# McCoy Creek Watershed Assessment

United States
Department of
Agriculture

Forest Service
Caribou – Targhee
National Forest

February 2007

# McCoy Creek

## Watershed Analysis

### February 2007

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|---|---|
| Location: | Bonneville County, Idaho |
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A watershed analysis is a living document and should edited and added to as information becomes available and as new issues arise. Below is a table that outlines the evolution of this document:

| Edition | Comments |
|---|---|
| | This analysis was started the spring of 2003. The majority of the analysis was completed by fall 2005. |
| June 2006 | This document had all been compiled but final edits had not been completed. |
| January 2006 | The New Travel Plan information was included |
| February 2007 | Final edits made |
| | |

# Watershed Analysis Overview

The purpose of this document is to document the analysis of the McCoy Creek watershed, conducted by the Soda Springs Ranger District. The District followed the six-step process and addressed the seven core topics outlined in the *Federal Guide for Watershed Analysis.* However, in an attempt to make the document user friendly the steps have been broken down and regrouped for the purpose of this document.

The *Federal Guide for Watershed Analysis* outlines a six-step process that must be followed and seven core topics that should be addressed in a watershed analysis.

**The six-steps of a watershed analysis are:**
1) Characterization of the watershed
2) Identification of issues and key questions
3) Description of current conditions
4) Description of reference conditions
5) Synthesis and interpretation of information
6) Recommendations.

**The seven core topics are:**
1) erosion processes
2) hydrology
3) vegetation
4) stream channel
5) water quality
6) species and habitats
7) human uses.

The document is composed of five chapters. They are:

1. Characterization
2. Issues and Key Questions
3. Reference, Current and Condition Trend
4. Interpretation and Opportunities
5. The Answers to the Key Question

Chapter one characterizes the human, aquatic, riparian and terrestrial features, conditions, processes, and interactions within the watershed. The chapter has been broken into the following sections.

- Location and Description.
- Hydrologic and Stream Processes.
- Soil Geology and Landtype Associations
- Vegetation.
- Species and Habitats.
- Human Uses.

Chapter two displays the issues and key questions identified in step two. Because the analysis is issue-driven, only the core topics and watershed-specific problems or issues/concerns are addressed in this document. Therefore some of the issues/questions the IDT (Interdisciplinary Team) has identified indicators that will be used to describe and display the ecological processes and effects at work within the watershed. These indicators will be used through out the remainder of the document to establish how well or poorly the ecological processes are functioning, and determine the conditions under which management activities should and should not take place.

There were five issues identified during the analysis process that the team felt needed to be addressed by this analysis iteration. These issues will serve as section headings and the indicator as subsections headings throughout the remainder of the document. The issues and the indicators are outline below:

1. **Vegetation Dynamics --** The "Caribou Nation Forest and Surrounding Area Sub-Regional Properly Functioning Condition Assessment" and other similar broad scale assessments have indicated that existing vegetation distribution, structure, and composition are outside the historic range of variability across much of the Soda Springs Ranger District. Therefore, the vegetation within the McCoy Creek watershed assessment area is likely also outside historic ranges, which has the potential to adversely affect ecosystem function.

   **Issue Indicators:**
   - **Non-Forested Vegetation**
     - Structure
     - Regime
     - Noxious Weeds
   - **Forest Vegetation**
     - Structure
     - Density
     - Species Composition
     - Disturbance Regimes

2. **Hydrologic Processes and Water Quality –** Channel stability, hydrologic processes and water quality within the watershed have been substantially impacted by historic mining practices. Channel stability impacts persist and will continue to persist for the long term. Some present practices, processes, and conditions may continue to produce or threaten impacts to water quality and channel stability.

   **Issue Indicators:**
   - No specific quantitative indicator for sediment has been developed. Forest Plan indicators for riparian Proper Functioning Condition and beneficial use support are used as qualitative surrogates, along with discussion of impacts organized by topic.

3. **Soil Productivity –** Is soil productivity being maintained now in the watershed?

   **Issue Indicators:**
   - Specific indicators not developed, organized by topic rather than indicators.

4. **Native Fish Habitat –** Yellowstone Cutthroat Trout populations, distribution and available habitat has been altered by human uses, which may have reduced species sustainability.

   **Issue Indicators:**
   - Population and Presence
   - Channel & Habitat Disturbances
   - Barriers
   - Non Native Species and Disease

5. **Wildlife Habitat –** The viability of some wildlife species may have been impacted by past and present activities.

   **Issue Indicators:**
   - Specific indicators not developed, organized by topic rather than indicators.

Chapter three presents information and data on the indicators or topics relevant to the issues and key questions developed in chapter 2. The IDT developed and displays the reference condition, current condition and trend for each indicator.

Chapter four puts the indicators or ecosystem elements into a context that can be understood, displayed and compared. In this chapter the indicators for each issue have been integrated and displayed by reporting units, i.e. cover type, HUC, or by species. This was an attempt to describe the ecological processes at work within the watershed. We believe that reporting resource indicators, in terms of the appropriate reporting unit is the best way to synthesize the data in chapter 3 and characterize it into a "So What?" context.

The definition of synthesis in the *Federal Guide for Watershed Analysis is: "The integration of separate ecosystem elements to understand the whole system: a primary goal of watershed analysis."* Each resource specialist interpreted the trend for the reporting unit i.e. cover type, HUC, or species, and described what caused the trend and what some of the results of the current trend may be. Indicators are all interrelated and a good interpretation cannot be done without discussing all the indicators at once.

Chapter four also outlines opportunities/recommendations for management action(s) that can be taken to reverse or change the current trend. It also outlines data gaps and limitations of the data used.

In Chapter five the IDT revisited the issues and key questions and put together short answers to each question. This chapter is intended to serve as an executive summary or quick reference of the findings of the watershed analysis.

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# 1.0 Characterization of the Watershed

## 1.1 Location & Description

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The McCoy watershed (MCW)is a 69,519-acre, 5th order Hydrologic Unit located in the Caribou Range, Bonneville County, Idaho, west of the town of Alpine, Wyoming (See **Figure 1.1-1**) and east of Grays Lake (Idaho). Sub watersheds were also delineated generally based on the USGS 6th HUCs, and assigned names to provide smaller reporting units. Refer to **Table 1.1-1** and **Figure 1.1-2**.

The analysis area is composed of drainages that drain from the north to south into McCoy Creek and then into Palisades Reservoir on the South Fork of the Snake River. Big Elk Mountain is the highest point in the analysis area at 9,476 feet and the lowest point is where McCoy Creek drains into Palisades Reservoir at approximately 5,620 feet above sea level

Prominent features within the watershed include the historic mining town of Caribou City, the north flank of Caribou Mountain, and the south flank of Big Elk Mountain. The watershed is covered by the Caribou Mountain, Herman, Big Elk Mountain, Poker Peak, Tincup Mountain, Idaho USGS quads and the Alpine, WY quad.

**Table 1.1-1: Sub Watershed Name and Acres.**

| Sub Watershed Name | Huc 6th # | Acres |
|---|---|---|
| Wolverine | 170401041104 | 10,919 |
| Fish | 170401041102 | 11,952 |
| Iowa | 170401041103 | 13,529 |
| Barnes | 170401041106 | 8,713 |
| Jensen | 170401041101 | 13,456 |
| Clear | 170401041105 | 10,950 |
| **Total Acres** | | **69,519** |

**Figure 1.1-1: McCoy Creek Vicinity Map**

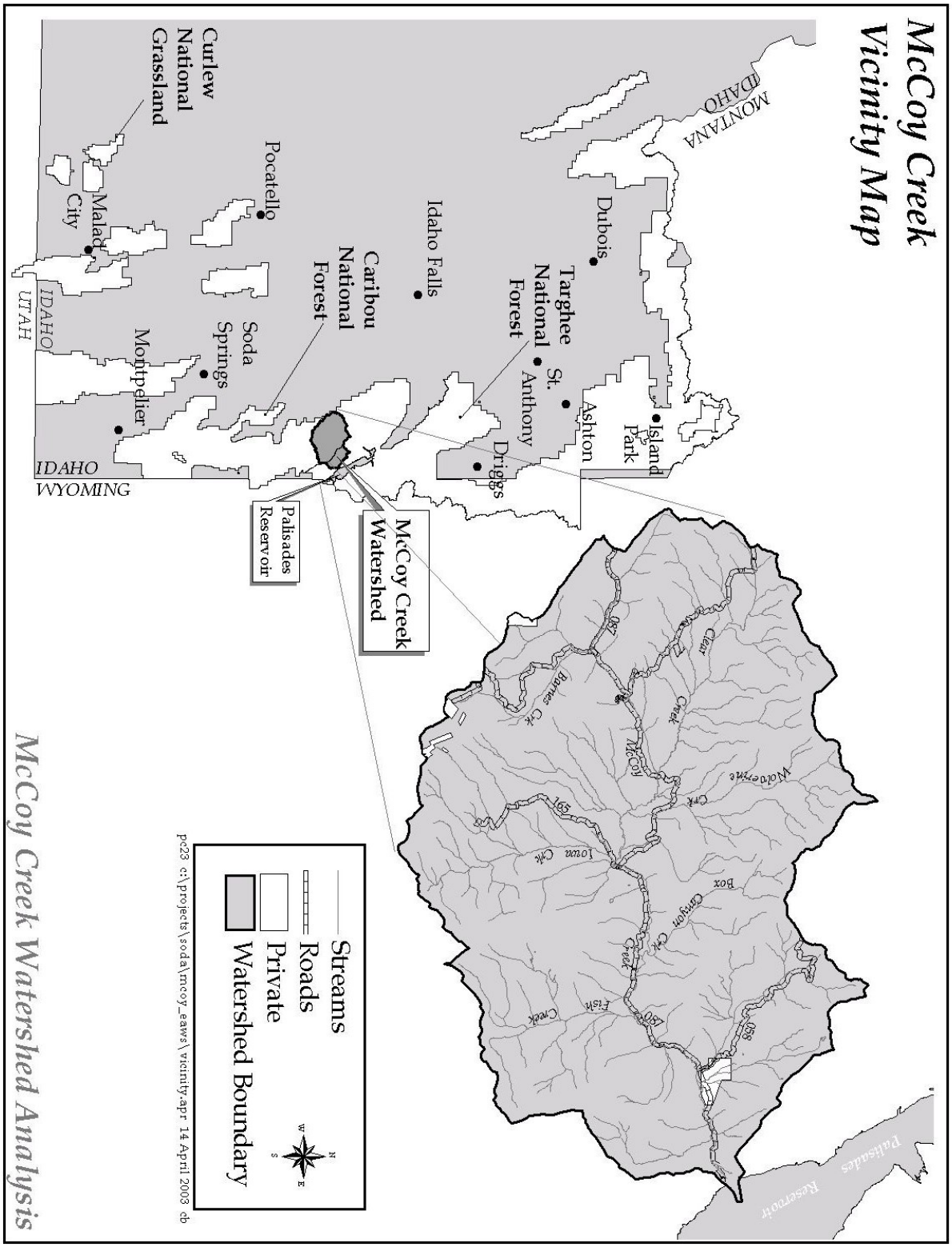
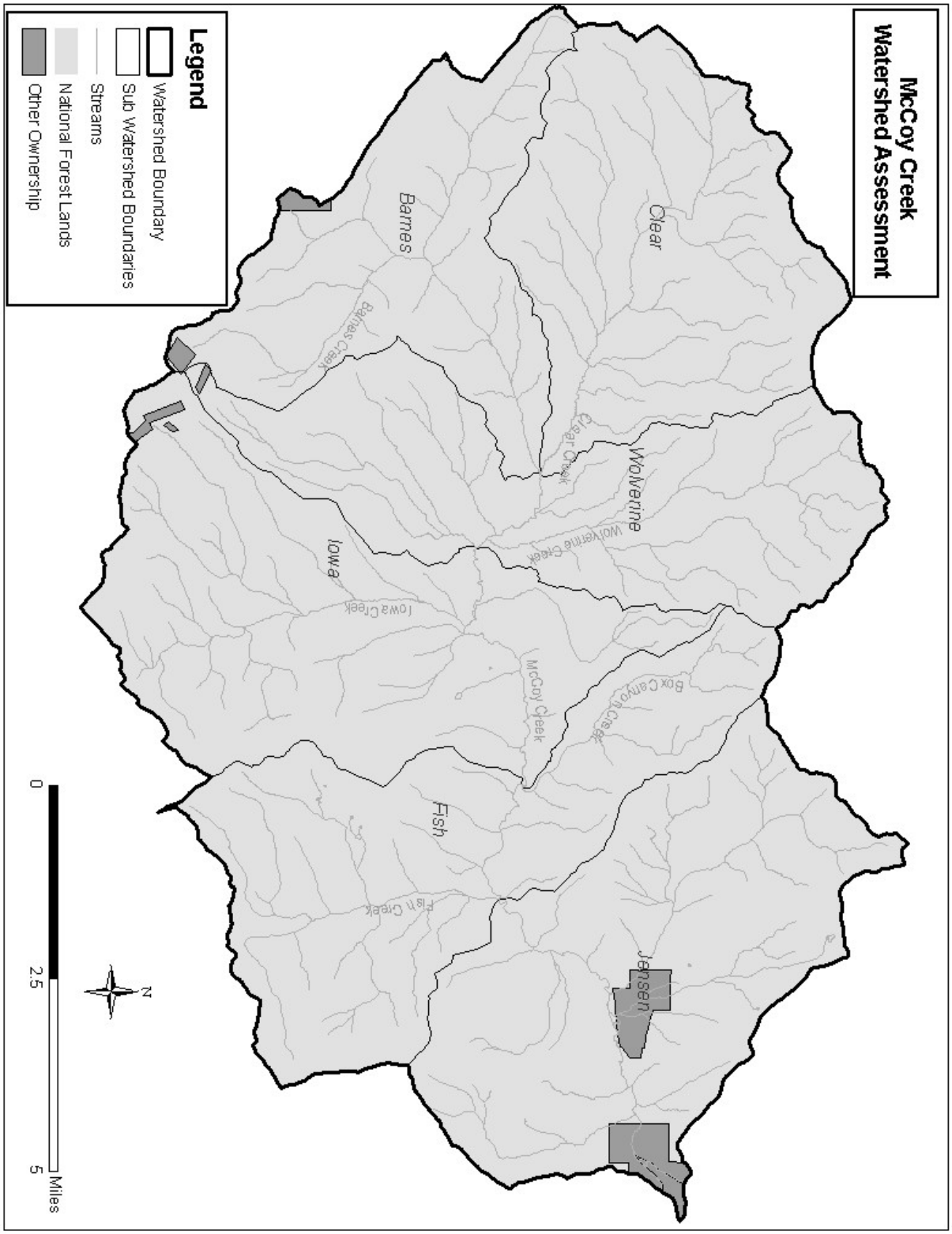


