	G3
	Idaho strawberry	*Waldsteinia idahoensis*	G3
	Oregon bluebells	*Mertensia bella*	G4
	tall swamp onion	*Allium validum*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	pale jumping-slug	*Hemphillia camelus*	G3G4
	Selway forestsnail	*Allogona lombardii*	G1
	smoky taildropper	*Prophysaon humile*	G1G2
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Upper Clear Creek (170603040201)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		

	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	Sitka alder/common ladyfern	*Alnus viridis* ssp. *sinuata/Athyrium filix-femina*	G3G4
Plants	**Common Name**	**Scientific Name**	**Rank**
	evergreen kittentail	*Synthyris platycarpa*	G3
	Oregon bluebells	*Mertensia bella*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Upper Cottonwood Creek (170603050901)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
Upper Crooked River (170603050401)			
Ecological Systems			
	Open Water		
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Fen		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	alpine laurel/peatmoss species	*Kalmia microphylla/Sphagnum* spp.	G3G4
	few-flowered spikerush	*Eleocharis quinqueflora*	G4
	few-flowered spikerush/peatmoss species	*Eleocharis quinqueflora/Sphagnum* spp.	G4
	mountain sedge	*Carex scopulorum*	G5
	mountain sedge/peatmoss species	*Carex scopulorum/Sphagnum* spp.	G5
	mountain sedge/white marsh marigold	*Carex scopulorum/Caltha leptosepala*	G4
	subalpine fir/bluejoint reedgrass, western Labrador-tea phase	*Abies lasiocarpa/Calamagrostis canadensis, Ledum glandulosum* phase	G4
	subalpine fir-Engelmann spruce/western Labrador-tea/mountain sedge	*Abies lasiocarpa-Picea engelmannii/Ledum glandulosum/Carex scopulorum*	G4
	timber oatgrass	*Danthonia intermedia*	G2G3
Plants	**Common Name**	**Scientific Name**	**Rank**
	spacious monkeyflower	*Mimulus ampliatus*	G1
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5

	fisher	*Martes pennanti*	G5
	flammulated owl	*Otus flammeolus*	G4
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	mountain quail	*Oreortyx pictus*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
	wolverine	*Gulo gulo*	G4T4
Upper Johns Creek (170603050601)			
Ecological Systems			
	Open Water		
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	black alpine sedge	*Carex nigricans*	G4
	bluejoint reedgrass	*Calamagrostis canadensis*	G4
	mountain sedge	*Carex scopulorum*	G5
	Sitka alder/mesic forbs	*Alnus viridis* ssp. *sinuata*/mesic forbs	G3G4
	subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
	subalpine fir/bluejoint reedgrass, bluejoint reedgrass phase	*Abies lasiocarpa/Calamagrostis canadensis, Calamagrostis canadensis* phase	G5
	subalpine fir/bluejoint reedgrass, western Labrador-tea phase	*Abies lasiocarpa/Calamagrostis canadensis, Ledum glandulosum* phase	G4
	subalpine fir/menziesia	*Abies lasiocarpa/Menziesia ferruginea*	G5
Plants	**Common Name**	**Scientific Name**	**Rank**
	arctic buttercup	*Ranunculus gelidus*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Upper Newsome Creek (170603050501)			
Ecological Systems			
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
	grand fir/Pacific yew/wild ginger	*Abies grandis/Taxus brevifolia/Asarum caudatum*	G2G3
	Sitka alder/miners lettuce	*Alnus viridis* ssp. *sinuata/Claytonia cordifolia*	GNR
	water sedge	*Carex aquatilis*	G5
Plants	**Common Name**	**Scientific Name**	**Rank**
	Blandow's helodium	*Helodium blandowii*	G5
	evergreen kittentail	*Synthyris platycarpa*	G3
	Idaho strawberry	*Waldsteinia idahoensis*	G3

	Oregon bluebells	*Mertensia bella*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Upper Red River (170603050101)			
Ecological Systems			
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Montane-Foothill Springs		
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Fen		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	alder buckthorn	*Rhamnus alnifolia*	G3
	black hawthorn/common snowberry	*Crataegus douglasii/Symphoricarpos albus*	G2
	bluejoint reedgrass	*Calamagrostis canadensis*	G4
	dwarf birch/mesic forbs-mesic graminoids	*Betula nana/*mesic forbs-mesic graminoids	G3G4
	dwarf birch/peatmoss species Shrubland	*Betula nana/Sphagnum* spp.	GU
	large boykinia	*Boykinia major*	GNR
	mountain alder/mesic graminoids	*Alnus incana/*mesic graminoids	G3
	mountain sedge	*Carex scopulorum*	G5
	Northwest Territory sedge/peatmoss species	*Carex utriculata/Sphagnum* spp.	G1G2
	panicled bulrush	*Scirpus microcarpus*	G4
	pink spiraea	*Spiraea douglasii*	G5
	reed canarygrass	*Phalaris arundinacea*	G5
	star sedge/peatmoss species	*Carex echinata/Sphagnum* spp.	GNR
	subalpine fir/bluejoint reedgrass	*Abies lasiocarpa/Calamagrostis canadensis*	G5
	subalpine fir/Sitka alder	*Abies lasiocarpa/Alnus viridis* ssp. *sinuata*	G4
	tufted hairgrass-timber oatgrass	*Deschampsia caespitosa-Danthonia intermedia*	GQ
	water sedge	*Carex aquatilis*	G5
Plants	**Common Name**	**Scientific Name**	**Rank**
	evergreen kittentail	*Synthyris platycarpa*	G3
	Idaho strawberry	*Waldsteinia idahoensis*	G3
	tall swamp onion	*Allium validum*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	boreal owl	*Aegolius funereus*	G5
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5
	fisher	*Martes pennanti*	G5
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
	wolverine	*Gulo gulo*	G4T4

Table 4. Total scores for condition, habitat, biodiversity, and landscape indicators for 50 wetland complexes, organized by conservation prioritization.

Subbasin	HUC 12 Name	Wetland Complex Name	Wetland ID #	Condition Total	Habitat Diversity Total	Biodiversity Total	Landscape Total	Total	Priority	Protection Status	Environmental Setting
South Fork	Upper American River	**American River Meadows - Table Meadows**	45	17	11	11	3	42	Class II	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	Upper Red River	**Upper Red River - Red River Hotsprings Meadows**	50	16	11	12	3	42	Class II	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	Silver Creek	**Silver Creek - China Point Sloped Wetlands**	28	15	12	10	3	40	Class II	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	Upper Crooked River	**East Fork Crooked River Headwaters**	1	18	10	7	4	39	Class II	Partial Protection - ID Rec. River; roadless	High elevation mountains
South Fork	South Fork Red River	**West Fork Red River - South Fork Red River Confluence**	34	15	11	10	3	39	Class II	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	Twentymile Creek	**Lower Twentymile Meadows**	35	17	10	8	3	38	Reference	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	Upper American River	**Upper American River Meadows**	16	14	10	8	3	35	Reference	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	Upper Johns Creek	Upper Johns Creek - Canyon Riparian	15	18	9	4	4	35	Reference	Protected - ID Natural River; Wilderness	Mid elevation rolling uplands
South Fork	Upper Johns Creek	**Upper Johns Creek - Square Mountain**	22	19	7	5	4	35	Reference	Protected - ID Natural River; Wilderness	High elevation mountains
Middle Fork	South Fork Clear Creek	**Kay Creek**	32	17	9	5	3	34	Reference	Not Protected	Mid elevation rolling uplands
South Fork	Upper Johns Creek	Upper Johns Creek - Trough Valley Meadows	30	19	7	3	4	33	Reference	Protected - ID Natural River; Wilderness	High elevation mountains
South Fork	Tenmile Creek	**Tenmile Creek Sloped Wetlands**	6	18	7	3	4	32	Reference	Protected - ID Natural River; Wilderness	High elevation mountains
South Fork	Lower Johns Creek	Lower Johns Creek - Canyon Mouth	49	15	6	7	3	31	Reference	Partial Protection - ID Rec. River; roadless	Breaklands and canyons
South Fork	Silver Creek	Lower Silver Creek	23	16	8	4	3	31	Reference	Partial Protection - ID Rec. River; roadless	Breaklands and canyons
South Fork	Tenmile Creek	Tenmile Meadows	9	18	6	4	3	31	Reference	Protected - ID Natural River; Wilderness	High elevation mountains
South Fork	Lower American River	Upper Kirks Fork	8	15	8	4	4	31	Reference	Partial Protection - ID Rec. River; roadless	Mid elevation rolling uplands
South Fork	Lower Johns Creek	Lower Johns Creek - American Creek Headwaters	39	16	9	2	3	30	Habitat	Not Protected - roadless	Mid elevation rolling uplands
Middle Fork	South Fork Clear Creek	South Fork Clear Creek - Confluence West and South Fork	26	17	7	3	3	30	Habitat	Not Protected	Mid elevation rolling uplands

Table 4 continued.

Subbasin	HUC 12 Name	Wetland Complex Name	Wetland ID #	Condition Total	Habitat Diversity Total	Biodiversity Total	Landscape Total	Total	Priority	Protection Status	Environmental Setting
South Fork	Upper Red River	Upper Red River - Trail Creek Headwaters	33	17	7	3	3	30	Habitat	Not Protected	Mid elevation rolling uplands
South Fork	Lower American River	Lower American River - Kirks Fork	10	15	6	5	3	29	Habitat	Partial Protection - ID Rec. River; roadless	Mid elevation rolling uplands
South Fork	Lower Johns Creek	Lower Johns Creek - Downstream Gospel Hump Wilderness	25	16	4	4	4	28	Habitat	Partial Protection - ID Rec. River; roadless	Breaklands and canyons
South Fork	Tenmile Creek	Tenmile Creek	3	16	6	4	2	28	Habitat	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	Twentymile Creek	Twentymile Creek - W Fk Twentymile Creek	12	17	6	2	3	28	Habitat	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	Lower Johns Creek	**Buck Meadows**	14	16	6	2	3	27	Habitat	Partial Protection - exclosure	Mid elevation rolling uplands
Middle Fork	Upper Clear Creek	Upper Clear Creek - Browns Springs Creek	19	16	6	2	3	27	Habitat	Not Protected	Mid elevation rolling uplands
South Fork	Upper Red River	Upper Red River - Ditch Creek Campground	13	14	6	5	2	27	Habitat	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	East Fork American River	East Fork American River - Flint Creek	2	17	6	0	3	26	Habitat	Not Protected - roadless	Mid elevation rolling uplands
South Fork	South Fork Clearwater River-Wing Creek	South Fork Clearwater River - Little Wing Creek	29	16	7	0	3	26	Habitat	Not Protected - roadless	Mid elevation rolling uplands
South Fork	Lower Johns Creek	Lower Johns Creek - American Creek	17	16	6	0	3	25	Habitat	Not Protected - roadless	Mid elevation rolling uplands
South Fork	Upper Red River	Upper Red River - E Fk Trail Creek	7	17	4	0	4	25	Habitat	Not Protected - roadless	Mid elevation rolling uplands
South Fork	Upper Red River	Upper Red River - South of Alberta Mine	11	18	3	0	2	23	Habitat	Not Protected - roadless	Mid elevation rolling uplands
South Fork	Meadow Creek	**McComas Meadows**	31	12	12	13	3	40	Restoration Opportunity	Partial Protection - ID Rec. River; exclosure	Mid elevation rolling uplands
South Fork	Middle Red River	**Middle Red River - Red River WMA**	41	7	14	11	1	33	Restoration Opportunity	Partial Protection - ID Rec. River; WMA	Mid elevation rolling uplands
South Fork	South Fork Clearwater River-Peasley Creek	South Fork Clearwater River - Blue Ridge to Mile 40.5	47	12	5	11	3	31	Restoration Opportunity	Partial Protection - ID Recreational River	Breaklands and canyons
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Mile 50 to Dutch Oven Creek	40	11	7	5	2	25	Restoration Opportunity	Partial Protection - ID Recreational River	Breaklands and canyons
South Fork	Upper Red River	**Upper Red River - Red River Ranger Station**	42	11	6	6	2	25	Restoration Opportunity	Partial Protection - ID Recreational River	Mid elevation rolling uplands

Table 4 continued.

Subbasin	HUC 12 Name	Wetland Complex Name	Wetland ID #	Condition Total	Habitat Diversity Total	Biodiversity Total	Landscape Total	Total	Priority	Protection Status	Environmental Setting
South Fork	South Fork Clearwater River-Grouse Creek	South Fork Clearwater River - Farrens Creek to Johns Creek	48	10	6	6	2	24	Restoration Opportunity	Partial Protection - ID Recreational River	Breaklands and canyons
South Fork	Upper Newsome Creek	Upper Newsome Creek - Above Baldy Cr Dredge	20	12	7	4	1	24	Restoration Opportunity	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	Lower American River	Lower American River - Northeast of Elk City	24	9	8	4	2	23	Restoration Opportunity	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	South Fork Clearwater River-Wing Creek	South Fork Clearwater River - Mile 43 to Reed Bar	37	12	4	5	2	23	Restoration Opportunity	Partial Protection - ID Recreational River	Breaklands and canyons
South Fork	Upper Newsome Creek	Upper Newsome Creek - Haysfork Creek	21	13	4	4	2	23	Restoration Opportunity	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Allison Creek	5	13	7	0	2	22	Restoration Opportunity	Not Protected	Mid elevation rolling uplands
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Golden to Fall Creek	36	11	4	5	2	22	Restoration Opportunity	Partial Protection - ID Recreational River	Breaklands and canyons
South Fork	Lower Red River	Lower Red River - Red Horse Creek Dredge	18	9	6	4	2	21	Restoration Opportunity	Partial Protection - ID Recreational River	Mid elevation rolling uplands
South Fork	Middle Red River	**Middle Red River - Red River Ranch Meadows**	43	7	7	5	2	21	Restoration Opportunity	Partial Protection - ID Rec. River; exclosure	Mid elevation rolling uplands
South Fork	South Fork Clearwater River-Lightning Creek	South Fork Clearwater River - Mile 18 to Farrens Creek	46	8	8	3	2	21	Restoration Opportunity	Partial Protection - ID Recreational River	Breaklands and canyons
South Fork	Elk Creek	Elk Creek - West Elk City Valley	27	8	6	5	1	20	Restoration Opportunity	Not Protected	Mid elevation rolling uplands
South Fork	Mill Creek	Mill Creek - Merron Creek Melton Creek Confluence	38	13	4	0	3	20	Restoration Opportunity	Not Protected	Mid elevation rolling uplands
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Santiam Creek	4	11	6	1	2	20	Restoration Opportunity	Not Protected	Breaklands and canyons
South Fork	Elk Creek	**Elk Creek - Elk City Meadows**	44	9	6	4	0	19	Restoration Opportunity	Minimal Protection - riparian fencing	Mid elevation rolling uplands

bold = wetland complex surveyed during 2006; Upper Johns Creek - Square Mountain was not surveyed, but pre-existing site data was consulted

Table 5. Ranking data and scores for habitat diversity and biodiversity significance for 50 wetland complexes.

Subbasin	HUC 12 Name	Wetland Complex Name	Cowardin Classes Count	Cowardin Classes Score	Wetland Plant Associations[1] Count	Wetland Plant Associations Score	Wetland Ecological Systems	Habitat Diversity Total	At-risk Wetland Animals	At-risk Wetland Plants	Globally Rare Wetland Plant Associations	Rare, Sensitive, Functionally Important Wetlands	Biodiversity Total
South Fork	Upper American River	**American River Meadows - Table Meadows**	4	2	13	3	6	11	6	4	1	0	11
South Fork	Lower Johns Creek	**Buck Meadows**	2	1	3	2	3	6	0	0	2	0	2
South Fork	East Fork American River	East Fork American River - Flint Creek	3	2	3	2	2	6	0	0	0	0	0
South Fork	Upper Crooked River	**East Fork Crooked River Headwaters**	2	1	8	3	6	10	4	0	1	2	7
South Fork	Elk Creek	**Elk Creek - Elk City Meadows**	9	3	1	1	2	6	4	0	0	0	4
South Fork	Elk Creek	Elk Creek - West Elk City Valley	3	2	3	2	2	6	4	1	0	0	5
Middle Fork	South Fork Clear Creek	**Kay Creek**	5	3	4	2	4	9	2	0	3	0	5
South Fork	Lower American River	Lower American River - Kirks Fork	3	2	3	2	2	6	5	0	0	0	5
South Fork	Lower American River	Lower American River - Northeast of Elk City	7	3	7	3	2	8	4	0	0	0	4
South Fork	Lower Johns Creek	Lower Johns Creek - American Creek	3	2	3	2	2	6	0	0	0	0	0
South Fork	Lower Johns Creek	Lower Johns Creek - American Creek Headwaters	5	3	5	3	3	9	0	0	2	0	2
South Fork	Lower Johns Creek	Lower Johns Creek - Downstream Gospel Hump Wilderness	1	1	2	1	2	4	4	0	0	0	4
South Fork	Lower Johns Creek	Lower Johns Creek - Canyon Mouth	1	1	3	2	3	6	5	0	2	0	7
South Fork	Lower Red River	Lower Red River - Red Horse Creek Dredge	4	2	4	2	2	6	4	0	0	0	4
South Fork	Silver Creek	Lower Silver Creek	5	3	5	3	2	8	4	0	0	0	4
South Fork	Twentymile Creek	**Lower Twentymile Meadows**	4	2	7	3	5	10	5	0	3	0	8
South Fork	Meadow Creek	**McComas Meadows**	3	2	13	3	7	12	6	1	4	2	13

Table 5 continued.

Subbasin	HUC 12 Name	Wetland Complex Name	Cowardin Classes Count	Cowardin Classes Score	Wetland Plant Associations[1] Count	Wetland Plant Associations Score	Wetland Ecological Systems	Habitat Diversity Total	At-risk Wetland Animals	At-risk Wetland Plants	Globally Rare Wetland Plant Associations	Rare, Sensitive, Functionally Important Wetlands	Biodiversity Total
South Fork	Middle Red River	**Middle Red River - Red River Ranch Meadows**	6	3	2	1	3	7	4	0	1	0	5
South Fork	Middle Red River	**Middle Red River - Red River WMA**	8	3	11	3	8	14	4	1	2	4	11
South Fork	Mill Creek	Mill Creek - Merron Creek Melton Creek Confluence	1	1	2	1	2	4	0	0	0	0	0
South Fork	Silver Creek	**Silver Creek - China Point Sloped Wetlands**	4	2	16	3	7	12	4	0	4	2	10
Middle Fork	South Fork Clear Creek	South Fork Clear Creek - Confluence West and South Fork	3	2	3	2	3	7	3	0	0	0	3
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Allison Creek	3	2	3	2	3	7	0	0	0	0	0
South Fork	South Fork Clearwater River-Peasley Creek	South Fork Clearwater River - Blue Ridge to Mile 40.5	2	1	2	1	3	5	10	1	0	0	11
South Fork	South Fork Clearwater River-Grouse Creek	South Fork Clearwater River - Farrens Creek to Johns Creek	3	2	3	2	2	6	5	1	0	0	6
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Golden to Fall Creek	2	1	2	1	2	4	4	1	0	0	5
South Fork	South Fork Clearwater River-Wing Creek	South Fork Clearwater River - Little Wing Creek	3	2	3	2	3	7	0	0	0	0	0
South Fork	South Fork Clearwater River-Lightning Creek	South Fork Clearwater River - Mile 18 to Farrens Creek	8	3	8	3	2	8	3	0	0	0	3
South Fork	South Fork Clearwater River-Wing Creek	South Fork Clearwater River - Mile 43 to Reed Bar	2	1	2	1	2	4	5	0	0	0	5
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Mile 50 to Dutch Oven Creek	3	2	3	2	3	7	4	1	0	0	5
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Santiam Creek	3	2	3	2	2	6	0	1	0	0	1
South Fork	Tenmile Creek	Tenmile Creek	4	2	4	2	2	6	4	0	0	0	4
South Fork	Tenmile Creek	**Tenmile Creek Sloped Wetlands**	2	1	3	2	4	7	0	0	1	2	3
South Fork	Tenmile Creek	Tenmile Meadows	2	1	2	1	4	6	4	0	0	0	4

Table 5 continued.

Subbasin	HUC 12 Name	Wetland Complex Name	Cowardin Classes Count	Cowardin Classes Score	Wetland Plant Associations[1] Count	Wetland Plant Associations Score	Wetland Ecological Systems	Habitat Diversity Total	At-risk Wetland Animals	At-risk Wetland Plants	Globally Rare Wetland Plant Associations	Rare, Sensitive, Functionally Important Wetlands	Biodiversity Total
South Fork	Twentymile Creek	Twentymile Creek - W Fk Twentymile Creek	3	2	3	2	2	6	0	0	2	0	2
South Fork	Upper American River	**Upper American River Meadows**	5	3	4	2	5	10	4	1	1	2	8
Middle Fork	Upper Clear Creek	Upper Clear Creek - Browns Springs Creek	1	1	3	2	3	6	2	0	0	0	2
South Fork	Upper Johns Creek	Upper Johns Creek - Canyon Riparian	5	3	5	3	3	9	4	0	0	0	4
South Fork	Upper Johns Creek	**Upper Johns Creek - Square Mountain**	2	1	4	2	4	7	2	0	1	2	5
South Fork	Upper Johns Creek	Upper Johns Creek - Trough Valley Meadows	4	2	4	2	3	7	3	0	0	0	3
South Fork	Lower American River	Upper Kirks Fork	3	2	3	2	4	8	4	0	0	0	4
South Fork	Upper Newsome Creek	Upper Newsome Creek - Above Baldy Cr Dredge	4	2	4	2	3	7	4	0	0	0	4
South Fork	Upper Newsome Creek	Upper Newsome Creek - Haysfork Creek	2	1	2	1	2	4	3	1	0	0	4
South Fork	Upper Red River	Upper Red River - Ditch Creek Campground	3	2	3	2	2	6	5	0	0	0	5
South Fork	Upper Red River	Upper Red River - E Fk Trail Creek	2	1	2	1	2	4	0	0	0	0	0
South Fork	Upper Red River	**Upper Red River - Red River Hotsprings Meadows**	7	3	13	3	5	11	4	1	5	2	12
South Fork	Upper Red River	**Upper Red River - Red River Ranger Station**	6	3	2	1	2	6	4	0	2	0	6
South Fork	Upper Red River	Upper Red River - South of Alberta Mine	2	1	2	1	1	3	0	0	0	0	0
South Fork	Upper Red River	Upper Red River - Trail Creek Headwaters	3	2	3	2	3	7	3	0	0	0	3
South Fork	South Fork Red River	**West Fork Red River - South Fork Red River Confluence**	7	3	6	3	5	11	4	2	2	2	10

[1] = for sites not visited in 2006, estimated by using Cowardin Class or Ecological Systems count as surrogate

bold = wetland complex surveyed during 2006; Upper Johns Creek - Square Mountain was not surveyed, but pre-existing data was consulted

Table 6. Ranking data and scores for condition and landscape context indicators for 50 wetland complexes.