**Figure 1.1-2: Sub Watersheds within MCW**



## 1.2 Land Ownership & Administration

The Caribou-Targhee National Forest manages most of the watershed, but other land ownership is involved. Approximate acres by jurisdiction are displayed in **Table 1.2-1** below.

**Table 1.2-1: Jurisdiction within the McCoy Creek Watershed (MCW)**

| Jurisdiction | Acres | Percent |
|---|---|---|
| Forest Service | 68,509 | 99% |
| Private | 508 | 1% |
| Bureau of Reclamation | 424 | <1% |
| State | 78 | <1% |
| **Total** | **69,519** | |

## 1.3 Hydrologic and Stream Processes

### 1.3.1 Climate

The McCoy Watershed is characterized by mild, mostly dry summers and cold, moderately moist winters. The most representative weather station is judged to be Henry, Idaho at 6,132 ft, which has an average maximum daily temperature of 54 degrees Fahrenheit, and an average daily minimum of 24 F. The average precipitation at that station is 21 inches with about half falling as snow. Maximum storm precipitation rates are 0.8 in to 0.9 in. for the 2yr, 6hr storm, and 2.8 in to 3.0 in for the 100yr, 24hr storm (NOAA, 1973), being lowest at the outlet and highest in the upper elevations of the watershed.

### 1.3.2 Stream System and Processes

McCoy Creek is an easterly flowing perennial stream, with the major tributaries (from west to east), Barnes Cr, Iowa Cr, Clear Cr, Wolverine Cr, Fish Cr and Jensen Cr. There are numerous other smaller named tributaries draining directly to McCoy Creek, comprising (from west to east) Spring Cr, Camp Cr, Miners Delight Cr, Kirk Cr, Box Canyon, York Cr, Hell Cr, Little Box Canyon and Bitters Creek. McCoy Creek is free-flowing, with no major natural or manmade impoundments, however, active beaver ponds, mostly less than an acre each, are common on both the mainstem and many tributary streams. Snowmelt runoff and infiltrated snowmelt discharging to creeks and springs are the dominant streamflow producing processes.

### 1.3.3 Water Quantity and Timing

Annual peak flows on McCoy Creek are generally from snowmelt, but extreme runoff events can result from late summer thunderstorms, “monsoons” and remnants of tropical rainstorms. Annual peak runoffs on tributary streams vary from April at the lower elevations to early July at the higher elevations. At the lower elevations, smaller melt events may occur during winter. Peak daily flow at the “McCoy Creek ab Reservoir nr Alpine” USGS Gage 13029500 during the period of record, (discontinuous in 1917 & 1918 and then continuous from October 1953 till September 1961) occurred from mid April to early May. Peak daily flow for the period of record was 927 cfs on April 21 & 24,

1956 (USGS, date varies). Flows in McCoy Creek generally subside to baseflow conditions by the end of August and typically persist to late March. Small intermittent tributary streams not fed by springs and seeps generally are dry during most of the baseflow period. Consumptive water rights use only an extremely small amount of the flow in the basin and do not significantly affect the hydrology.

Historic intensive grazing practices appear to have substantially reduced or eliminated the "O" and "A" soil horizons in many areas of the watershed. These horizons at full thickness in a forest or prairie soil typically can have a high moisture retaining capacity due to the high organic content and can temporarily detain substantial precipitation or snowmelt (at least when calculated on a basin-wide basis) until lower soil layers can absorb the water and are the major part of the "soil sponge". This sponge can effectively increase soil moisture holding capacity and net infiltration, which also moderates runoff peaks, most notably from rainstorms and can to some degree increase the quantity of water that reaches groundwater. Reduction of these upper soil layers is likely to have resulted in having substantially increased peak storm flows and to a lesser degree, reduced groundwater supply in the watershed.

Water quantity delivered to streams may be reduced by changes in the vegetative composition. At least partly due to policies of aggressive fire suppression over many decades, there has been substantial conversion (replacement) of aspen to conifer, as discussed in the forested vegetation section of this assessment. Research has shown that coniferous forests generally use more water than aspen forests on an annual basis in evapotranspiration processes (De Byle & Winokur, 1985). This implies that where conifer has replaced aspen, less water from precipitation is expected to pass below the root zone to reach groundwater and eventually streamflow. One estimate is that about 0.5 acre foot more water is consumed annually for each acre of aspen that has been converted to conifer. Because the effect is to the groundwater table rather than surface flows, this is expected to mostly affect baseflows rather than peak storm flows or snowmelt. However, riparian and subsurface hydrologic processes are dynamic and synergistic, so that if this additional groundwater flow causes a rise in the groundwater table as expected, it would trigger a lateral expansion of riparian areas along streams or near springs, which in turn would consume some of the additional water through evapotranspiration, moderating any increase during the summer. Loss of Aspen is also known to affect the number of beavers in a system and can reduce the potential size and stability of impoundments they construct.

There has also been increased succession of grasses by sagebrush, and succession of sagebrush by conifer in the watershed, also likely influenced by aggressive fire suppression policies. In both these cases, the later seral species consumes more water than the earlier one. No historical data is readily available on acres converted to make a quantitative estimate of the flow changes resulting from them possible.

### 1.3.4 Watershed Geomorphology

The Caribou Range is mostly a series of anticlines and synclines of carbonate and sedimentary rock formations along a generally northwest – southeast axis, with thrust faults and major fractures mostly along the same axis. Caribou Mountain however, is of intrusive igneous origin. In many areas, the geologic structure has influenced the orientation of valleys. Most of the McCoy Creek drainage exhibits a dendritic drainage pattern with two exceptions. The southwest portion exhibits a

linear/trellis pattern with the major axis along a WNW direction, reflecting the sedimentary patterns, but the south central part of the basin on the north flank of Caribou Mountain has a radial stream pattern typical of igneous intrusions. Most perennial streams in the southern half of the watershed originate in moderately steep to very steep, forested, "V" shaped (Rosgen type I) valleys. In the northern half, most streams originate in moderately to steeply-sloped open bowl-shaped basins. The lower ends of most drainages form flat alluvial valley floors with moderate sideslopes and meandering stream channels. A GIS analysis based on the USGS stream layer indicates that the McCoy watershed has a total drainage density of both perennial intermittent streams of approximately 2.4 stream miles/square mile.

Most stream channels are first and second order with high to moderate gradients with low sinuosity and very narrow floodplains. They are usually steep, straight cascades or step pool (Rosgen "A' type) (Rosgen, 1994) channels in the uppermost reaches, typically the uppermost 10-20% of the lengths. Below this, the channels generally evolve into riffle dominated (Rosgen "B" type channels) for some or much of the remaining length. Some are only "B" type for 10—20% of the length, then changing to "E" type streams. Where management impacts have been severe most "E" type streams have downcut and degraded to "G" and may also have widened to "F" type channels. Numerous historic flow diversions for placer mining were constructed on Barnes Creek, Bilk Creek, and Anderson Gulch. One current diversion is in place in the upper reaches of Barnes Creek. Channels have been altered or constricted by roads in Barnes Creek, Lower and upper McCoy Creeks. No channelization or major relocation of channels other than the previously mentioned for roads are apparent in the watershed. Beaver are present and frequently abundant in some of the upper reaches and nearly all of the lower, less steep reaches of the tributaries. Abandoned beaver dams are found in most reaches where they are not currently present, showing that they are a major factor in the hydrologic system. Beaver are also abundant in the upper and middle mainstem of McCoy Creek.

### 1.3.5 Water Quality

Water quality is variable due to a variety of factors, many of which are not uniform within the watershed. The dominant water quality issue is the effects of large amounts of sediment, mostly produced by historic placer, dredge and hydraulic mining. Occasional placer mining continues to occur. Quantities of coarse sediment deposited were so large, that some stream channels such as Iowa and Bilk Creek have been completely destabilized. This has resulted in dominance of streambanks by so much coarse sediment that shading vegetation has been retarded or completely precluded, likely resulting in increased peak summer water temperatures. Roads are the second most important sediment source, resulting from siting of road prisms in drainage bottoms, road drainage ditches that are routed to streams without any buffer, and unarmored road crossings sited where fine grained materials are dominant. There are also lesser non-point sources, including streambank disturbances from livestock and natural processes. Extensive areas of unstable and unproductive soils that cannot support lush ground cover are present which can serve as upland sources of sediment. Historic intensive grazing has depleted upper soil horizons in some areas, particularly on and near ridges. Intense rain events on these areas can cause significant erosion with little or no current human or additional natural disturbance. Though readings are few, chemical water quality for the most part does not appear to be outside the expected natural state nor does it appear to be a limiting factor. Carbonate or carbonate cemented rocks underly most of the watershed, therefore streams are believed to be well

buffered and have a pH at or below 8.3. There are no agricultural operations or other significant man-made sources of contamination by biologics such as bacteria.

## 1.3.6 Data Gaps

### Water Quality

No known analyses for heavy metals such as Mercury have been done in the McCoy Creek watershed. The most significant unknown for water quality is that mercury that was used historically to enhance placer gold recovery is or could be mobilized by high flows. There are reports that it was used (USDA-FS, 1994). This report presumed that this Mercury had settled into gravels in the bottoms of stream channels and become inert. No known lab or excavation analysis has been done to confirm this. Stream channel bed gravels and cobbles in steep, fast moving streams such as McCoy Creek are nearly always highly transmissive, such that abundant water flow through these gravels is probable. This water flow is likely oxegenated, and so the mercury may be oxidizing and becoming mobile. The rate that this might be occurring, if present is not known, but is usually low at the relatively low temperatures present in the basin. If mercury is becoming mobile at a significant rate, contamination by mercuric compounds may be a water quality issue. No known lab tests for biologics for any of the streams of McCoy basin exist.

### Groundwater

No known wells exist in the McCoy watershed, so there is no data on well yield or subsurface layering. No known significant springs are found in the lower portions of the valley bottoms. The fills of the lower reaches of all valleys throughout the watershed are composed of alluvium. Coarse alluvium is the dominant substrate in nearly all perennial streambeds, therefore coarse alluvium is most likely a major component of the valley fill and probably transmits most subsurface flow where it is present as a continuous deposit. Valley fills composed of abundant coarse material generally have unconfined, single water table aquifers. No known activities that may have caused significant groundwater pollution have occurred. There is a remote possibility that an extremely minor amount of sewage might escape from the pit toilets at the McCoy guard station and the McCoy campground, however as these facilities are new and there are no groundwater wells in the basin, this is not an issue.

### Sediment Sources

No measurements of sediment delivery from roads have been done for McCoy watershed. Therefore the amount of sediment being delivered from roads cannot be accurately quantified.

### Watershed Geomorphology

No reference reaches have been identified in the watershed. Intensive grazing occurred historically throughout the watershed, therefore no tributary watersheds are likely to be identified that do not bear the effects from intensive grazing.

## 1.4 Soil Geology & Landtype Association

The best summary for descriptions of the geology, soils, topography, geomorphic processes and disturbance factors, both natural and human caused, can be found in A *Hierarchical Stratification of Ecosystems of the Caribou National Forest* and the Targhee National Forest Subsections and landtype Associations. A more detailed description of the vegetation type for each soil family comes *from Soil Survey of the Caribou National Forest, 1990* and the *Ecological Unit Inventory for the Targhee National Forest, Vol. 2, 1999.*

McCoy Watershed falls into the Caribou Range Overthrust Mountains Subsection. This subsection consists of mountain ranges and valleys of Mesozoic and Cenozoic age sedimentary rock, intrusive rock and metamorphic rock. Geomorphic processes have resulted in the formation of a low, nearly featureless gently undulating land surface resulting in a broad valley. Secondary geomorphic processes are confined to drainages, with fluvial, residual and gravitational transfer by landslides. Valley bottoms usually have streams, creating a landscape that is slightly to moderately dissected.

Below is a summary of the six-landtype associations (LTA), soil types, and vegetation found within this sub-section.

**Caribou Basins, Toeslopes and Fans / Mountain Big Sagebrush – Lodgepole pine – Aspen Landtype Association (M331Di – 01)**

This landtype consists of basins, toeslopes, fans and foothills in the Caribou Mountain Range. Geologic uplifting of the surrounding mountains was followed by fluvial and colluvial deposition after a period of glaciation. Parent materials are sandstones, siltstones and limestone. This LTA occurs in a foothill/basin landscape and is composed of three major landforms; basins, toeslopes and fans. Wetlands are a minor component. The associated landscape is moderately dissected by streams in a dendritic pattern type. Parent materials are sandstones, siltstones and limestone.

The soils are moderately deep (20 – 40 inches) to deep (40 – 60 inches) and well drained with a loam surface texture. These soils are classified as Argic Cryoborolls and Mollic Argic Cryoboralfs. They have a clay component and a relatively deep (9 inches or over) dark fertile A horizon, which high in organic matter (ranging from 1% to 5%).

**Table 1.4-1: Caribou Basins Landtype Association**

| Soil Association (Family) | Soil No. | Landform | Vegetation Type | Sedimen t Delivery |
|---|---|---|---|---|
| Whiteman-Starman-Judkins | 156 | Toeslopes and fans | Aspen, lodgepole pine, snowberry, rose, serviceberry, pachistima, geranium lupine, pinegrass, Mountain brome, sedge needlegrass | 0.008 |
| Beaverdam-Nissula Toponce Families | 83 | Dissected toe-slopes | Aspen, lodgepole pine, subalpine fir, service berry, chokecherry, pachisma, snowberry, big sagebrush, Oregon grape, Mountain brome, bluegrass, pinegrass | 0.010 |
| Beaverdam-Swede-Toponce families | 330 | Dissected up-land basins | Big sagebrush, snow-Berry, geranium, lupine, yarrow, wyethia, needle- and-thread, bluegrass, Junegrass, fescue and bromgrass | 0.010 |
| Swede Family-Typic Cryoboralfs | 332 | Low ridges, up-land basins | Big sagebrush, rabbit brush, aster, buck- wheat, wyethia, wheatgrass, junegrass, bromegrass, bluegrass | 0.015 |

## Caribou Mountain Glaciated Cirques and Headwalls/Alpine fir and Sagebrush Landtype Association (M331Di – 03)

The landtype consists of glaciated cirques, headwalls and talus sideslopes which comprise the landforms of this LTA. Alpine glaciation was the geomorphic process responsible for the formation of this landscape. Parent materials are glacially worked diorite, metamorphic skarns (contact metamorphic rock rich in iron) and hornfels (fine grained silicate rock produced by contact metamorphism), conglomerates, mudstones and sandstone. This area has the highest elevations located in the Caribou Mountain Range (8,300 – 9,800 ft).

Soils range from shallow (<20 inches deep) to moderately deep (20 to 40 inches) and are well to excessively well drained. Surface textures are generally gravelly and cobbly loam with some sandy loam inclusions. The classification of these soils includes Lithic Cryoborolls, Lithic Mollic Cryoboralfs, and Mollic Cryoboralfs. Rock outcrops comprise a small component of this LTA as well (5% – 10%). The area is only slightly dissected with a radial to parallel stream pattern.

**Table 1.4-2: Caribou Mountain Landtype Association**

| Soil Association (Family) | Soil No. | Landform | Vegetation Type | Sediment Delivery |
|---|---|---|---|---|
| Starley-Ketchum-Povey | 103 | Cirques and Headwalls | Big sagebrush, bluegrass needlegrass, Fescue, geranium, buckwheat, yarrow | 0.015 |
| Whitemen-Starman-Judkins | 156 | Headwalls, side-Slopes and basins | Subalpine fir, Idaho fescue, pinegrass, geranium, sedge, bluegrass | 0.014 |

## Tincup Unstable Foothills and Basins/Alpine fir and Sagebrush Landtype Association (M331Di – 04)

The landtype consists of foothills and basins in the Caribou Mountain Range. The formative processes are a combination of thrust faulting and slumping which result in scarp and dip foothill landforms. The parent materials are sandstones, limestone, siltstones and mudstones.

Soils are moderately deep (20 inches - 40 inches) to deep (60 inches or over) and well drained. Surface textures are gravelly and cobbly loam and loam. These soils are classified as Argic Cryoborolls, Mollic Cryoborolls and Argic Pachic Cryoborolls, much the same as in M331Di – 03. These landforms are moderately dissected by streams with a parallel type pattern.

**Table 1.4-3: Tincup Landtype Association**

| Soil Association (Family) | Soil No. | Landform | Vegetation Type | Sediment Delivery |
|---|---|---|---|---|
| Swede-Rooset-Nisula | 360 | Steep Dip-scarps | Aspen, mountain maple, Subalpine fir, big sagebrush, choke- cherry, snowberry, wyethia, balsamroot, lupine, geranium, bromgrass, wheatgrass, bluegrass, pinegrass | 0.015 |
| Swede-Drayon-Nisula | 362 | Rolling Dip-scarps | Aspen, subalpine fir, Douglas-fir, choke -cherry, snowberry, big sagebrush, geranium, aster, sunflower, buck-wheat, bromgrass, june grass, wheatgrass, fescue | 0.015 |
| Toponce-Swede-Dranyon | 454 | Rolling Foot-hills | Aspen, Big sagebrush, snowberry, choke- cherry, Lupine, mountainlover, Geranium, aster, pine-grass, wheatgrass, blue-grass | 0.025 |
| Harkness-Beaverdam - Rooset | 910 | Steep Dip-scarps | Big sagebrush, snow-berry, paintbrush, wyethia, geranium, bromgrass, wheat grass, Needle-and-threat grass | 0.015 |

### McCoy Unstable Mountains and Canons/Douglas fir-alpine fir-Sagebrush Landtype Association (M331Di – 05)

The landtype consists of unstable mountainsides and canyons in the Caribou Mountain Range. The processes that formed this area are thrust faulting followed by slope failure and fluvial dissection. Consequently, the landscape consists of dissected mountain slopes and broken mountain slope landforms. The parent materials are sandstone, siltstone and mudstone.

The soils are moderately deep (20 to 40 inches) to deep (40 to 60 inches) and well drained. Surface textures are gravelly loam and loam, with the classification of Mollic Cryoboralfs, Argic Cryoborolls and Typic Cryoborolls. Streams create a moderately dissected topography with a parallel and dendritic pattern. McCoy Creek is the major drainage for this LTA.

**Table 1.4-4: McCoy Landtype Association**

| Soil Association (Family) | Soil No. | Landform | Vegetation Type | Sediment Delivery |
|---|---|---|---|---|
| Harkness-Blaine | 317 | Hummocky Mountain Slopes | Lodgepole pine, sub- alpine, scattered aspens, chokecherry, snowberry, mulesear wyethia, balsamroot, geranium, yarrow, bromegrass, sedge, wheatgrass, bluegrass | 0.015 |
| Cloud Peak-Farlow-Swede | 370 | Steep Mountain Slopes | Aspen, lodgepole pine, subalpine fir, Douglas-fir, chokecherry, service- berry, huckle berry, big sagebrush, mint, balsam root, geranium, wyethia, wheatgrass, wildrye, pinegrass | 0.015 |
| Swede-Chitum-Blaine | 430 | Unstable Canyon Slopes | Aspen, subalpine fir, Douglas-fir big sagebrush, snowberry, lupine, geranium, balsamroot, wyethia, fescue, ryegrass, bromegrass | 0.030 |
| Judkins-Farlow | 602 | Dissected Mountain Slopes | Subalpine fir, Douglas-fir, spruce, snowberry, serviceberry, mountain- lover, aster, arnica, meadowrue, wyethia, pinegrass, needle-and-thread, bromegrass, wheatgrass | 0.010 |

### Elk Mountain Sideslopes and Ridgelands/Alpine fir – Lodgepole pine and Sagebrush Landtype Association (M331Di-07)

The landtype is located along the northern boundary of the Caribou National Forest in the Caribou Mountain Range. The geomorphic processes forming this area are mass wasting, colluvial and fluvial deposition, acting on the uplifted mountain range and resulting in the mountainsides and ridge landforms. Parent materials are meta-sandstones, conglomerate, shale, limestone, siltstones and mudstones.

The soils are shallow (less than 20 inches) to deep (40 to 60 inches) and somewhat excessively to well drained. Surface textures are gravelly and cobbly loam, loam and gravelly sandy loam, with a classification of Argic Cryoborolls and Mollic Cryoboralfs. This LTA is moderately dissected with a dendritic and trellis pattern. s, McCoy Creek is the major stream drainage.

**Table 1.4-5: Elk Mountain Landtype Association**

| Family Association | Soil No. | Landform | Vegetation Type | Sediment Delivery |
|---|---|---|---|---|
| Swede-Blaine-Povey | 202 | Rounded ridges | Big sagebrush inter-spersed with scattered stands of aspen or subalpine fir, mountain maple, serviceberry, chokecherry, wyethia, western coneflower, balsamroot, horsemint, geranium, paint-brush, Idaho fescue, bluegrass, Mountain brome. | 0.018 |
| Judkins-Redfeather-Swede | 203 | | Big sagebrush inter-spersed with aspen, sub-alpine fir, limber pine, snowberry, geranium, aster, wyethia, meadow-rue, lupine, elk weed, arnica, horsemint, mountain brome, wheatgrass, bluegrass | 0.018 |
| Swede-Mikesell-Nisula | 503 | Mountainsides | Subalpine fir, Lodgepole pine, few Douglas-fir, snowberry, serviceberry, big sagebrush, geranium arnica, meadowrue, Oregon grape, pinegrass, needle-and-thread, bromegrass, elk sedge | 0.010 |
| Ericson-Farlow-Swede | 603 | Mountainsides | Subalpine fir, Lodgepole pine, Douglas-fir, snow berry, current, owl service berry, lupine, geranium, arnica, elk sedge, pine grass, brome grass | 0.015 |
| Swede-Blaine-Starkey | 608 | Mountainsides | Big sagebrush with inter-spersed aspen, subalpine fir, snowberry, choke cherry, geranium, lupine, wyethia, needle-and-thread, fescue, brome grass, bluegrass | 0.020 |

The last Landtype Association is located on the Palisade District of the Targhee National Forest and utilizes a slightly different format than the Caribou National Forest (Targhee National Forest Subsections and Landtype Associations, 1998). This description will not include a sediment delivery amount and the plant information will not be as detailed as for the Caribou National Forest. The geology has been simplified to just sedimentary rocks.