Subbasin	HUC 12 Name	Wetland Complex Name	Livestock Grazing	Introduced Species Cover	Introduced Species Cover[1] Score	Dams	Dams Score	Mines	Mines Score	Water Quality Impairments	Water Quality Impairments Score	% Agriculture	Agriculture Score	Road Density	Road Density Score	Condition Total	Agriculture	Dams	Mines	Roads	Landscape Total
South Fork	**Upper American River**	**American River Meadows - Table Meadows**	0	1.2	3	0	3	0	3	1	2	0.0	3	0.5	3	17	1	1	1	0	3
South Fork	**Lower Johns Creek**	**Buck Meadows**	0	5.6	2	0	3	0	3	1	2	0.0	3	0.2	3	16	1	1	1	0	3
South Fork	East Fork American River	East Fork American River - Flint Creek	0		3	0	3	0	3	1	2	0.0	3	0.0	3	17	1	1	1	0	3
South Fork	**Upper Crooked River**	**East Fork Crooked River Headwaters**	1	0.0	3	0	3	0	3	1	2	0.0	3	0.0	3	18	1	1	1	1	4
South Fork	**Elk Creek**	**Elk Creek - Elk City Meadows**	0		0	0	3	0	3	1	2	0.8	0	1.3	1	9	0	0	0	0	0
South Fork	Elk Creek	Elk Creek - West Elk City Valley	0		0	0	3	0	3	1	2	0.8	0	2.3	0	8	0	1	0	0	1
Middle Fork	**South Fork Clear Creek**	**Kay Creek**	0		2	0	3	0	3	0	3	0.0	3	0.2	3	17	1	1	1	0	3
South Fork	Lower American River	Lower American River - Kirks Fork	0		1	0	3	0	3	1	2	0.0	3	0.0	3	15	1	1	1	0	3
South Fork	Lower American River	Lower American River - Northeast of Elk City	0		1	0	3	3	0	1	2	0.0	3	2.4	0	9	1	1	0	0	2
South Fork	Lower Johns Creek	Lower Johns Creek - American Creek	0		2	0	3	0	3	1	2	0.0	3	0.0	3	16	1	1	1	0	3
South Fork	Lower Johns Creek	Lower Johns Creek - American Creek Headwaters	0		2	0	3	0	3	1	2	0.0	3	0.0	3	16	1	1	1	0	3
South Fork	Lower Johns Creek	Lower Johns Creek - Downstream Gospel Hump Wilderness	0		2	0	3	0	3	1	2	0.0	3	0.0	3	16	1	1	1	1	4
South Fork	Lower Johns Creek	Lower Johns Creek - Canyon Mouth	0		2	0	3	0	3	2	1	0.0	3	0.0	3	15	1	1	1	0	3
South Fork	Lower Red River	Lower Red River - Red Horse Creek Dredge	0		1	0	3	3	0	1	2	0.0	3	3.1	0	9	1	1	0	0	2
South Fork	Silver Creek	Lower Silver Creek	0		2	0	3	0	3	1	2	0.0	3	0.0	3	16	1	1	1	0	3
South Fork	**Twentymile Creek**	**Lower Twentymile Meadows**	1	0.5	3	0	3	0	3	1	2	0.0	3	0.9	2	17	1	1	1	0	3

[1]estimated based on field observation and HUC 12 condition for wetland complexes not surveyed in 2006.

Table 6 continued.

Subbasin	HUC 12 Name	Wetland Complex Name	Livestock Grazing	Introduced Species Cover	Introduced Species Cover[1] Score	Dams	Dams Score	Mines	Mines Score	Water Quality Impairments	Water Quality Impairments Score	% Agriculture	Agriculture Score	Road Density	Road Density Score	Condition Total	Agriculture	Dams	Mines	Roads	Landscape Total
South Fork	**Meadow Creek**	**McComas Meadows**	0	22.1	0	0	3	0	3	1	2	0.0	3	1.5	1	12	1	1	1	0	3
South Fork	**Middle Red River**	**Middle Red River - Red River Ranch Meadows**	0	27.0	0	0	3	0	3	2	1	0.5	0	2.6	0	7	0	1	1	0	2
South Fork	**Middle Red River**	**Middle Red River - Red River WMA**	0	21.4	0	0	3	2	1	2	1	0.7	0	0.7	2	7	0	1	0	0	1
South Fork	Mill Creek	Mill Creek - Merron Creek Melton Creek Confluence	0		2	0	3	0	3	1	2	0.0	3	1.9	0	13	1	1	1	0	3
South Fork	**Silver Creek**	**Silver Creek - China Point Sloped Wetlands**	0	0.0	3	0	3	0	3	1	2	0.0	3	1.1	1	15	1	1	1	0	3
Middle Fork	South Fork Clear Creek	South Fork Clear Creek - Confluence West and South Fork	0		2	0	3	0	3	0	3	0.0	3	0.4	3	17	1	1	1	0	3
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Allison Creek	0		1	0	3	0	3	2	1	0.0	3	0.8	2	13	1	1	0	0	2
South Fork	South Fork Clearwater River-Peasley Creek	South Fork Clearwater River - Blue Ridge to Mile 40.5	0		2	0	3	0	3	2	1	0.0	3	4.5	0	12	1	1	1	0	3
South Fork	South Fork Clearwater River-Grouse Creek	South Fork Clearwater River - Farrens Creek to Johns Creek	0		1	0	3	1	2	2	1	0.0	3	4.8	0	10	1	1	0	0	2
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Golden to Fall Creek	0		1	0	3	0	3	2	1	0.0	3	5.4	0	11	1	1	0	0	2
South Fork	South Fork Clearwater River-Wing Creek	South Fork Clearwater River - Little Wing Creek	0		2	0	3	0	3	1	2	0.0	3	0.0	3	16	1	1	1	0	3
South Fork	South Fork Clearwater River-Lightning Creek	South Fork Clearwater River - Mile 18 to Farrens Creek	0		1	0	3	0	3	2	1	0.1	0	4.7	0	8	1	1	0	0	2
South Fork	South Fork Clearwater River-Wing Creek	South Fork Clearwater River - Mile 43 to Reed Bar	0		2	0	3	0	3	2	1	0.0	3	5.0	0	12	1	1	0	0	2
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Mile 50 to Dutch Oven Creek	0		1	0	3	0	3	2	1	0.0	3	4.6	0	11	1	1	0	0	2
South Fork	South Fork Clearwater River-Leggett Creek	South Fork Clearwater River - Santiam Creek	0		1	0	3	0	3	2	1	0.0	3	2.9	0	11	1	1	0	0	2
South Fork	Tenmile Creek	Tenmile Creek	1		3	0	3	0	3	1	2	0.0	3	1.1	1	16	1	1	0	0	2

Subbasin	HUC 12 Name	Wetland Complex Name	Livestock Grazing	Introduced Species Cover	Introduced Species Cover[1] Score	Dams	Dams Score	Mines	Mines Score	Water Quality Impairments	Water Quality Impairments Score	% Agriculture	Agriculture Score	Road Density	Road Density Score	Condition Total	Agriculture	Dams	Mines	Roads	Landscape Total
South Fork	**Tenmile Creek**	**Tenmile Creek Sloped Wetlands**	1	0.0	3	0	3	0	3	1	2	0.0	3	0.0	3	18	1	1	1	1	4
South Fork	Tenmile Creek	Tenmile Meadows	1		3	0	3	0	3	1	2	0.0	3	0.0	3	18	1	1	0	1	3
South Fork	Twentymile Creek	Twentymile Creek - W Fk Twentymile Creek	1		2	0	3	0	3	1	2	0.0	3	0.2	3	17	1	1	1	0	3
South Fork	**Upper American River**	**Upper American River Meadows**	0	20.9	0	0	3	0	3	1	2	0.0	3	0.5	3	14	1	1	1	0	3
Middle Fork	Upper Clear Creek	Upper Clear Creek - Browns Springs Creek	0		2	0	3	0	3	0	3	0.0	3	0.8	2	16	1	1	1	0	3
South Fork	Upper Johns Creek	Upper Johns Creek - Canyon Riparian	1		3	0	3	0	3	1	2	0.0	3	0.0	3	18	1	1	1	1	4
South Fork	**Upper Johns Creek**	**Upper Johns Creek - Square Mountain**	1		3	0	3	0	3	0	3	0.0	3	0.1	3	19	1	1	1	1	4
South Fork	Upper Johns Creek	Upper Johns Creek - Trough Valley Meadows	1		3	0	3	0	3	0	3	0.0	3	0.0	3	19	1	1	1	1	4
South Fork	Lower American River	Upper Kirks Fork	0		1	0	3	0	3	1	2	0.0	3	0.0	3	15	1	1	1	1	4
South Fork	Upper Newsome Creek	Upper Newsome Creek - Above Baldy Cr Dredge	0		2	0	3	1	2	1	2	0.0	3	1.7	0	12	1	0	0	0	1
South Fork	Upper Newsome Creek	Upper Newsome Creek - Haysfork Creek	0		2	0	3	0	3	1	2	0.0	3	2.4	0	13	1	1	0	0	2
South Fork	Upper Red River	Upper Red River - Ditch Creek Campground	1		2	0	3	0	3	1	2	0.0	3	2.2	0	14	1	1	0	0	2
South Fork	Upper Red River	Upper Red River - E Fk Trail Creek	1		2	0	3	0	3	1	2	0.0	3	0.0	3	17	1	1	1	1	4
South Fork	**Upper Red River**	**Upper Red River - Red River Hotsprings Meadows**	1	3.2	3	0	3	0	3	1	2	0.0	3	1.4	1	16	1	1	1	0	3
South Fork	**Upper Red River**	**Upper Red River - Red River Ranger Station**	1	31.5	0	0	3	1	2	1	2	0.0	3	4.1	0	12	1	1	0	0	2
South Fork	Upper Red River	Upper Red River - South of Alberta Mine	1		2	0	3	0	3	0	3	0.0	3	0.0	3	18	1	1	0	0	2
South Fork	Upper Red River	Upper Red River - Trail Creek Headwaters	1		2	0	3	0	3	1	2	0.0	3	0.2	3	17	1	1	1	0	3
South Fork	**South Fork Red River**	**West Fork Red River - South Fork Red River Confluence**	1	0.3	3	0	3	0	3	1	2	0.0	3	2.1	0	15	1	1	1	0	3

Table 7. Ecological systems; plant associations; at-risk plants and animals for wetland complexes in study area not surveyed in 2006.

Upper Johns Creek - Canyon Riparian (Reference)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Upper Johns Creek - Trough Valley Meadows (Reference)			
Ecological Systems			
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Upper Kirks Fork (Reference)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Tenmile Meadows (Reference)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Mesic Meadow		
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Lower Silver Creek (Reference)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3

South Fork Clear Creek - Confluence West and South Fork (Habitat)			
Ecological Systems			
	Northern Rocky Mountain Western Hemlock-Western Red-cedar Forest		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Upper Red River - Trail Creek Headwaters (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Lower Johns Creek - Canyon Mouth (Habitat)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	arrow-leaf groundsel	*Senecio triangularis*	G3?
	grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	gray wolf	*Canis lupus*	G4
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Lower American River - Kirks Fork (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	Idaho giant salamander	*Dicamptodon aterrimus*	G3
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Lower Johns Creek - American Creek Headwaters (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
	panicled bulrush	*Scirpus microcarpus*	G4

	Sitka alder/common ladyfern	*Alnus viridis ssp. sinuata/Athyrium filix-femina*	G3G4

Tenmile Creek (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
Lower Johns Creek - Downstream Gospel Hump Wilderness (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Twentymile Creek - W Fk Twentymile Creek (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	grand fir/arrowleaf groundsel	*Abies grandis/Senecio triangularis*	G3
	Sitka alder/mesic forbs	*Alnus viridis ssp. sinuata*/mesic forbs	G3G4
Upper Red River - Ditch Creek Campground (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	fisher	*Martes pennanti*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
East Fork American River - Flint Creek (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Upper Clear Creek - Browns Springs Creek (Habitat)			
Ecological Systems			
	Northern Rocky Mountain Western Hemlock-Western Red-cedar Forest		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
South Fork Clearwater River - Little Wing Creek (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		

	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Upper Red River - E Fk Trail Creek (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Lower Johns Creek - American Creek (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Upper Red River - South of Alberta Mine (Habitat)			
Ecological Systems			
	Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland		
South Fork Clearwater River - Blue Ridge to Mile 40.5 (Restoration Opportunity)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Open Water		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	bank monkeyflower	*Mimulus clivicola*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	humped coin	*Polygyrella polygyrella*	G2G3
	Nimapuna tigersnail	*Anguispira nimapuna*	G1
	pale jumping-slug	*Hemphillia camelus*	G3G4
	sheathed slug	*Zacoleus idahoensis*	G3G4
	smoky taildropper	*Prophysaon humile*	G1G2
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
South Fork Clearwater River - Mile 50 to Dutch Oven Creek (Restoration Opportunity)			
Ecological Systems			
	Open Water		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	bank monkeyflower	*Mimulus clivicola*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
South Fork Clearwater River - Farrens Creek to Johns Creek (Restoration Opportunity)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Open Water		
Plants	**Common Name**	**Scientific Name**	**Rank**
	bank monkeyflower	*Mimulus clivicola*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1