**High Caribou Mountains – Conifer Forest (M331 -701)**
This area is located in the mountains and foothills, with a southeast to northwest trending overthrust. The landscape is strongly dissected with a dendritic drainage pattern where perennial streams are common in the larger drainages. Slope failures and unstable soils are common in some portions of this LTA.

Soils are derived from local alluvium and colluvium from mixed sedimentary rocks, with a component of loess. Soils are very deep (greater than 60 inches) with medium textured A and B-horizons and a subsoil (C horizon) grading from fine texture to moderately coarse with gravels and cobbles. These soils classify as loamy-skeletal, mixed superactive Vitrandic Cryoborolls, loamy-skeletal, carbonatic Calcic Cryoborolls and Cryochrepts. Soils are cold with a thick organic layer, and a component of volcanic ash.

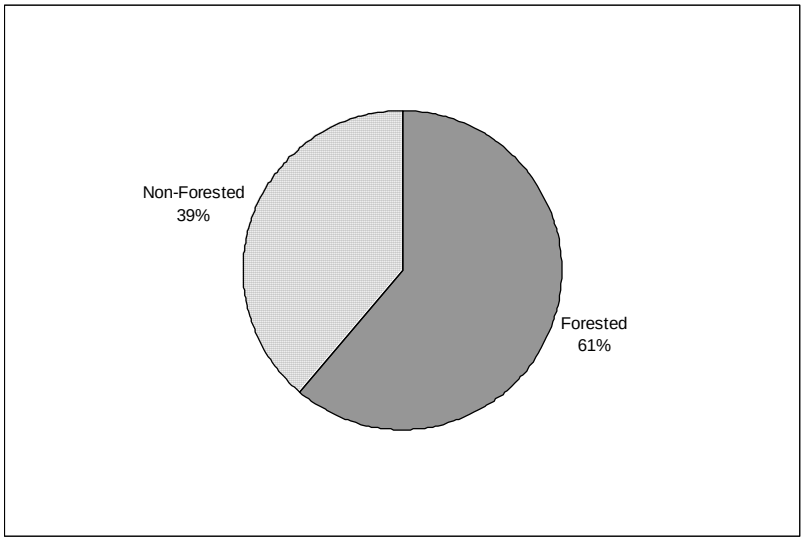
The dominant potential natural communities are:

- Douglas-fir /Oregon grape plant association with a whortleleaf snowberry phase
- Subalpine fir/mallow, ninebark plant association
- An ecotone of: Douglas-fir/whortleleaf snowberry plant association
- Mountain big sagebrush/Idaho fescue plant association
- Subalpine big sagebrush/California brome plant association
- Subalpine fir/sweet cicely plant association; myrtle pachistima phase
- Mosaic of subalpine fir/mallow ninebark plant association and a subalpine fir/pinegrass plant association with a pinegrass phase.

## 1.5 Vegetation Dynamics

The vegetation within the analysis area was first characterized using two general vegetation community types, Forested and Non-Forested. The Forested community type was divided into four cover types in order to further characterize the vegetation within the watershed. To characterize the Non-forested community type, five cover types have been used within the watershed. The vegetation data used in this section is the result of aerial photo interpretation and local knowledge to populate the GIS stand coverage. The following sections break each class down by vegetation type and ownership.

**Figure 1.5-1: MCW Vegetation Communities**




### 1.5.1 Forest Vegetation

Approximately 61% of the analysis area can be characterized as forested vegetation (FV) and as typical for high elevation forest in the intermountain west. The Caribou National Forest manages approximately 99% of the acres that are classified as forested vegetation. For the purpose of analysis in this document forested vegetation within the analysis area has been broken into four cover types; spruce/fir, Douglas-fir, lodgepole and aspen.

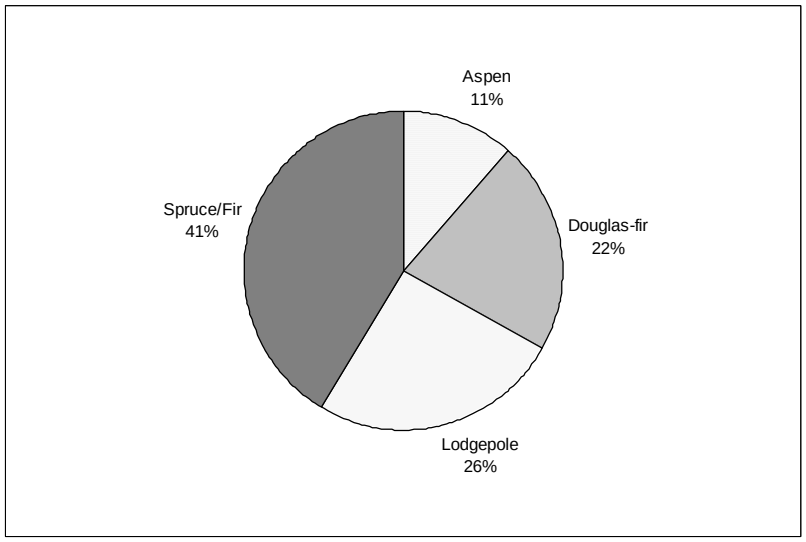



**Figure 1.5-2: Forested Cover Types**

**Table 1.5-1 Forest cover types: For more general information on tree species/cover types see http://na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm**

| Cover Type (% of FV) | Jurisdiction | Description |
|---|---|---|
| Spruce/Fir (41%) | 99% FS 1% Non FS | Stands that are currently dominated by subalpine fir or Engelmann Spruce have been included in this type. The spruce/Fir cover type is found on more acres than any other species within the analysis area. In this type subalpine fir is the dominant climax species with a mix of Engelmann spruce. Aspen, lodgepole pine and Douglas-fir often occur in various ratios in the early seral stage. |
| Lodgepole (26%) | 99% FS 1% Non FS | Lodgepole pine is a pioneer species that requires a disturbance that exposes bare mineral soil to regenerate. In most stands in this type lodgepole is the seral species with subalpine fir being the climax species. However in other stands lodgepole can be considered as persistent seral due to the fire return interval. Aspen may be found as a minor component of the type. |
| Douglas-fir (22%) | 100% FS <1% Non FS | Rocky Mountain Douglas-fir is found throughout the analysis area. At the lower drier edge of its zone, it is confined to north slopes and shaded areas and is often the climax species for the site. At the higher levels, it can grow on any aspect including sunny rocky south and west exposures. On cooler moist sites it is an early seral species with subalpine fir and Engelmann spruce as climax species. Aspen is often an important early seral species in this type. |
| Aspen (11%) | 100% FS <1% Non FS | Quaking aspen is found throughout the analysis area. Aspen can vary form an early seral to persistent seral species. It can also occur as a climax species, occupying sites below the limit of conifers. |

FS = Forest Service

The Caribou National Forest Sub Regional Properly Functioning Condition (PFC) Assessment and the draft Forest Plan EIS state that at the forest level all of the forested cover types are out side of properly functioning and desired future conditions. The PFC assessment states that at the sub-regional scale the Engelmann spruce/subalpine fir, Douglas-fir and aspen types are at high to moderate risk and that lodgepole is at low risk. The PFC document looked at structure, composition and disturbance regime to develop the ratings.

## 1.5.2 Non-Forested Vegetation

Approximately 39% of the analysis area can be characterized as non-forested vegetation (NFV). The Caribou National Forest manages approximately 98% of the acres that are classified as non-forested vegetation. For the purpose of analysis in this document non-forested vegetation has been broken into five cover types sagebrush/grass, mountain brush, riparian/water, other, and mountain shrub.

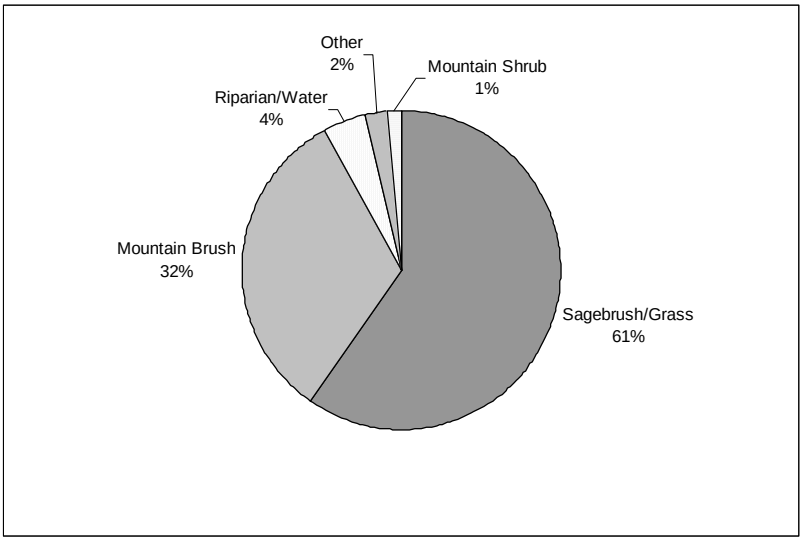



**Figure 1.5-3: Non-Forested Cover Types**

**Table 1.5-2 Non-Forest cover types**

| Cover Type (% NFV) | Jurisdiction | Description |
|---|---|---|
| Sagebrush/ Grass (61%) | 98% FS 2% Non FS | Areas that are currently dominated by sagebrush have been included in this type. Sagebrush is found on more acres than other non-forested species within the analysis area. This type is dominated by the presence of sagebrush however many sagebrush taxa may be represented. This type may have a variety of other brush species represented but they will generally represent less than 25% of the cover percent. This type generally has an associated herbaceous layer of perennial grasses and forbs in varying amounts. Grass and forb species composition is strongly influences by physical and chemical soil characteristics and by grazing pressure. |
| Mountain Brush (32%) | 99% FS 1% Non FS | Areas that currently have one or more of the mountain brush species representing over 25% of the cover present have been included in this type. The mountain brush type is found intermingled with sagebrush at mid elevations and conifer/aspen forests at higher elevations. Mountain brush species are: chokecherry, serviceberry, rose, mountain, snowberry, elderberry and ceanothus. These species may occur alone and form rather distinct types or may have mixed composition. These species generally sprout after fire and normally occupy slightly moister areas than sagebrush. However, sagebrush and bitterbrush are also often represented. This type generally has an associated herbaceous layer of perennial grasses and forbs in varying amounts. Grass and forb species composition is strongly influences by physical and chemical soil characteristics and by grazing pressure. |
| Riparian/ Water (4%) | 81% FS 19% Non FS | Areas that currently are dominated by riparian species or water have been included in this type. This type includes a wide range of riparian types from wetland vegetation to patches of willows. Most of the riparian cover type is associated with stream channels. |
| Other (2%) | 98% FS 2% Non FS | Areas included in this type are dominated by bedrock, boulder fields, talus slopes or exposed dirt. |
| Mountain Shrub (1%) | 100% FS 0% Non FS | Areas included in this type are currently dominated by curlleaf mountain mahogany, rocky mountain juniper or bigtooth maple. This type covers a broad ecological spectrum from moderate to deep well drained soils to shallow rocky soils on ridge tops and southerly exposures. This type could be considered the transitional type. It represents what grows where it is to hash for trees and not suited for sagebrush. Curlleaf mountain mahogany is the only mahogany found in the assessment area it is a hardwood evergreen with tree like from. Rocky mountain juniper is the dominant juniper species found within the assessment area, it is a shrubby tree with scale-like evergreen leaves. |

FS = Forest Service

The Caribou National Forest Sub Regional Properly Functioning Condition (PFC) Assessment states that at the sub-regional scale the riparian/wetland, mountain shrub and sagebrush types are at high to moderate risk and that mountain brush is at low risk. The PFC document looked at structure, composition and disturbance regime to develop the ratings.

### 1.5.3 Disturbance Agents

#### *Fire*

Fire has been a frequent visitor in the MCW, either as localized spot fires or as large, expansive conflagrations. Barrett (1994) documented several major fire years throughout the Caribou National Forest in 1745, 1781, 1844, and 1934. Since the 1970, over 41 fires have been suppressed within the analysis area, which equates to 1 wildfire per year. The results of fire suppression and historical grazing practices have had an impact on forested and non-forested community types. The lack of fire has resulted in two primary changes. First, it has resulted in an increased incidence of large fuel accumulations. Secondly, it has caused modification of vegetation structure and composition.

Fire has been the dominant historic disturbance that has determined the age and mix of species within the watershed. A mix of non-lethal and lethal fires controlled vegetation distribution prior to European settlement. The absence of fire, over the last 150 years has altered the patterns and species mix within vegetation types. Succession toward late seral or climax species has resulted from the lack of natural fire.

#### *Insect and disease*

Insects and disease have also played a role in shaping vegetation composition and structure. Insects that have played a role include mountain pine beetle, Douglas-fir bark beetle, spruce budworm, and fir engraver. The effects of these insects can range from small pockets of mortality to large epidemics that cover large areas. The diseases that exist include mistletoe, various rusts and root diseases, and many forms of cankers. The effects of these diseases tend to be limited in scope, effecting growth more than causing mortality, but where likely important in shaping fire intensity and severity.

## 1.6 Species & Habitats

### 1.6.1 Fish

McCoy Creek is a large tributary to the Snake River that flows into Palisades Reservoir. Major tributaries of McCoy Creek include Jensen, York, Box Canyon, Clear, Pole, City, Barnes, Camp, Miners Delight, Iowa, Lake, and Fish creeks. Many of these streams have been impacted to various degrees by past mining. Today, some gold dredging still occurs with less stream impacts than in the past. Today, McCoy Creek and its tributaries are relatively heavily used by recreators and fishing is a major recreational activity that occurs there.

Yellowstone cutthroat trout, a Regional Foresters Sensitive Species, can be found throughout most perennial streams in the watershed. It is the only native trout species in the analysis area. U.S. Fish and Wildlife Service was petitioned to list Yellowstone cutthroat trout in August 1998. In February 2001, the agency finalized their finding on the petition to list Yellowstone cutthroat trout. They indicated the petition did not provide substantial information to indicate listing was warranted. In December 2004, a federal judge in Colorado ruled that the US Fish and Wildlife Service was arbitrary and capricious in its 90 day review and overturned their finding, ordering the agency to conduct a 12

month status review. Yellowstone cutthroat trout currently retains its status as a Sensitive species on the Regional Foresters Sensitive Species List.

Limited data exist for McCoy Creek and its tributaries. In this analysis, we defined "past" conditions with data collected prior to around 2000 and "current" conditions with data collected later than generally 2000. We determined trend with a comparison of past and current conditions and interpreted trend. The report concludes with recommendations to address the interpretation of trend.

### 1.6.2 Wildlife

Wildlife considered for this watershed analysis will focus on threatened, endangered, sensitive, and management indicator species (TES/MIS) and several key wildlife species found on the Caribou National Forest.

#### Threatened and Endangered

Threatened and endangered species that may occur in the McCoy Creek Watershed include wolves, lynx, and bald eagle (USDI 2003).

#### Sensitive and Management Indicator Species

The McCoy Creek Watershed may provide habitat for several Forest Service sensitive species including spotted bat *Euderma maculatum*, Townsend's (Western) big-eared bat (*Corynorhinus townsendii*), Wolverine (*Gulo gulo*), Boreal owl (*Aegolius funereus*), Flammulated owl (*Otus flammeolus*), Great gray owl (*Strix nebulosa*), Three-toed woodpecker (*Picoides tridactylus*), harlequin duck *Histrionicus histrionicus*, Northern goshawk (*Accipiter gentilis*), Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*), and Payson's bladderpod *Lesquerella paysonii*.

The goshawk, sharp-tailed grouse and sage-grouse are MIS in the Caribou Nation Forest Revised Forest Plan.

Sensitive species that do not exist because of lack of suitable habitat include the pygmy rabbit (*Brachylagus idahoensis)*, trumpeter swan *Cygnus buccinator*, peregrine falcon (*Falco peregrinus anatum*), Columbia spotted frog (*Rana luteiventris*), starveling milkvetch *(Astragalus jejunus var. jejunus)*, and Cache beardtongue *Penstemon compactus* (Groves and others 1997, Spahr and others 1991, and USDA 2003a, 3-271).

#### Key Wildlife Species

Migratory landbirds, mule deer, elk beaver, western boreal toad and northern leopard frog are the key species that will be considered in the Watershed Assessment.

## 1.7 Human Uses

Historic and existing human use patterns influence the appearance, condition, and management opportunities within the watershed.

### 1.7.1 The First Inhabitants

Archaeological and ethnographic sources indicate the historic and prehistoric utilization of the McCoy Creek area for camping, hunting, fishing, gathering, grazing, mining, and traveling. Archaeological investigations of known and as yet undiscovered cultural resources may offer insights into the historic and prehistoric land uses and settlement patterns of the area.

Archaeological investigations have revealed that the Shoshone-Bannock Tribes and/or their ancestors have occupied the Northern Great Basin and Central Rocky Mountain Area for at least 12,000 years. Cultural material remains from archaeological sites indicate that prehistoric people of the area depended on hunting wild game and collecting edible plant foods for subsistence. To acquire a wide variety of resources for survival prehistoric groups followed a nomadic lifestyle moving their seasonal campsites through the spring, summer, and fall. As people became more dependent on big game hunting for subsistence movement of camps was often associated with the migration of big game such as, buffalo herds.

The annual movement pattern for the Shoshone-Bannock Tribes that followed a nomadic lifeway, included several larger winter encampments utilized by the majority of bands in a tribe, followed by dispersal of bands in the spring to gather resources throughout summer and into the fall. Winter months were generally spent near major river systems and at lower elevations.

### 1.7.2 Mining

#### Historical Working

Gold mining in this area began around 1870 with the discovery of placer gold. This quickly brought people into the area with the thought of “striking it rich.” There were numerous mining claims in the “Mount Pisgah” (later known as the Caribou) Mining District and several small cities that sprung up in the area from the early 1870’s until the early 1900’s. Caribou City (also know as Carriboo City, for Jessie “Carriboo Jack” Fairchilds) and Keenan City were the two largest cities in the area. These towns included stores, saloons, post offices, stables, miner’s cabins and several other businesses associated with mining camps. In the summer of 1885, most of Caribou City burned and was never rebuilt. (Johnson and Carney, 1990)

Three types of mining have occurred in the Caribou Mountain area: lode, placer and dredging operations. Precious metals that have been mined in the Caribou Mountain mining district are lode gold, placer gold and lode copper. Silver has also been produced as more of a byproduct of the gold mining. **Figure 1.7-1** displays the locations of the historic mines and **Table 1.7-1** describes the type of workings associated with each mine.

Total direct disturbance from mining is estimated at 1,293 acres. Most of this occurred during the time of heaviest activity (1870’s through the 1890’s). It is not clear how many acres of disturbance

were associated with the mining camps. These include the town sites themselves, cabins, roads, ditches, mill sites, and other support businesses. Mining continued on through the 1930's, although it was much smaller in scale compared then the first 20 or so years of mining. Since then, mining has wound down to a few, very small operations and some recreational panning, so the area has had time to recover and re-grow the vegetation over a large portion of the disturbed land.

Placer operations made up a large portion of the disturbance in the area. As **Figure 1.7-2** and **Figure 1.7-3** illustrates, Barnes, McCoy, Bilk and Iowa Creeks were the most heavily disturbed by these operations. Dredges, gold pans, sluice boxes and hydraulic giants were the main types of equipment used for this form of mining.

From 1878 through 1934, there were 498 placer claims and 491 lode claims filed in or near the project area. In 1992, the Bureau of Mines (BOM) reported that there were 168 placer claims and 146 lode claims in or near the project area. (BOM, 1993)

### Present Workings

Caribou Mountain has become an increasingly popular place for recreational prospecting in recent years. Panning is the only form of prospecting that is administered as an unregulated recreational activity. The State of Idaho, Department of Water Resources, and the Forest Service jointly regulate suction dredging and sluicing within the stream channels of McCoy Creek and its tributaries. (IDWR, 2003a)

A search was conducted in the Bureau of Land Management (BLM) LR2000 database for active claims. The results of that search revealed 26 placer claims, 26 lode claims and 2 tunnel claims in the project area. All of these claims are located within the Forest boundary. For a claim to be considered active, the BLM requires annual assessment work to be conducted on the claim. This can be waived with an annual $100 per claim fee. (BLM, 2002)

In 1994, in-stream mining activities in Caribou Basin were analyzed in an environmental assessment (EA). The Decision Notice for this EA set a limit of 5 permitted in-stream operations per year. The permitting process requires filing a Notice of Intent (NOI) with the Forest Service (Soda Springs Ranger District), and a "Joint Permit to Alter a Stream" issued by the Department of Water Resources on behalf of the State of Idaho and the U.S. Army Corps of Engineers. Even with an approved NOI, in-stream mining activities will not be approved in McCoy Creek and it's tributaries between May 1 and September 1 of every year to protect spawning and rearing habitat for the Snake River fine-spotted cutthroat trout. (USFS, 1994)