	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Upper Newsome Creek - Above Baldy Cr Dredge (			
Ecological Systems			
	Rocky Mountain Alpine-Montane Wet Meadow		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plant Associations	**Common Name**	**Scientific Name**	**Rank**
	water sedge	*Carex aquatilis*	G5
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Upper Newsome Creek - Haysfork Creek (Restoration Opportunity)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	Blandow's helodium	*Helodium blandowii*	G5
Animals	**Common Name**	**Scientific Name**	**Rank**
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Lower American River - Northeast of Elk City (Restoration Opportunity)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
South Fork Clearwater River - Mile 43 to Reed Bar (Restoration Opportunity)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	Canada lynx	*Lynx canadensis*	G5
	pale jumping-slug	*Hemphillia camelus*	G3G4
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
South Fork Clearwater River - Allison Creek (Restoration Opportunity)			
Ecological Systems			
	Open Water		
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
South Fork Clearwater River - Golden to Fall Creek (Restoration Opportunity)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		

	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	bank monkeyflower	*Mimulus clivicola*	G4
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Lower Red River - Red Horse Creek Dredge (Restoration Opportunity)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Animals	**Common Name**	**Scientific Name**	**Rank**
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	northern leopard frog	*Rana pipiens*	G5
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
South Fork Clearwater River - Mile 18 to Farrens Creek (Restoration Opportunity)			
Ecological Systems			
	Columbia Basin Foothill Riparian Woodland and Shrubland		
	Open Water		
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
South Fork Clearwater River - Santiam Creek (Restoration Opportunity)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	Idaho strawberry	*Waldsteinia idahoensis*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
Elk Creek - West Elk City Valley (Restoration Opportunity)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		
Plants	**Common Name**	**Scientific Name**	**Rank**
	Idaho strawberry	*Waldsteinia idahoensis*	G3
Animals	**Common Name**	**Scientific Name**	**Rank**
	bull trout	*Salvelinus confluentus*	G3
	chinook salmon	*Oncorhynchus tshawytscha*	G5T1
	steelhead	*Oncorhynchus mykiss gairdneri*	G5T2T3
	westslope cutthroat trout	*Oncorhynchus clarki lewisi*	G4T3
Mill Creek - Merron Creek Melton Creek Confluence (Restoration Opportunity)			
Ecological Systems			
	Rocky Mountain Subalpine-Montane Riparian Shrubland		
	Rocky Mountain Subalpine-Montane Riparian Woodland		

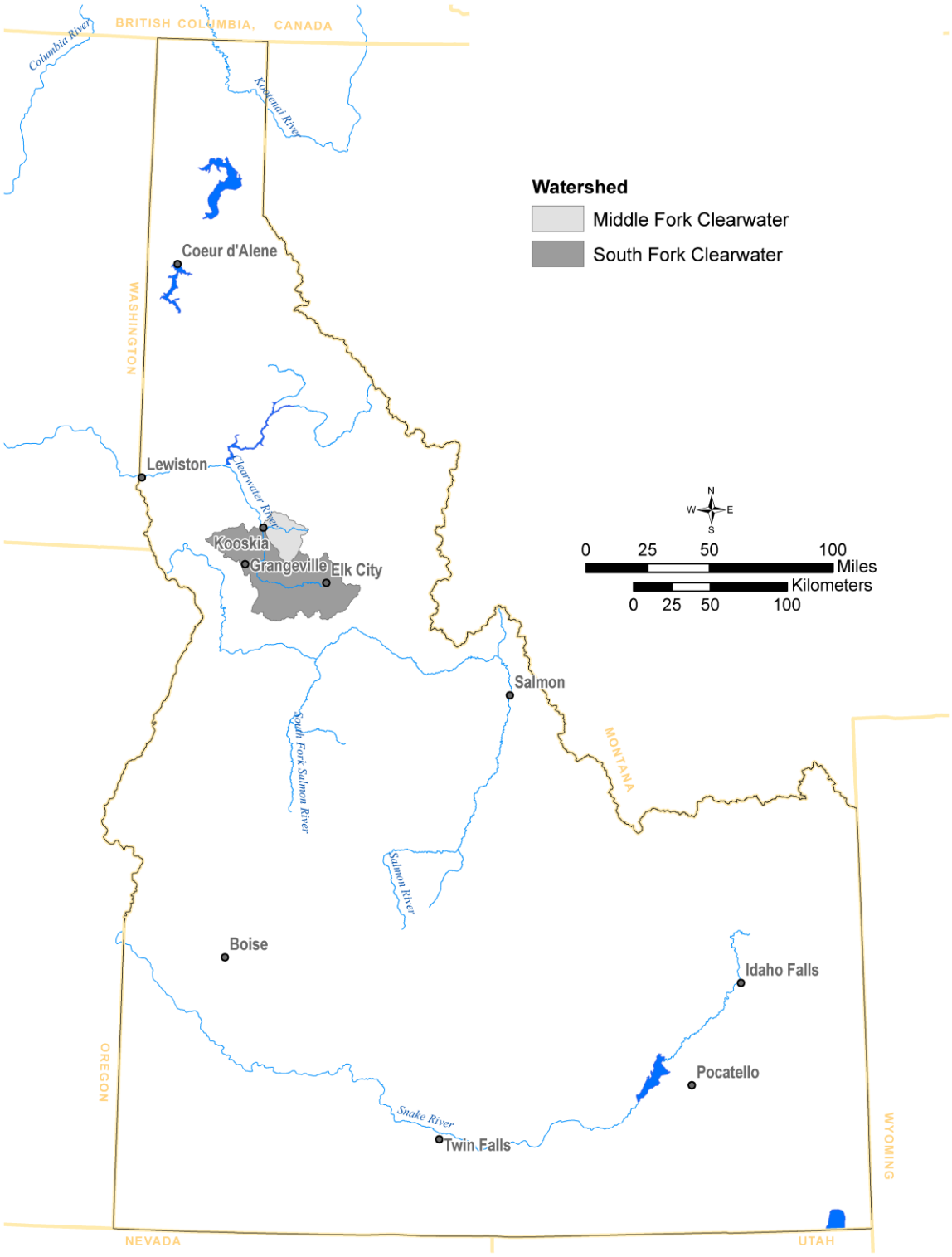

Figure 1. Study area.

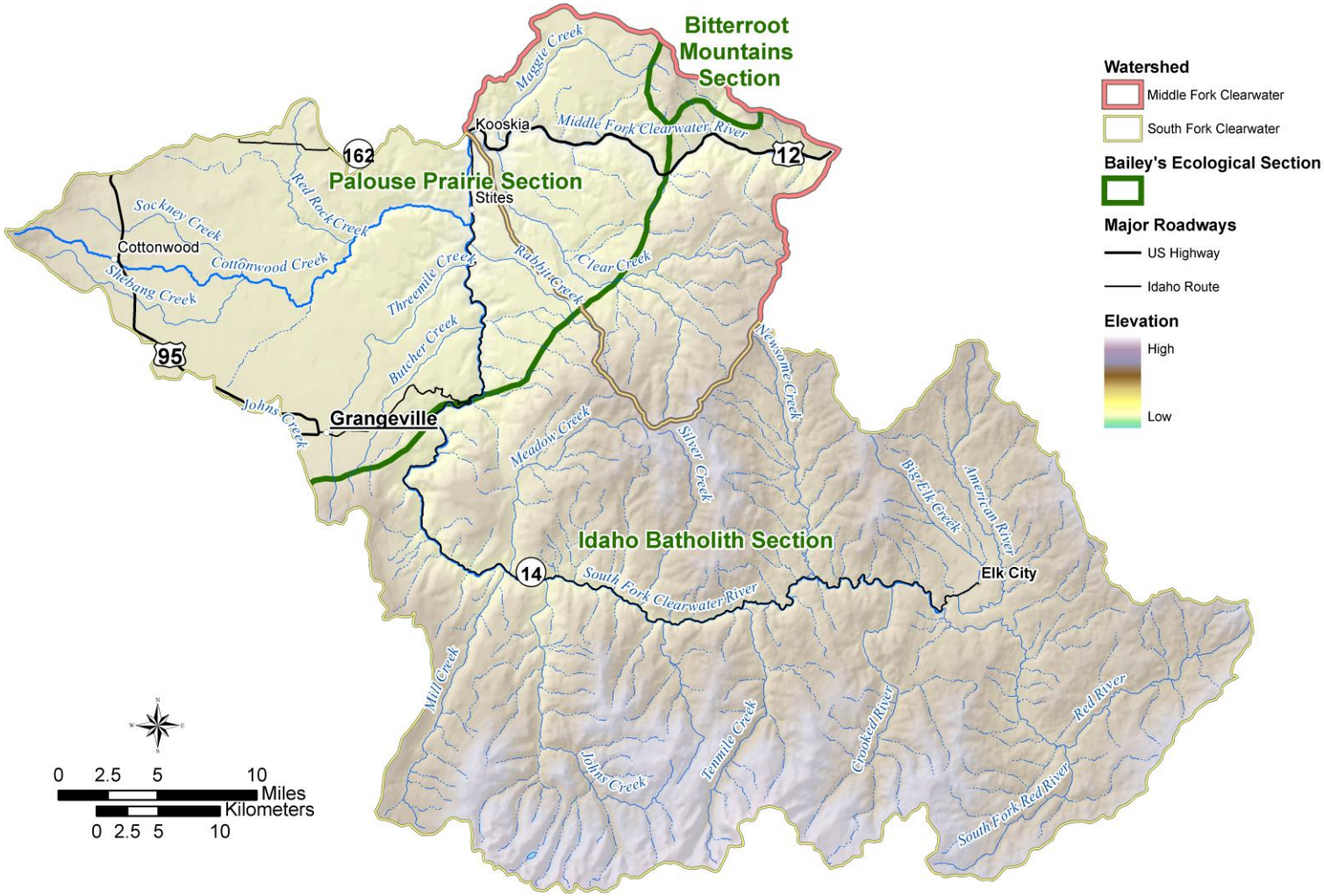

Figure 2. Environmental settings in study area, shown by topography and ecoregional section boundaries.

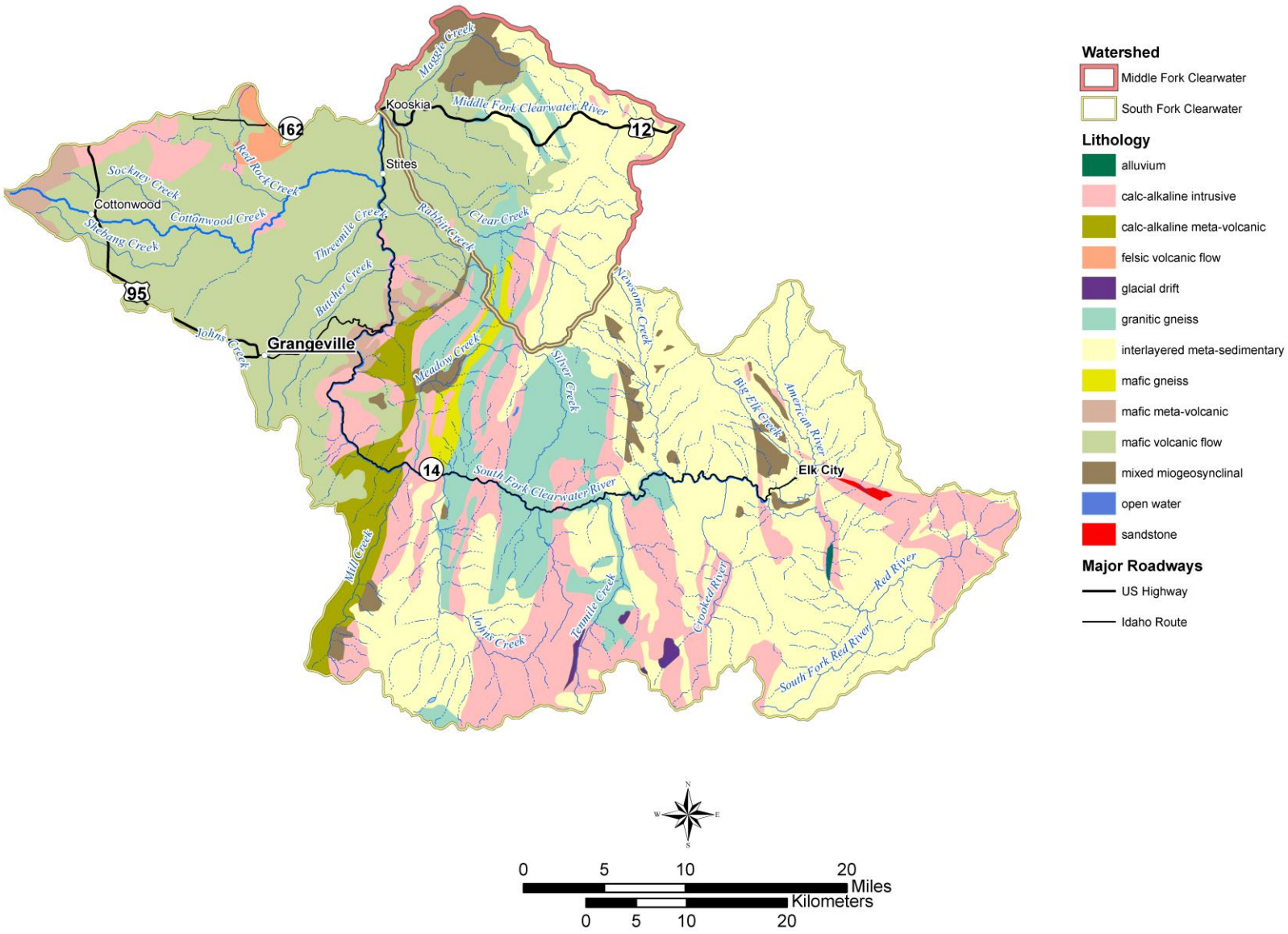

Figure 3. Lithology in study area.

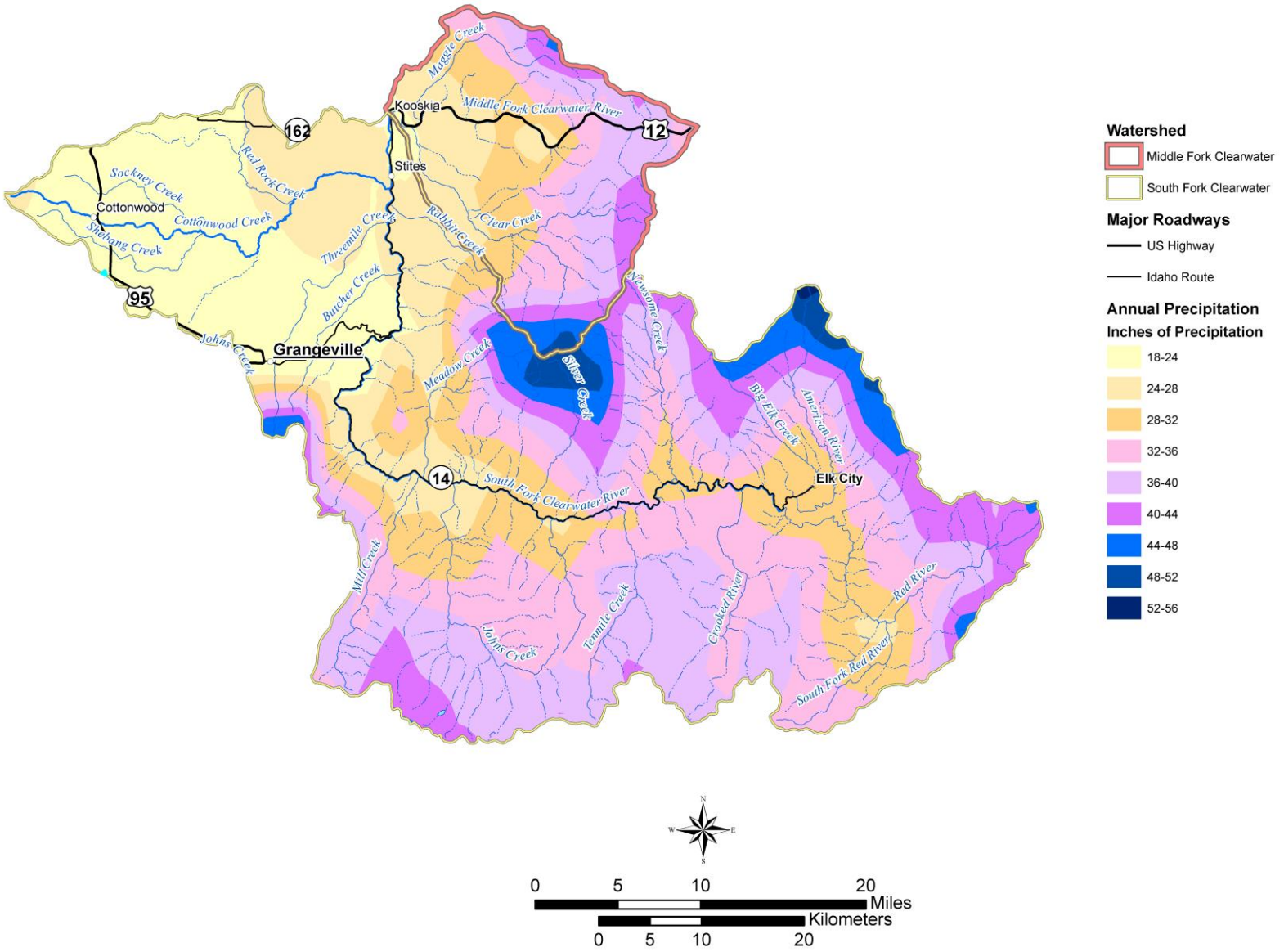

Figure 4. Mean annual precipitation in study area.

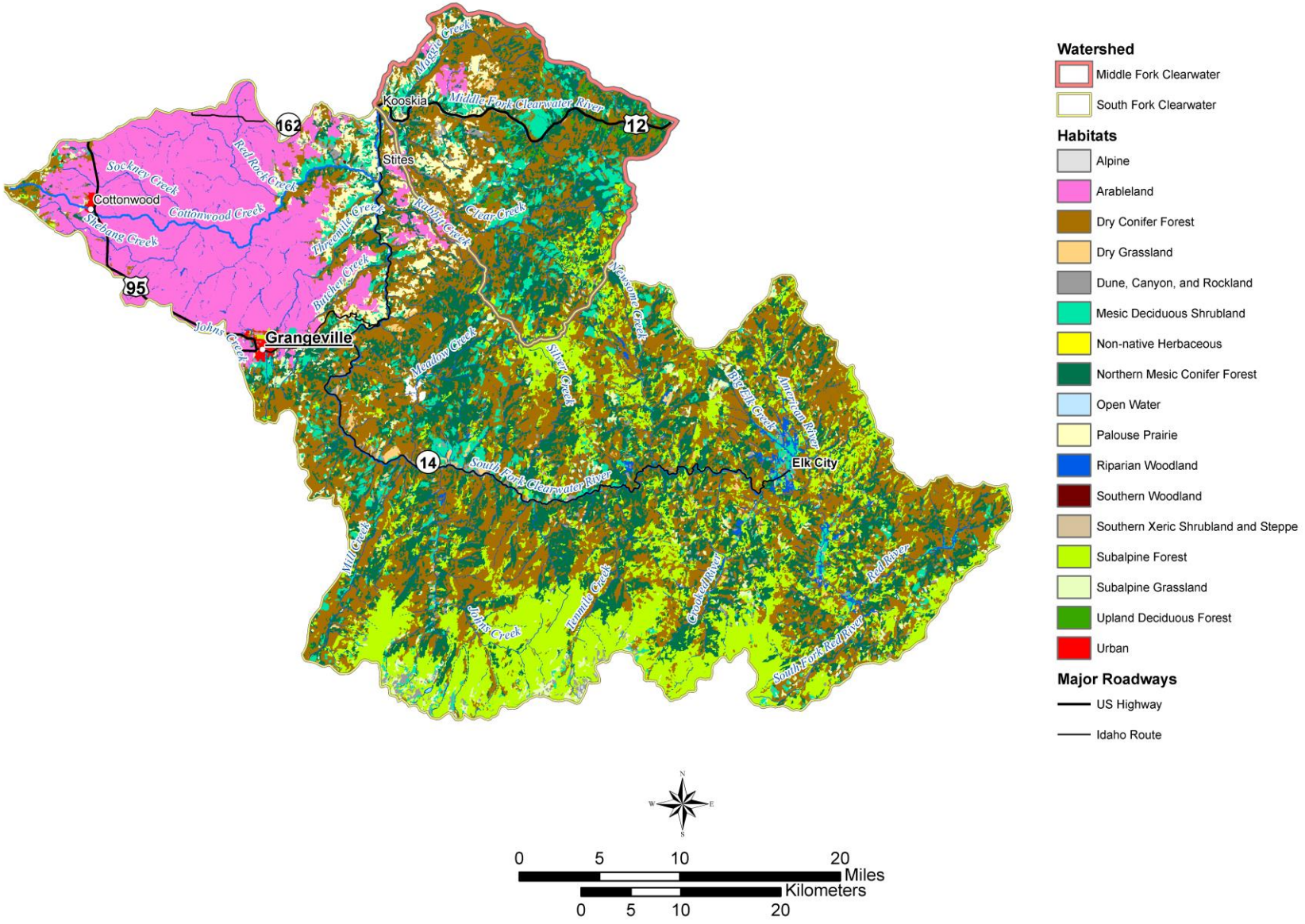

Figure 5. Habitats in study area. Habitats represent vegetation cover types resulting from an agglomeration of similar ecological systems.

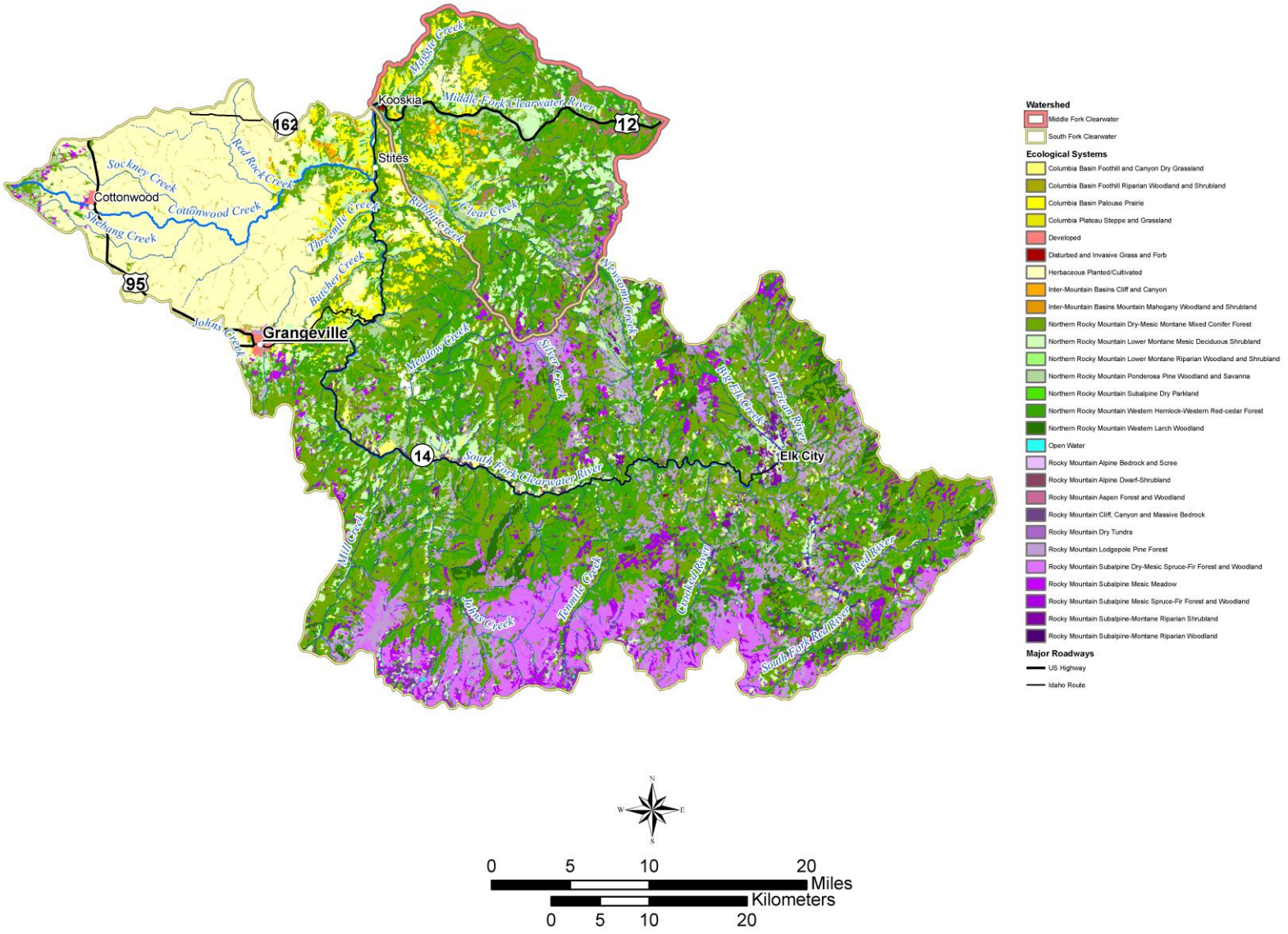

Figure 6. Ecological systems in study area.