**Figure 1.7-1: Historic Mines within the MCW**

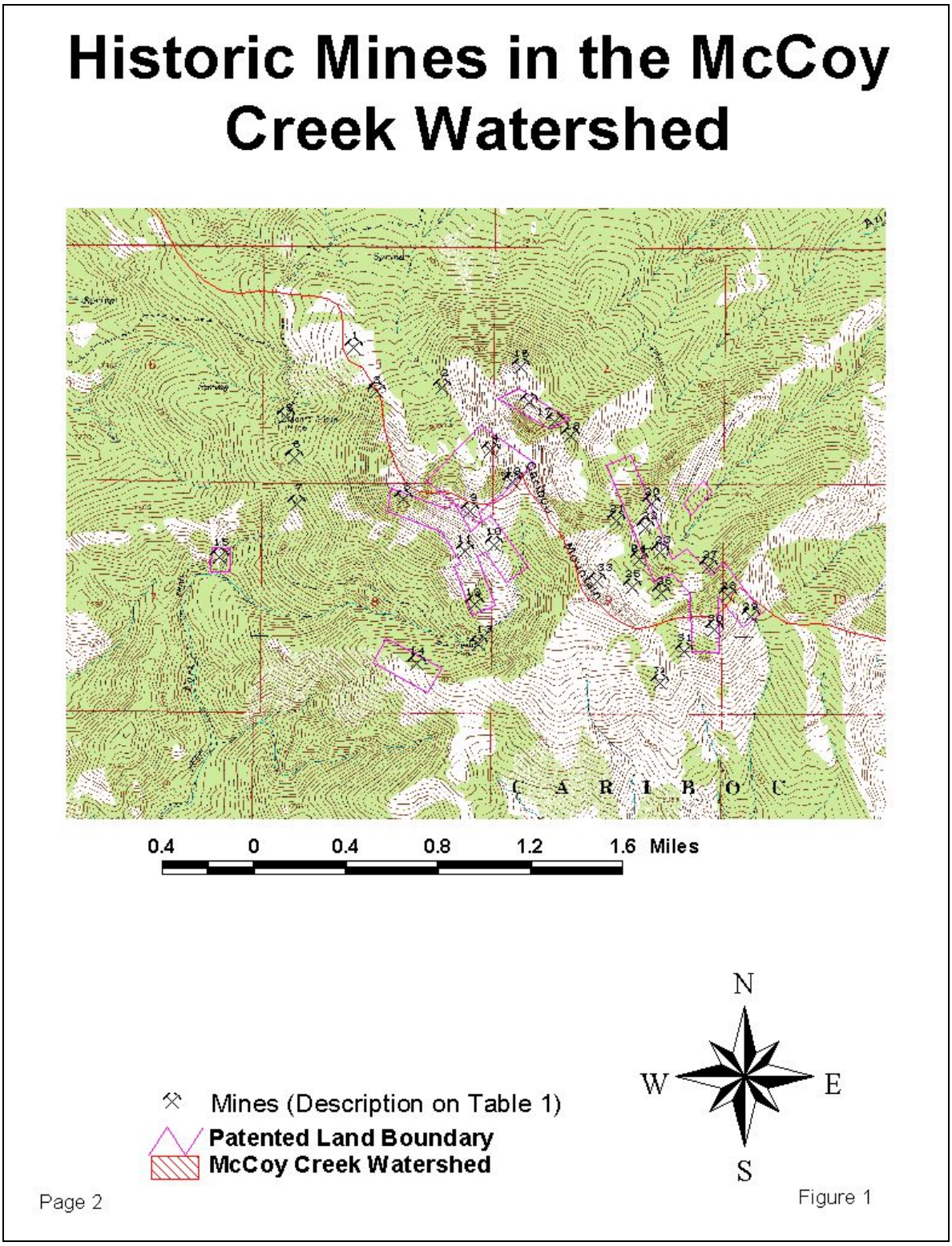


**Table 1.7-1: Mine Names and Type within the MCW**

| Number | Mine Name | Workings | Sec. # | Claim Type |
|---|---|---|---|---|
| 1 | Rough & Ready | 1 shaft, 3 test pits | 5 | Lode Claim |
| 2 | Unnamed | 1 caved adit, 1 test pit | 5 | Lode Claim |
| 3 | Unnamed | 2 caved adits, 1 test pit | 5 | Lode Claim |
| 4 | Grey Eagle | 4 caved adits, 1 test pit | 4,5 | Patented |
| 5 | Monte Cristo | 2 caved adits, 1 test pit, 1 shaft | 5 | Lode Claim |
| 6 | Oskaloosa | 5 test pits | 5 | Lode Claim |
| 7 | Bell Boy | 1 shaft, 1 caved adit, 2 test pits | 8 | Lode Claim |
| 8 | Lonestar | 1 test pit | 8 | Patened |
| 9 | Mayflower | 3 test pits | 8 | Patened |
| 10 | Lakeview | 2 adits | 9 | Patened |
| 11 | Northern Light | 1 caved adit | 8 | Patened |
| 12 | X.L.N.T. | 2 test pits | 8 | Patened |
| 13 | Evergreen | 1 caved adit | 8 | Lode Claim |
| 14 | Wasatch | 1 adit | 8 | Patened |
| 15 | Wasatch | Mill site | 7 | Patened |
| 16 | Unnamed | 3 test pits | 4 | Lode Claim |
| 17 | Lalla Rooth | 1 adit, 5 test pits | 4 | Patened |
| 18 | Pittsburg | 2 caved adits, 1 adit, 2 trenches | 4 | Lode Claim |
| 19 | Unnamed | 1 test pit | 4 | Lode Claim |
| 20 | Unnamed | 1 caved adit, 1 test pit | 9 | Lode Claim |
| 21 | Unnamed | 1 adit, 2 test pits | 9 | Lode Claim |
| 22 | Unnamed | 1 adit, 1 test pit | 9 | Lode Claim |
| 23 | Robinson | 3 caved adits, 1 test pit | 9 | Lode Claim |
| 24 | Nola B | 1 caved adit | 9 | Lode Claim |
| 25 | Rusler | 1 caved adit, 1 shaft | 9 | Lode Claim |
| 26 | Old Charley | 1 caved adit | 9 | Lode Claim |
| 27 | Nealon | 1 caved adit | 9 | Lode Claim |
| 28 | Unnamed | 2 test pits | 10 | Lode Claim |
| 29 | Iowa | 1 test pit | 10 | Lode Claim |
| 30 | Oneida | 4 caved adits, 1 shaft, 3 test pits | 9 | Lode Claim |
| 31 | Unnamed | 2 caved adits | 9 | Lode Claim |
| 32 | Ophir | 3 test pits | 9 | Lode Claim |
| 33 | Unnamed | 1 adit, 1 trench | 9 | Lode Claim |
| **Placer Operations (T03S R44E)** | | | | |
| Placer | Barnes Ck. area | Placer mining | 19,29,30 | Placer Claim |
| Placer | McCoy Ck. area | Dredge mining | 20 | Placer Claim |
| Placer | Anderson Ck. area | Placer mining | 25,26,35 | Placer Claim |
| Placer | Bilk and Iowa Ck. area | Placer mining | 24,25,35,36<br>1,2 (T04S R44E) | Placer Claim |

**Figure 1.7-2: Historic Placer Mining along Barnes and McCoy Creeks.**

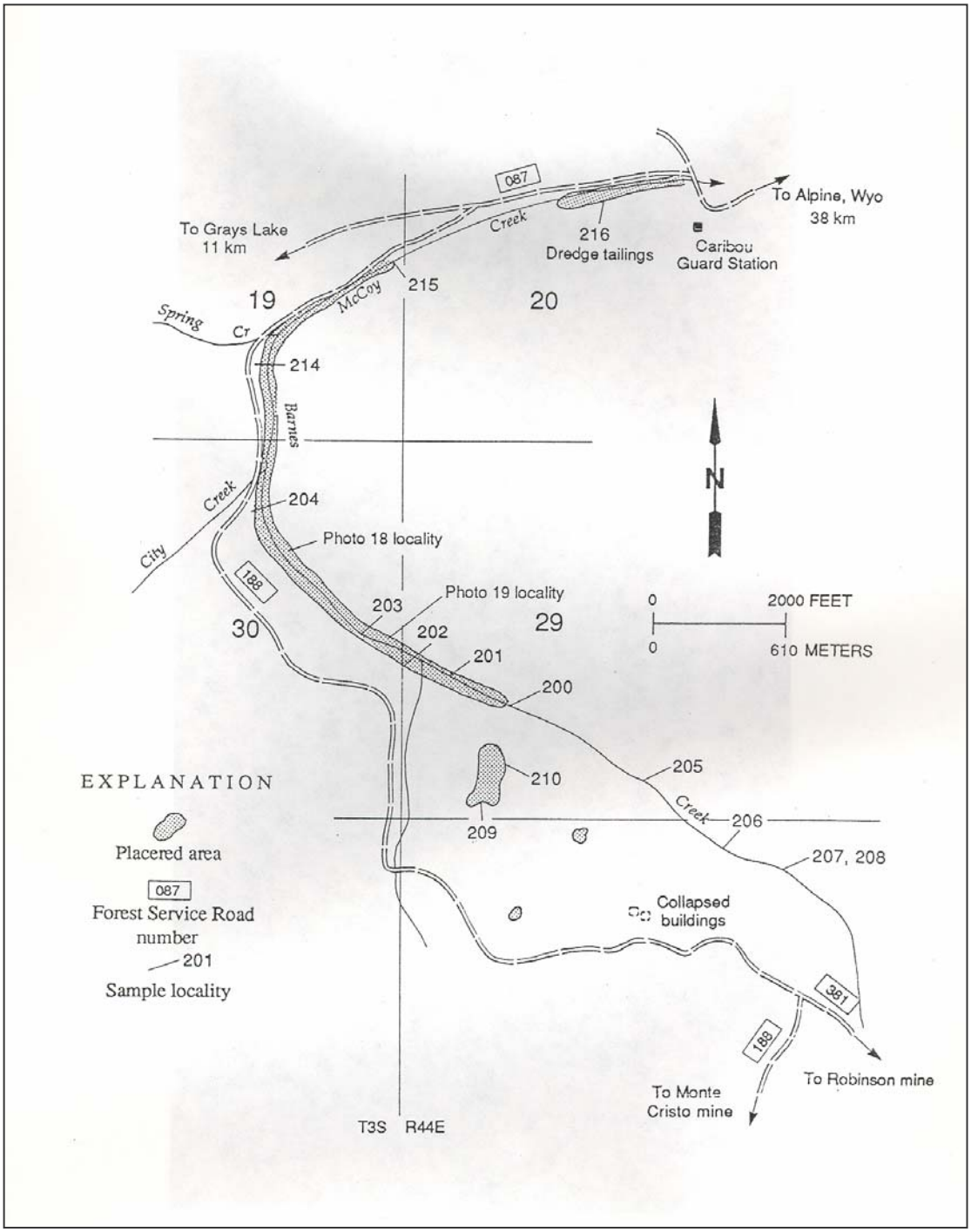
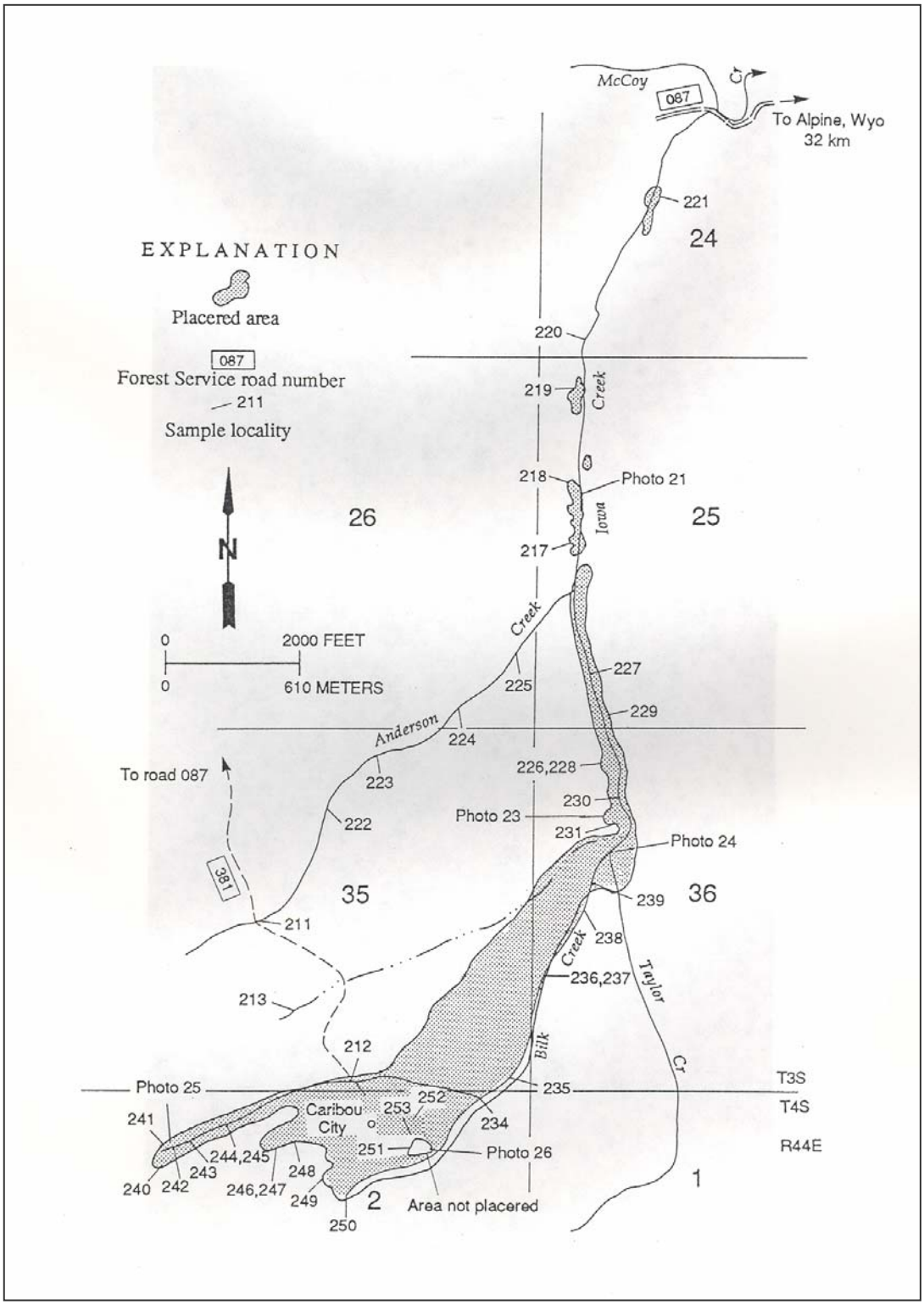


**Figure 1.7-3: Historical Placer Mining Along Bilk and Iowa Creeks.**



There are currently three approved small mining operations in the Caribou Basin area. Only two of those operations are permitted for in-stream mining activities. The three operations combined disturb less than 5 acres per year. Claim holders are required to do annual reclamation on areas of disturbance, and final reclamation when they are totally through with the mining claim. Some recreational panning activities and illegal placer operations disturb areas along the stream banks and do not perform any reclamation work. The total disturbed acres for approved operators and other mining activities is still less then 5 acres per year.