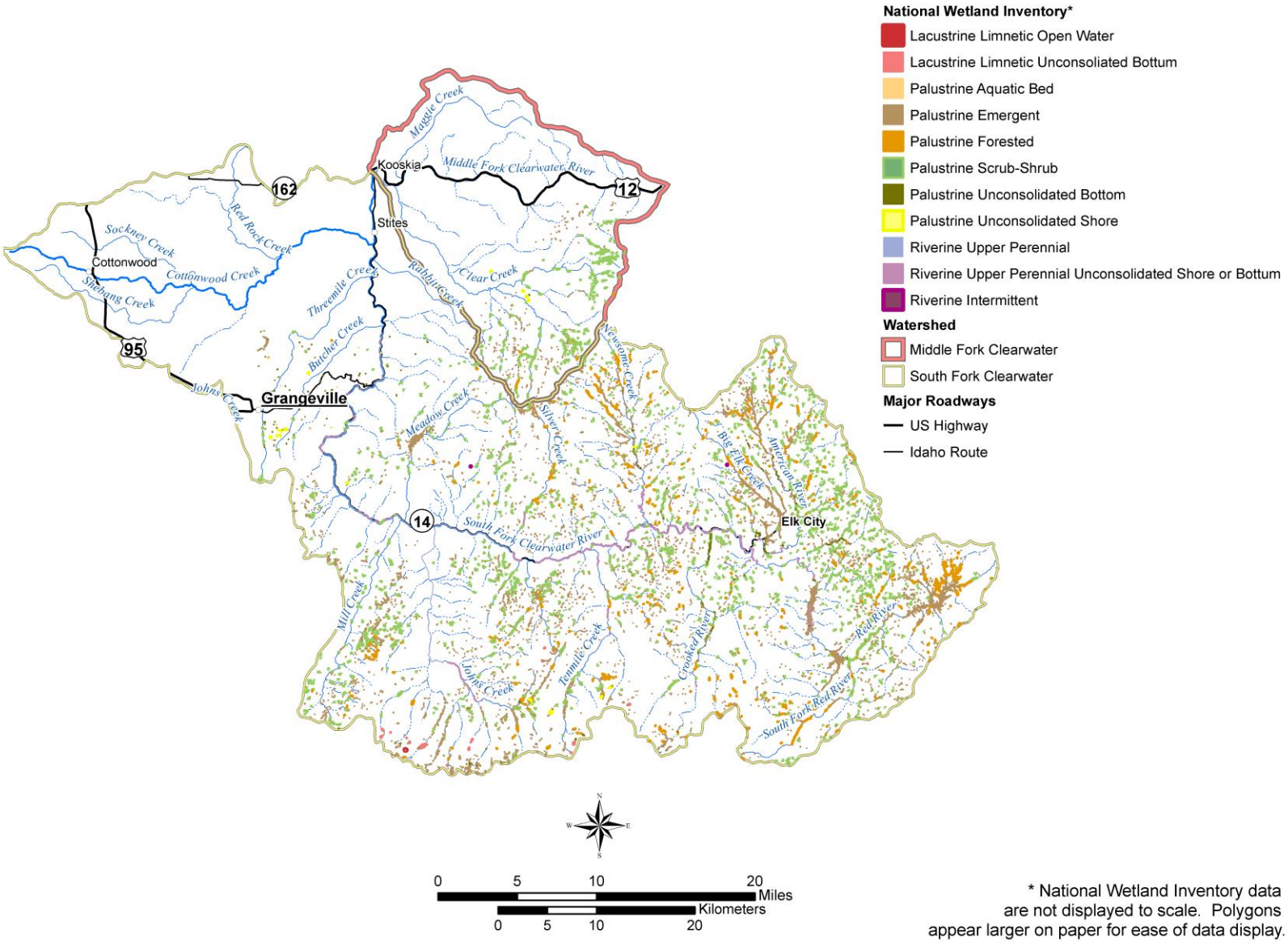

Figure 7. Wetlands in the South Fork Clearwater subbasin and a portion of the Middle Fork subbasin. Based on digitized National Wetland Inventory map of Cowardin classes. Digital NWI maps were not available for the Camas Prairie portion of the South Fork subbasin.

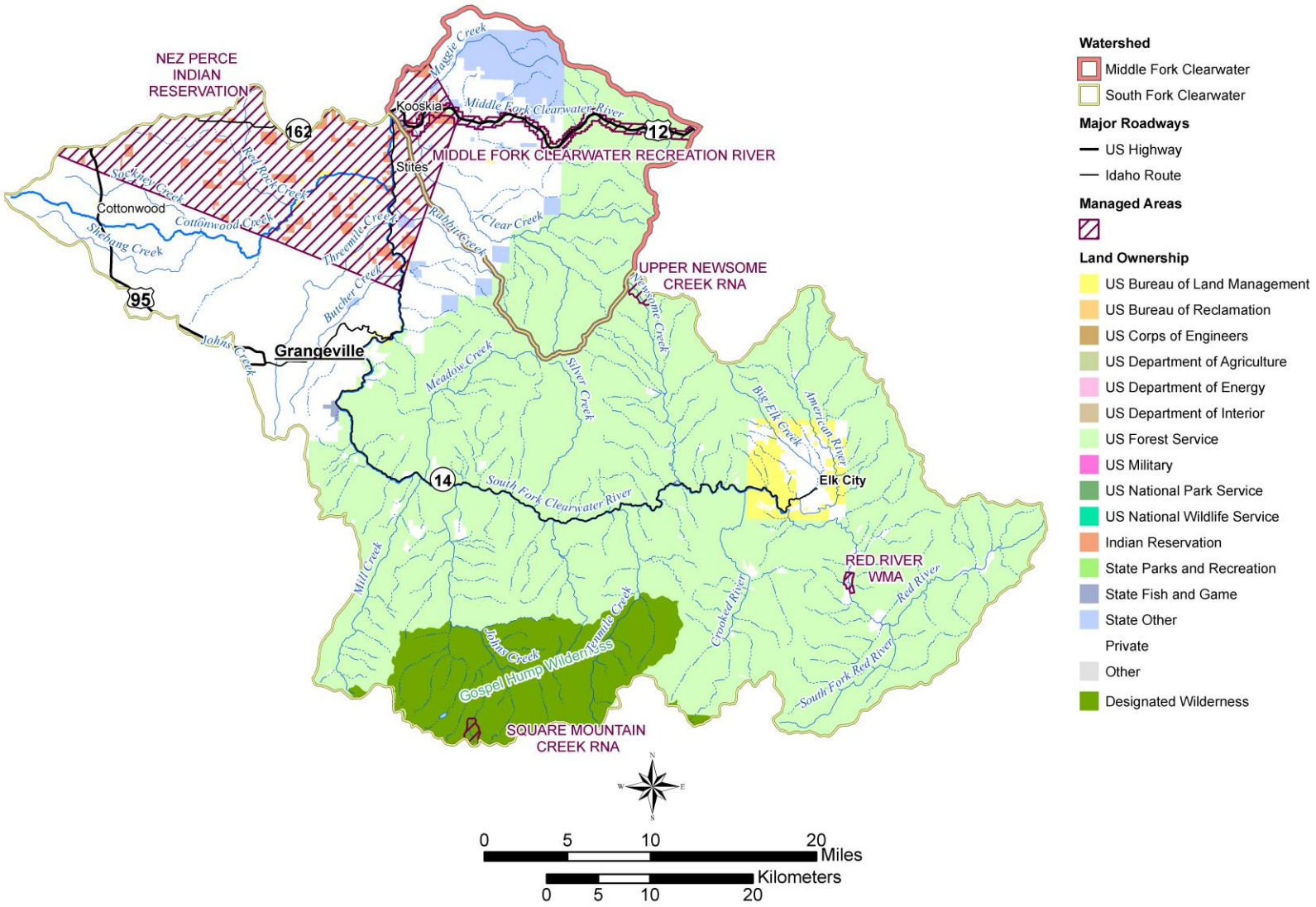

Figure 8. Land ownership and managed areas in study area.

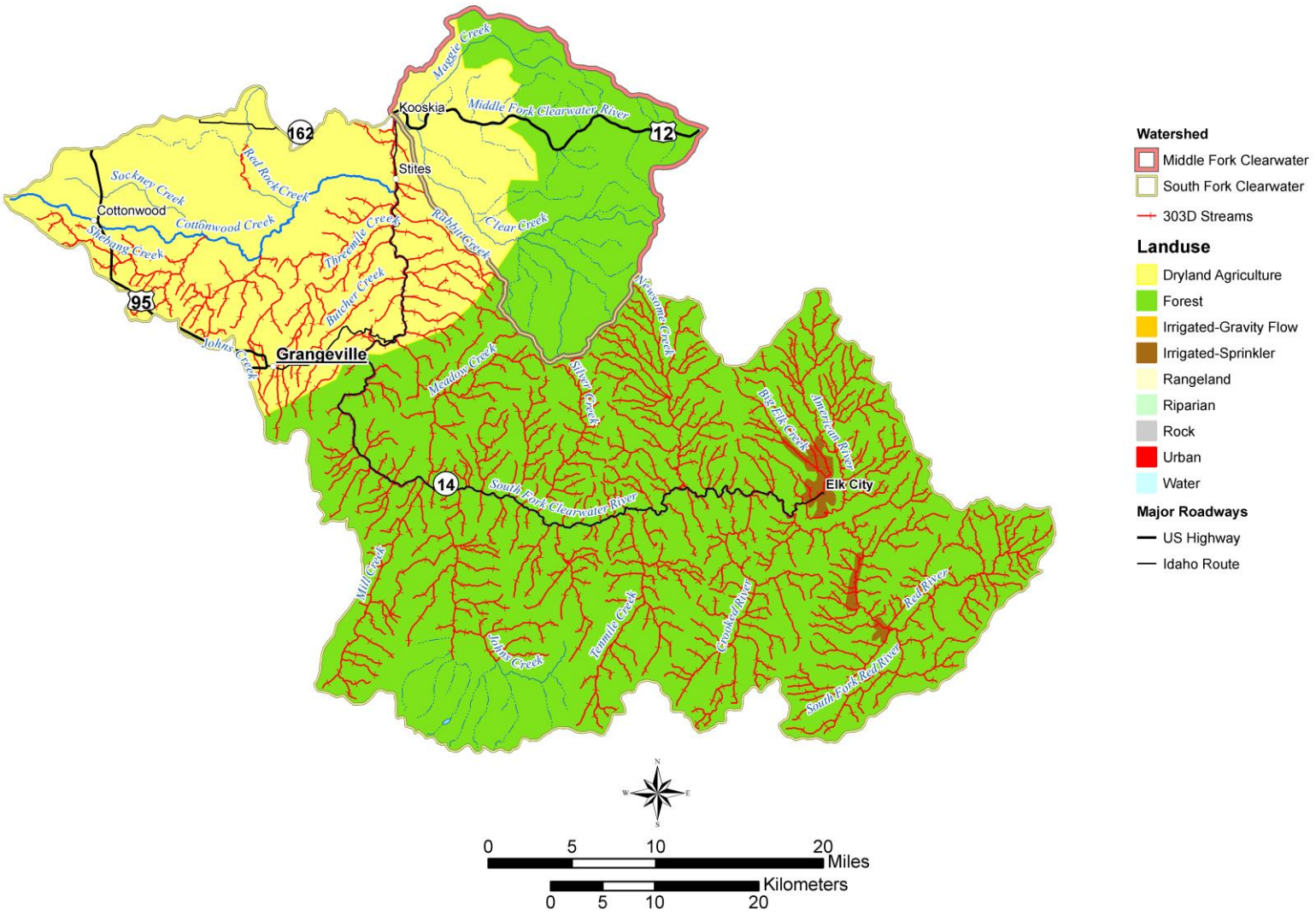

Figure 9. Dominant land uses in study area and water quality impaired streams. Impaired streams shown by water quality limited reaches listed under Section 303(d) of the Clean Water Act. Water quality information was not available for the Middle Fork subbasin.

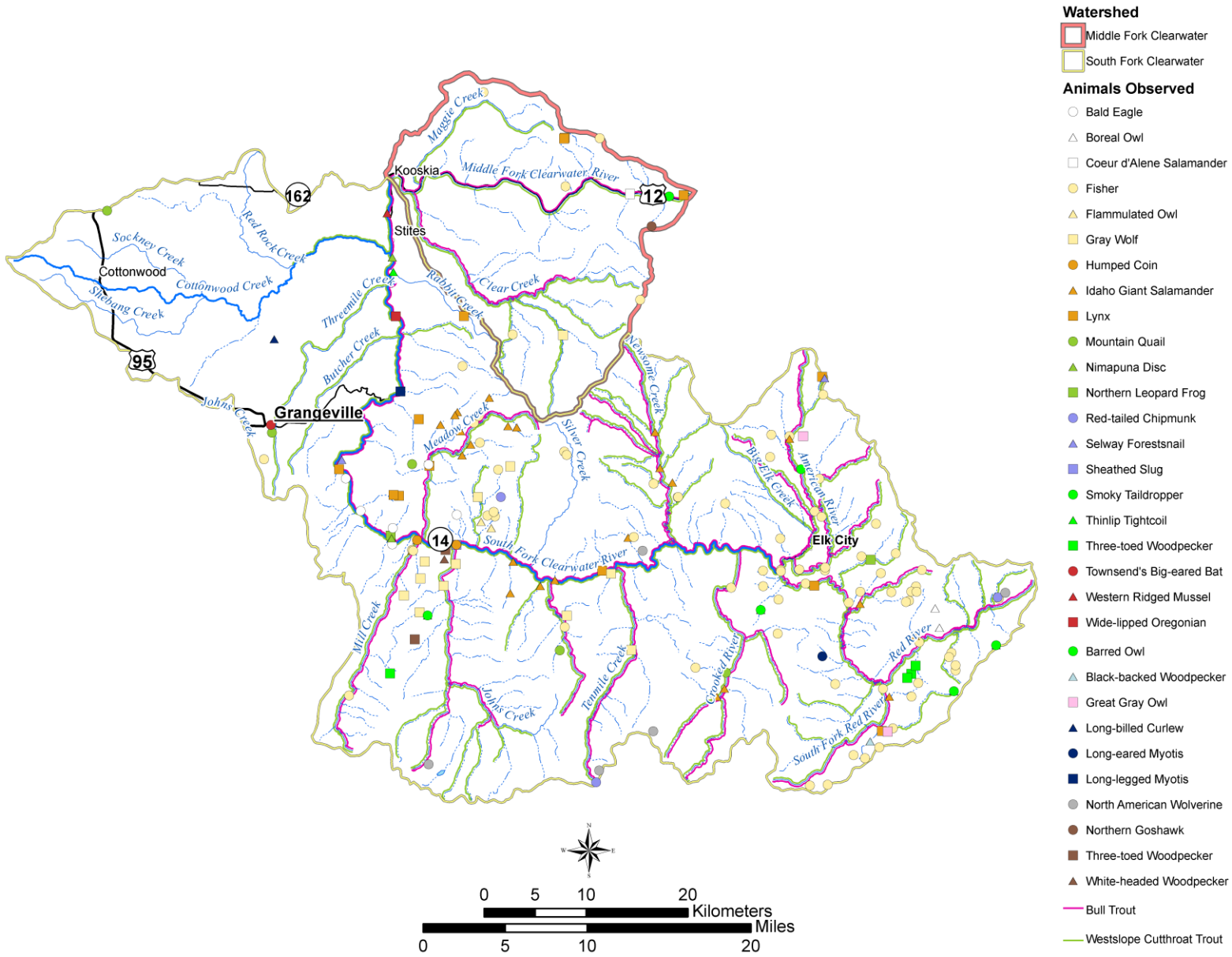

Figure 10. At-risk wildlife species observations in study area. Chinook salmon and steelhead streams are not shown.

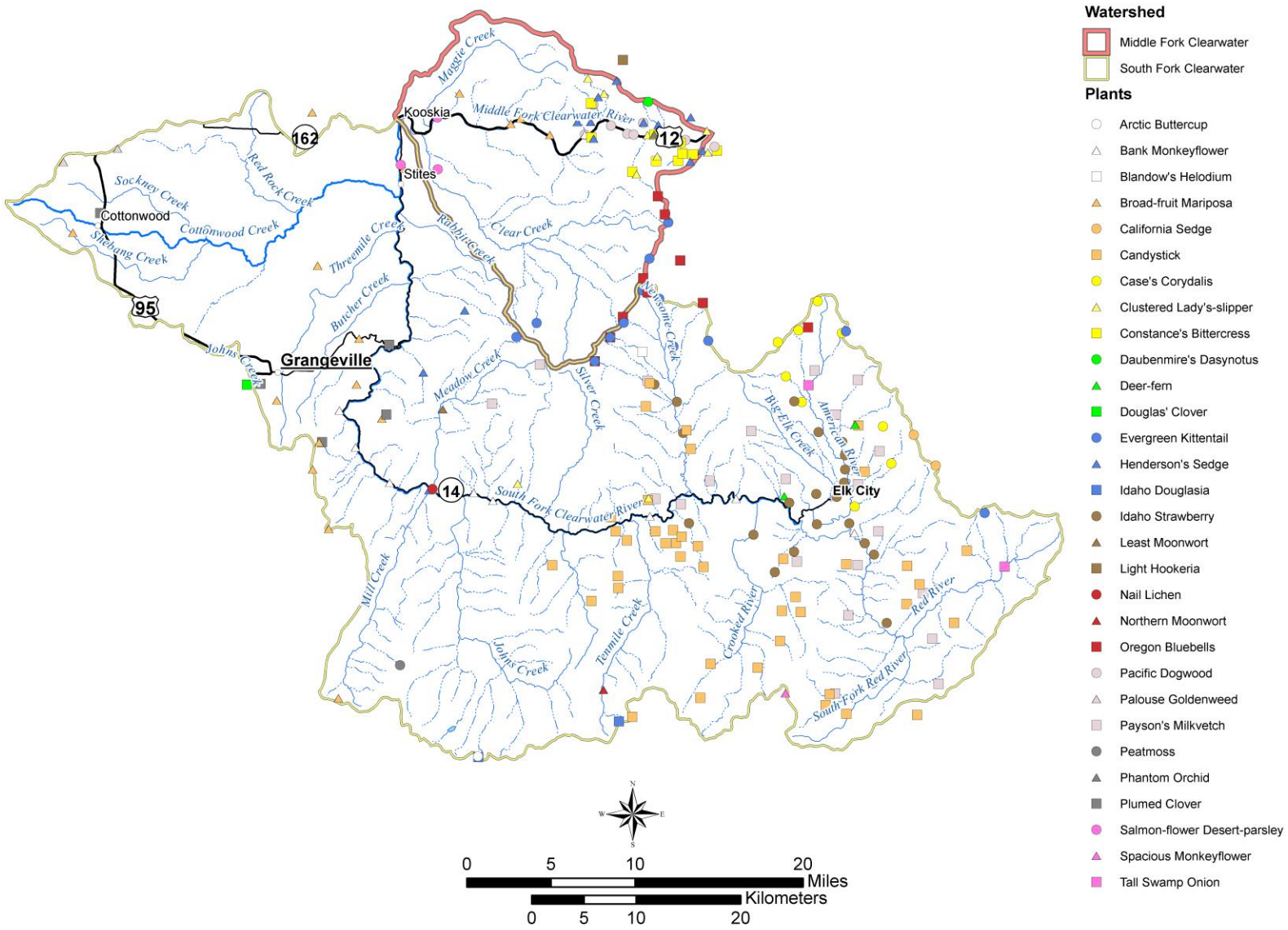

Figure 11. A-risk vascular and non-vascular plant species occurrences in study area.

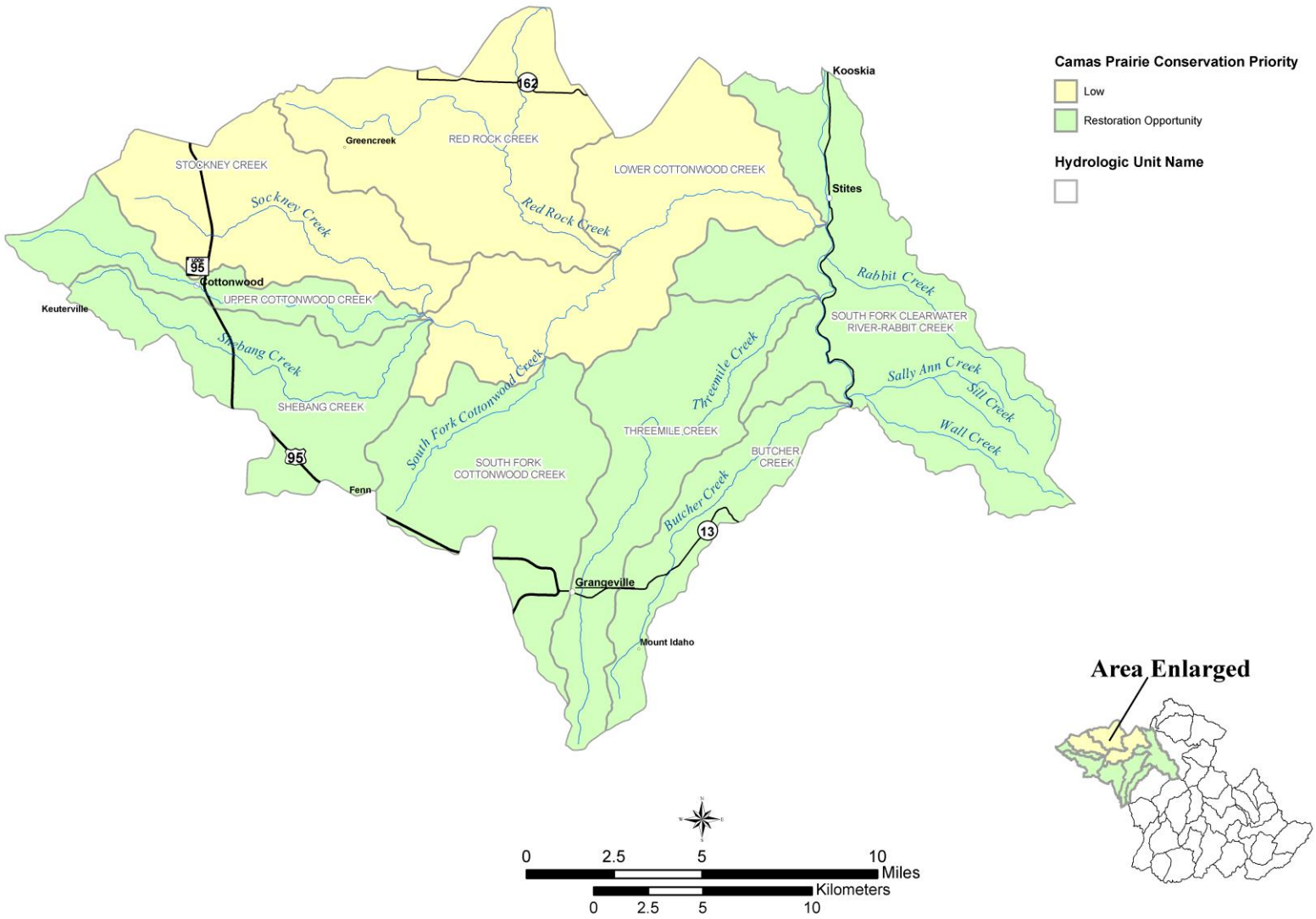

Figure 12. Conservation prioritization for HUC 12s in the Camas Prairie portion of the South Fork Clearwater subbasin.