## Nonmetallic Mineral Resources

Nonmetallic mineral resources include a great number of minerals, including mineral materials, oil and gas, geothermal resources, phosphate, petrified wood and others. The removal of these and other mineral types are covered under one of the following acts: The Mineral Leasing Act of 1920, the Mineral Material Act of 1947 and the Surface Resources Act of 1955.

### *Mineral Materials*

Besides the precious metals that have been and are still being mined in the study area, there are other mineral resources that have a potential for removal or mining. These are salable minerals, which primarily consist of common varieties of sand, gravel, stone, pumice, cinders and ordinary clay. Disposal of these minerals requires either a sales contract or free use permit. There has been some minor interest in mineral materials permits for the collection of the river gravels around the area. Generally, the interest is limited to a couple of pick-up loads of rounded river rocks for landscaping.

### *Oil and gas*

The potential for oil and gas does exist in southeastern Idaho. The same type of geology does exist in the study area as does in the oil fields of southwestern Wyoming. In 1920, sampling of shales from the Phosphoria Formation, along Palisades Creek, yielded oil at the rate of three gallons per ton. (Savage, 1961) An overview of Forest Service records show that in the 1970's and 1980's, several leases for oil and gas exploration were received and permits were issued for that exploration. A careful search of the BLM LR2000 records has shown that there are no active or pending leases for oil and gas in the study area (BLM, 2003). Any hope of oil and gas production would come from the sedimentary rocks deposited in a shallow marine environment, such as found in some of the strata found in the project area. (EIA, 2001)

### *Geothermal resources*

A potential for geothermal energy exists throughout the entire Southeast Idaho region, due to a relatively close proximity to Yellowstone National Park. Currently there are no geothermal leases and/or lease applications in the study area. A map from the Idaho Department of Water Resources shows a low-temperature (65-85 degrees F) geothermal source in Gray, Idaho, and three high temperature (>120 degrees F) sources just outside the northern and southern boundaries of the study area. (IDWR, 2003b)

***Leasable Minerals***

Leasable minerals include oil and gas, oil shale, geothermal resources, potash, sodium, coal, phosphate and other minerals (BLM, 1996). There are no phosphate leases in the project area (BLM, 2003).

### 1.7.3 Livestock Grazing

Grazing by ungulates has occurred in the analysis area since man began to explore the area and most likely occurred long before European settlement. Grazing by domestic livestock first occurred in the late 1800's. A narrative from the Comb Creek Allotment Management Plan of 1976 states that "From the time Star Valley was settled in 1884, until the establishment of the Caribou National Forest 23 years later, these allotments and adjoining areas were heavily grazed by hundreds of large bands of sheep". What documentation can be found at the Soda Springs Ranger District reaffirms that grazing occurred in the McCoy Creek area when the Caribou National Forest was established in 1905. Earliest settlers were allowed to take their livestock on the National Forest as soon as snow left and the livestock were allowed to follow the receding snowline to graze the new green growth of the year. Due to a fire at the Salt River Ranger District many of the range records were lost and little documented information prior to the year 1919 remains. Although early records indicate that some areas were considered to be "exclusive" cattle range or sheep range, use by both kinds of livestock on the same range was common. This type of practice occurred throughout the early 1900's and it wasn't until the 1940's that significant change was made in numbers of livestock and/or the season of use. In the early 1900's the authorized grazing season was from early to mid-May through mid to late October. Season of use was gradually changed as range data was collected. In the 1960's Forest Service managers, who negotiated boundary changes and established separate allotments for each kind of livestock, essentially terminated the practice of "common or dual use". Another practice that was recognized as a problem in the late 1950's was re-grazing areas many times in a single season. Allotment management plans in the 1960's commonly stated that every inch of the forage was grazed at least once and was often grazed several times in a single season. This practice along with dual use and over-stocking left much of the range in fair to poor condition. From the reduction of livestock numbers and/or season of use in the 1940's and the elimination of "common or dual use" in the 1960's the McCoy Creek watershed area has seen a reduction in grazing intensity (animal unit month's or AUM's) of approximately 63 percent over the last 100 years.

To improve the conditions of rangelands and to better manage grazing allotments, in the early 1960's some type of grazing system was typically applied to the allotment. One of the primary grazing systems implemented was a rest-rotation system. Implementation of this and other grazing systems required a full-time herder to regulate the movement of sheep during the grazing season. Having a herder to move the sheep helped reduce problems of sheep bedding in the same location. In the allotment management plans of the 1960's sheep were limited to bedding in a single area for a maximum of three nights.

Other improvements that helped with the distribution of cattle were the development of supplemental water sources. Records indicate that significant efforts to develop alternative water sources were first made in the 1960's. Water developments (i.e. troughs, ponds) were placed in various locations across the allotment to obtain more uniform use of the rangelands. This proved effective in eliminating some of the use in the riparian areas and getting forage from locations that typically received lighter use. Please refer to **Figure 1.7-4** for a display of range allotments within MCW.

### 1.7.4 Roads

This watershed analysis is split by two districts the Soda Springs District and the Palisades District. There are only three main roads in the analysis area, they are: Herman-McCoy Creek Road #50087 which is an arterial, gravel surface and receives a lot of traffic from recreation, livestock permittees and in general forest visitors. This road travels through both districts with the major portion of the road being on the Soda Springs District. The road runs from Federal Highway 89 just south of Alpine, Wyoming and goes to Herman, Idaho, which is on the North end of Grays Lake National Wildlife Refuge. The next road is Brockman Road #50086 (new number), which takes off of the Herman-McCoy Creek Road near the Caribou Guard Station and goes to the Brockman Guard Station and continues to the county road. This road is a native surface road and in need of some upgrading, surface, drainage etc. It is classified as a collector road and has had several timber sales use this road. This road also crosses both districts and again the most miles are on the Soda Springs District. The last of the three roads is the Bear Creek-Elk Jensen Road #058, which is also a collector. This road goes from the McCoy Creek Road to Bear Creek and is the head of Bear Creek arm on Palisades Reservoir. Only a portion of this road is within the McCoy Creek Watershed Analysis area, it is also a native surface road and narrow in places with portions of it subject to slumping in the spring of the year, especially after a heavy snow fall winter. The whole length of this road is on the Palisades Ranger District. The most use on this road is recreation use but it has had other activities as well.

The rest of the roads in this analysis area are classified as local roads with most of them being high clearance vehicle use. They are made up of roads used for mining activities and timber sale activities and are on the most part native surface roads. Many of the roads on the South side of the analysis area were constructed in rockier soils and the roads do not erode near a bad as on the North side of the analysis area, using McCoy Creek as the center for North and South. Many of the old roads along the Brockman Road were constructed for the purpose of harvesting timber they now have been closed off for full size vehicle use and are used as motorized trails. Please refer to **Figure 1.7-5**.

A roads analysis is completed for the watershed and is located in appendix A.

### 1.7.5 Timber Harvest and Personal Use Forest Products

Scattered stumps throughout the watershed indicate that timber removal has been a traditional use of the forest dating back to the first settlers. Early settlers would have needed lumber to construct homes, barns, and mining related structures and wood would have been the primary heat source. Since little forested ground exists outside what now is national forest and valley settlers would not have hauled wood any further than necessary it can be assumed that most of the early needs of Caribou City, Keenan City, and Gray’s Lake area would have been harvested on national forest lands.

Available records indicate that less that 2% of the forested acres in the analysis area have been harvested in the last 40 years. Harvest in the last 40 years has been predominately clearcuts and seedtree harvesting of lodgepole pine. Firewood, post and pole gathering has reduced snag and down woody debris within relatively narrow bands along roads.

## 1.7.6 Recreation Activities

***Hunting***

Big game hunting is popular during the fall months with hunters on horseback in the non motorized areas and motorized hunting on designated routes of unit 66A. Hunting begins in late August with archery season and generally ends in mid November following the cow elk rifle hunt. The area has one Outfitter and Guide.

***Camping***

The analysis area has one campground and numerous dispersed camping opportunities. The McCoy Creek Campground is located at the confluence of McCoy Creek as it enters Palisades reservoir. Dispersed camping sites are common along McCoy Creek with the majority of campers coming from the surrounding counties to enjoy weekend stays on the Forest. During the start of big game hunting season demographics change and all camping spots are full from August to November.

***Snowmobiling***

Snow machining dominates winter activities in the analysis area, primarily along the groomed trail system from Brockman to McCoy Creek that is part of a larger trail system from Idaho Falls, Idaho to Alpine Wyoming. Caribou Mountain provides challenging off trail riding for experienced snowmobilers who enjoy high marking and un-groomed terrain. At the junction of the Brockman and McCoy Creek roads are the Caribou Guard Station and Caribou warming shelter. The Guard Station is a Forest Service facility that can be rented for overnight use, while the warming hut is free for day use only and is maintained by a snowmobile club from Idaho Falls.

***Non-Motorized travel***

The majority of the analysis area is closed to motorized travel providing about 50 miles of non-motorized trails. Horseback riding during the summer months and hunting on horseback during the fall months dominate the non-motorized travel in the analysis area. Mountain biking and hiking occur in incidental amounts with the exception of big game hunting on foot during the fall season.

***Motorized Travel***

The analysis has about 72 miles of roads and trails open to motorized use. The majority of the routes are secondary high clearance vehicle roads that are open to ATV's. About 8 miles are designated as ATV routes for vehicles 50 inches or less.

***Other Recreation Activities***

Sight seeing, berry picking and fishing on the lower end of McCoy Creek also occur in the analysis area.