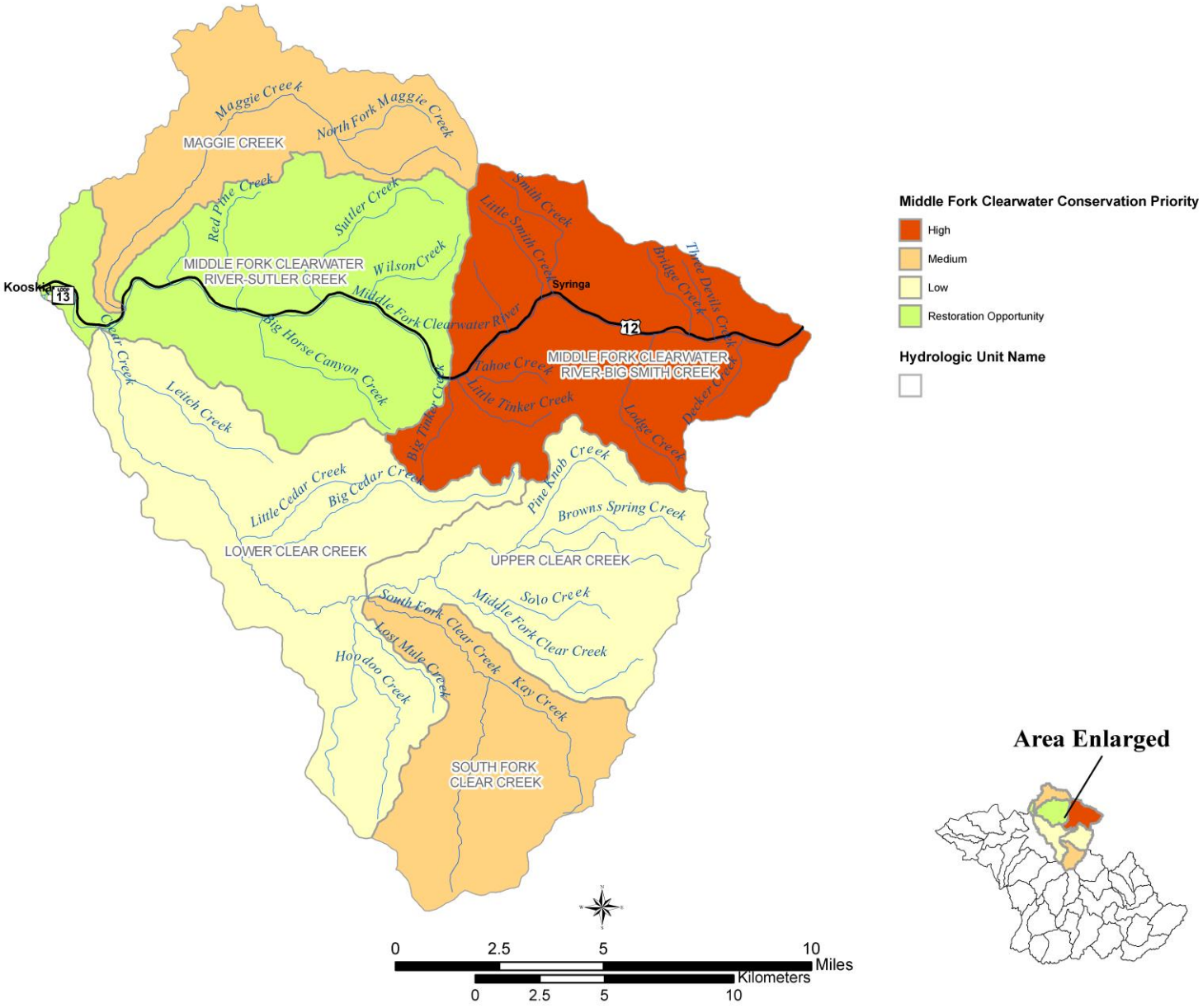

Figure 13. Conservation prioritization for HUC 12s in the Middle Fork Clearwater subbasin.

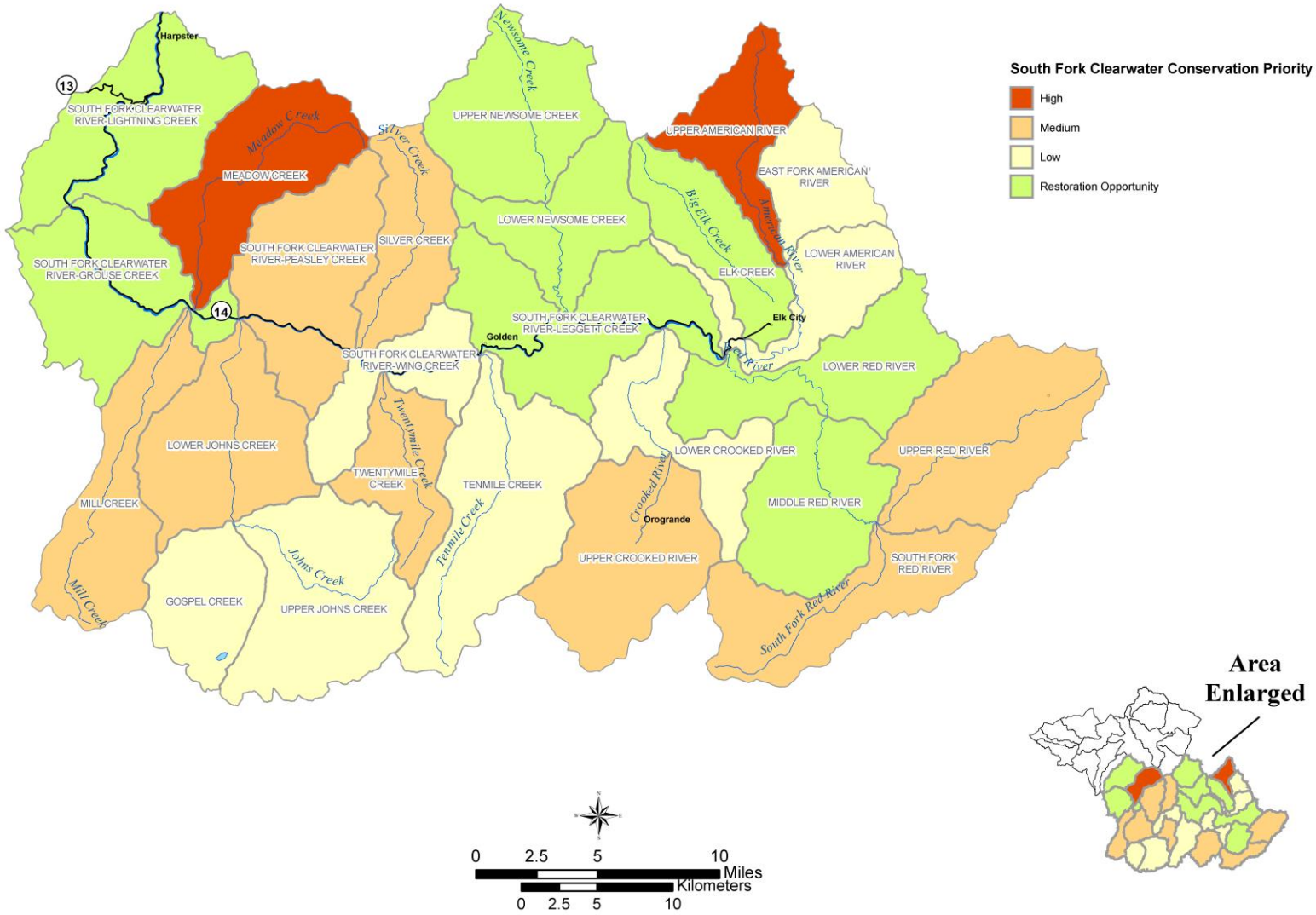

Figure 14. Conservation prioritization of HUC 12s in the South Fork Clearwater subbasin, excluding the Camas Prairie.

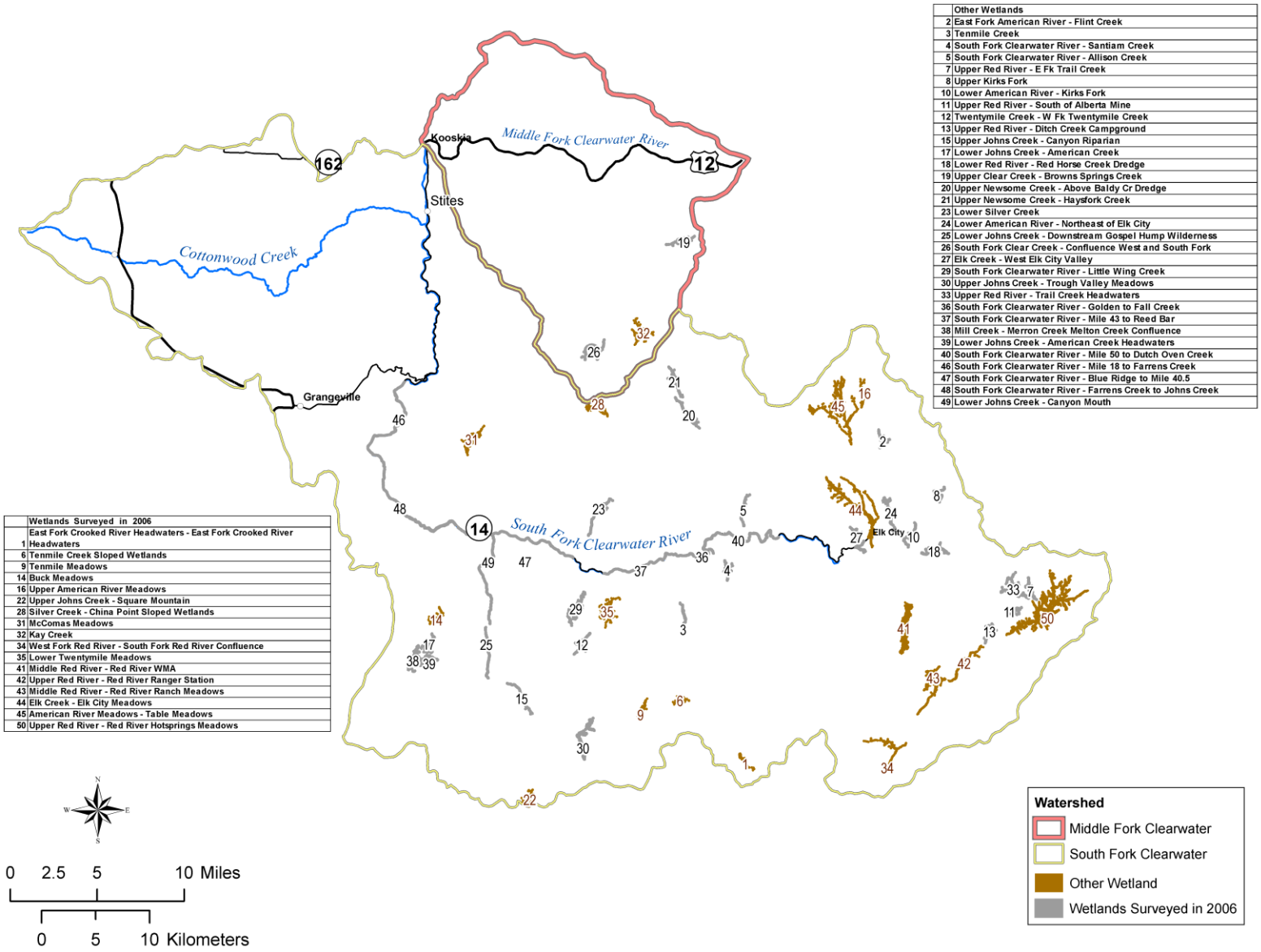

Figure 15. Locations of 50 wetland complexes assessed for conservation prioritization. Wetland complexes surveyed in 2006 are highlighted.