**Figure 1.7-4: Range Allotments within MCW**

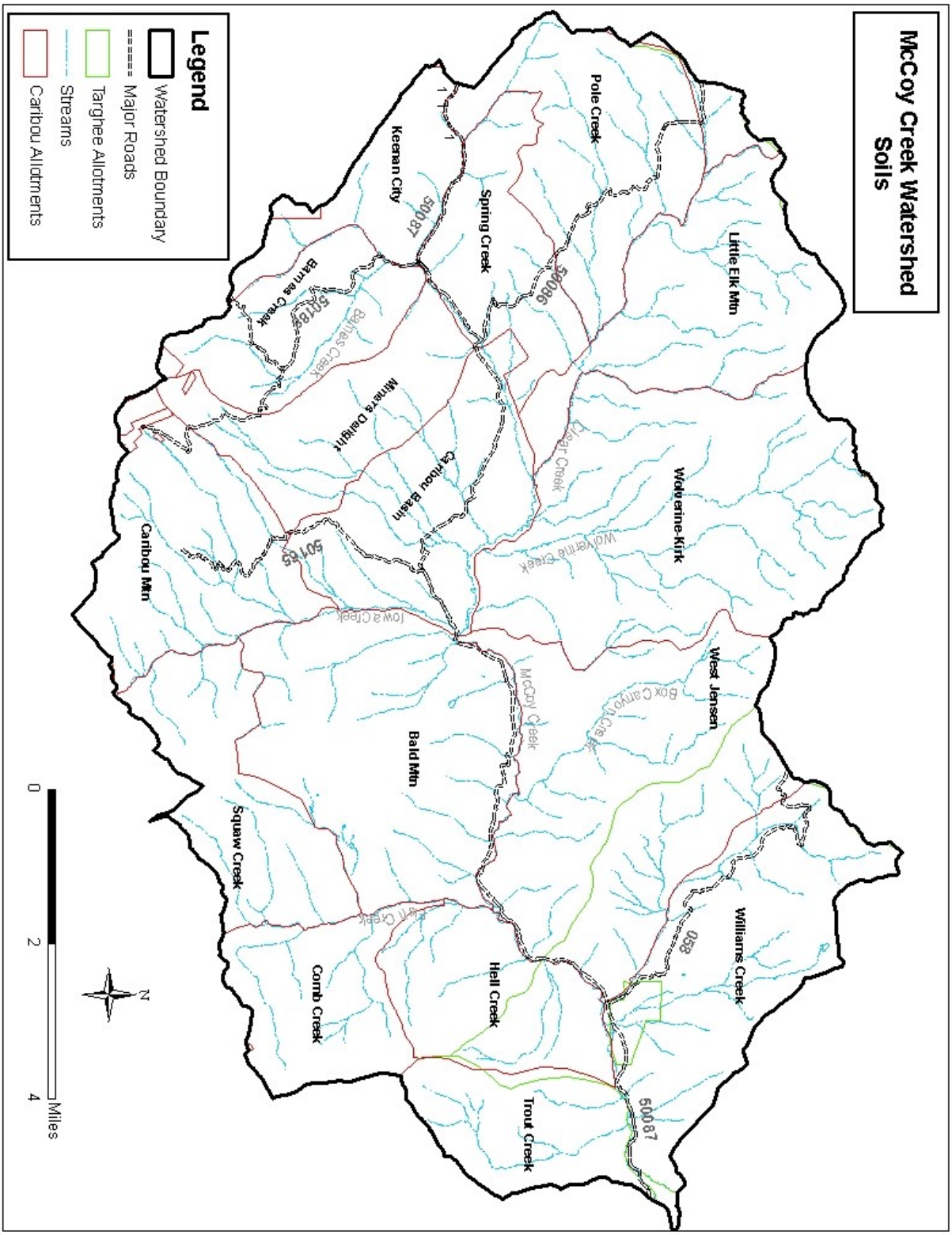
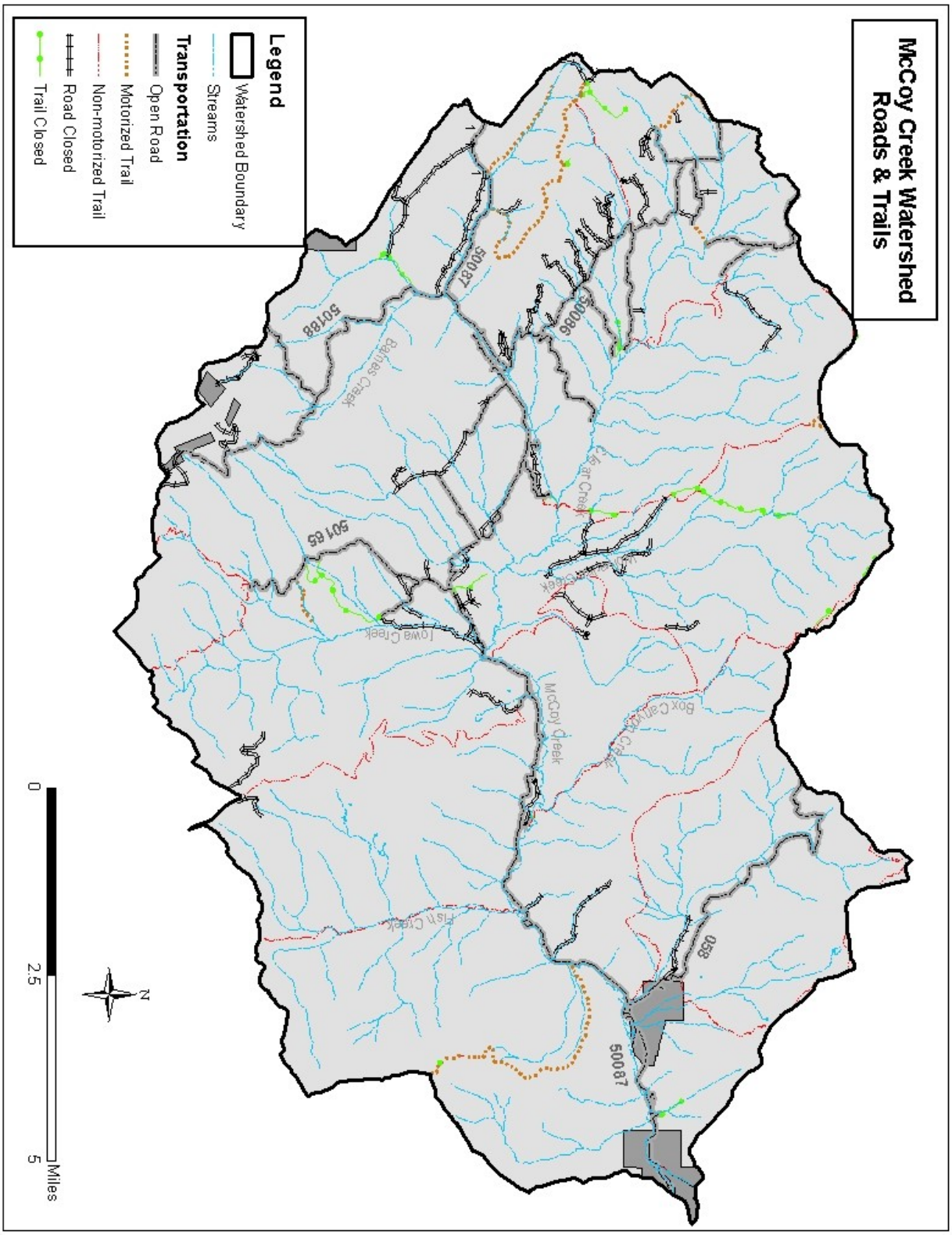


**Figure 1.7-5: Transportation System for MCW**



# 2.0 Issues and Key Questions

The purpose of this chapter is to focus on the key elements of the ecosystem relevant to future land management activities, and to identify data and analysis needed to provide broad direction for future projects. These issues and key questions were identified and developed by the interdisciplinary team. Major issues of immediate concern are identified and characterized. Key questions have been developed.

*2.1 Vegetation Dynamics* ..... *1*
*2.2 Hydrologic Processes and Water Quality* ..... *2*
*2.3 Soil Productivity* ..... *2*
*2.4 Native Fish Habitat* ..... *2*
*2.5 Wildlife Habitat* ..... *3*

## 2.1 Vegetation Dynamics

The "Caribou Nation Forest and Surrounding Area Sub-Regional Properly Functioning Condition Assessment" and other similar broad scale assessments have indicated that existing vegetation distribution, structure, and composition are outside the historic range of variability across much of the Soda Springs Ranger District. Therefore, the vegetation within the McCoy Creek watershed assessment area is likely also outside historic ranges, which has the potential to adversely affect ecosystem function.

### Key Questions

**Non-Forested Vegetation**

1) How has the structure of non-forested cover types changed? (Indicator - structure class reported by cover type)
2) How has the disturbance regimes of non-forested cover types changed? (Indicator - disturbance regimes reported by cover type)
3) How has the presence of noxious weed affected native vegetation?

**Forest Vegetation**

1) How has the structure of the forested cover types changed? (Indicator - structure class reported by cover type)
2) How has the density of the forested cover types changed? (Indicator - density reported by cover type)
3) How has the species composition of the forested cover types changed? (Indicator - species composition reported by cover type)
4) How has the disturbance regimes of the forested cover types changed? (Indicator - disturbance regimes reported by cover type)

## 2.2 Hydrologic Processes and Water Quality

Current or past management may be causing impacts or impeding recovery from past impacts to the hydrologic system, water quality and watershed health.

**Key Questions-**

1) How are aquatic system morphology, processes and dynamics, including floodplain function, stability of channels and wetlands, changes in flow patterns and the sediment budget impacted by current management? Indicators – a) Proper Functioning Condition, b) Channel stability surveys (Pfankuch), c) AIZ & upland motorized route densities, d) Number of stream crossings, e) IWWI Geomorphic Integrity.
2) Are non-point source pollutants impacting water quality? Indicators: a) AIZ motorized route density, b) number of motorized route stream crossings, c) Impairment of beneficial uses, d) IWWI Water Quality Integrity.
3) Are current levels or trends of hydrologic disturbance affecting water yield or watershed health? Indicators: a) Hydrologic disturbance, b) Motorized route densities.
4) What physical resource characteristics or conditions are present that increase sensitivity to impacts to aquatic resources? Indicators: a) IWWI Watershed Vulnerability, b) patterns and levels of disturbance and resource use.
5) How are past management practices or activities affecting the current condition? Indicator: Analysis of use, impacts and recovery trends.

## 2.3 Soil Productivity

Is soil productivity being maintained now in the watershed?

### Key Questions-

1) What are the major livestock grazing soil impacts in the watershed?

2) Is recreation use (camping and ATV use) causing a significant increase in soil disturbance, in the form of erosion, sediment delivery or compaction?

3) How susceptible to management activities are the land types found within the watershed?

4) How much of the watershed has been detrimentally disturbed by past activities?

5) At what point is an impact to soil no longer considered detrimental?

## 2.4 Native Fish Habitat

Yellowstone cutthroat trout, a Regional Foresters Sensitive Species, occur in the analysis area. All 3 life history patterns of Yellowstone cutthroat trout are exhibited in the McCoy Creek Watershed. Resident life history fish live their entire lives in streams, while migratory fish (fluvial and adfluvial) migrate throughout the system to spawn, returning downstream to larger rivers (fluvial) or Palisades Reservoir (adfluvial) as adults. In addition, both forms of Yellowstone cutthroat trout (fine-spotted and large-spotted) occur in the analysis area. Past and current management activities

in the analysis area, including mining, dispersed camping, vegetation management, grazing, road building and maintenance, and motorized recreation, have affected the quality of habitat available to these fish.

### Key Questions-

1) How and to what extent has the historic habitat of Yellowstone cutthroat trout been affected by land management activities, particularly mining, motorized recreation, dispersed camping, transportation system development, and grazing? (Indicator(s)- population, and presence reported by local population watershed)

2) What are the dominant sediment delivery mechanisms in the analysis area and how did they compare with natural processes? Where are the high risk areas?

3) What upstream migration barriers for fish exist in the analysis area? What actions are required to address these barriers?

4) How and to what extent has native fish in the analysis area been affected by the introduction of non-native fish? What actions are required to address these concerns?

5) What survey and monitoring should be conducted to gain a better understanding of the quality and quantity of aquatic species habitat and populations?

## 2.5 Wildlife Habitat

The viability of some wildlife species may have been impacted by past and present activities.

**Key Question-**

1) How and to what extent have natural events and human impacts affected habitat and populations of Threatened, Endangered, Sensitive, and Management Indicator Species (TES/MIS) and key wildlife species?

# 3.0 Reference, Current and Condition Trend

The purpose of this chapter is to present information on the indicators relevant to the issues and key questions developed in chapter 2. The IDT (interdisciplinary team) was instructed to develop a reference condition or desired future, current condition and trend for each indicator.

*3.1 Vegetation Dynamics.....1*
*3.2 Hydrologic Processes and Water Quality.....12*
*3.3 Soil Productivity & Quality .....25*
*3.4 Native Fish Habitat .....42*
*3.5 Wildlife Habitat.....55*

## 3.1 Vegetation Dynamics

In this section the indicators developed to track the Vegetation Dynamics issue will be displayed by vegetation type. The use of vegetation types allows for an operational way to reference other documents such as the Revised Forest Plan and the Caribou National Forest Sub-Regional Assessment of Properly Functioning Condition (PFC).

**Issue Indicators:**
- **Structure**
- **Species Composition**
- **Disturbance Regimes**
- **Presence of Noxious Weeds**

**Figure 3.1-1: Forested Vegetation Mosaic:** This is the typical aspen and conifer mosaic at mid elevations within the MCW. The figure also displays the transition zone between non-forested and forested types.

**Figure 3.1-2: Lodgepole Pine Type:** An example of a mature/old lodgepole stand with an understory of subalpine and Douglas-fir.

**Figure 3.1-3: Aspen with Conifer Understory.** This stand along the Barnes Creek Road is a good example of what many of the Aspen stands within MCW look like, mature aspen with conifer relics in the overstory and Douglas-fir or subalpine fire in the understory.

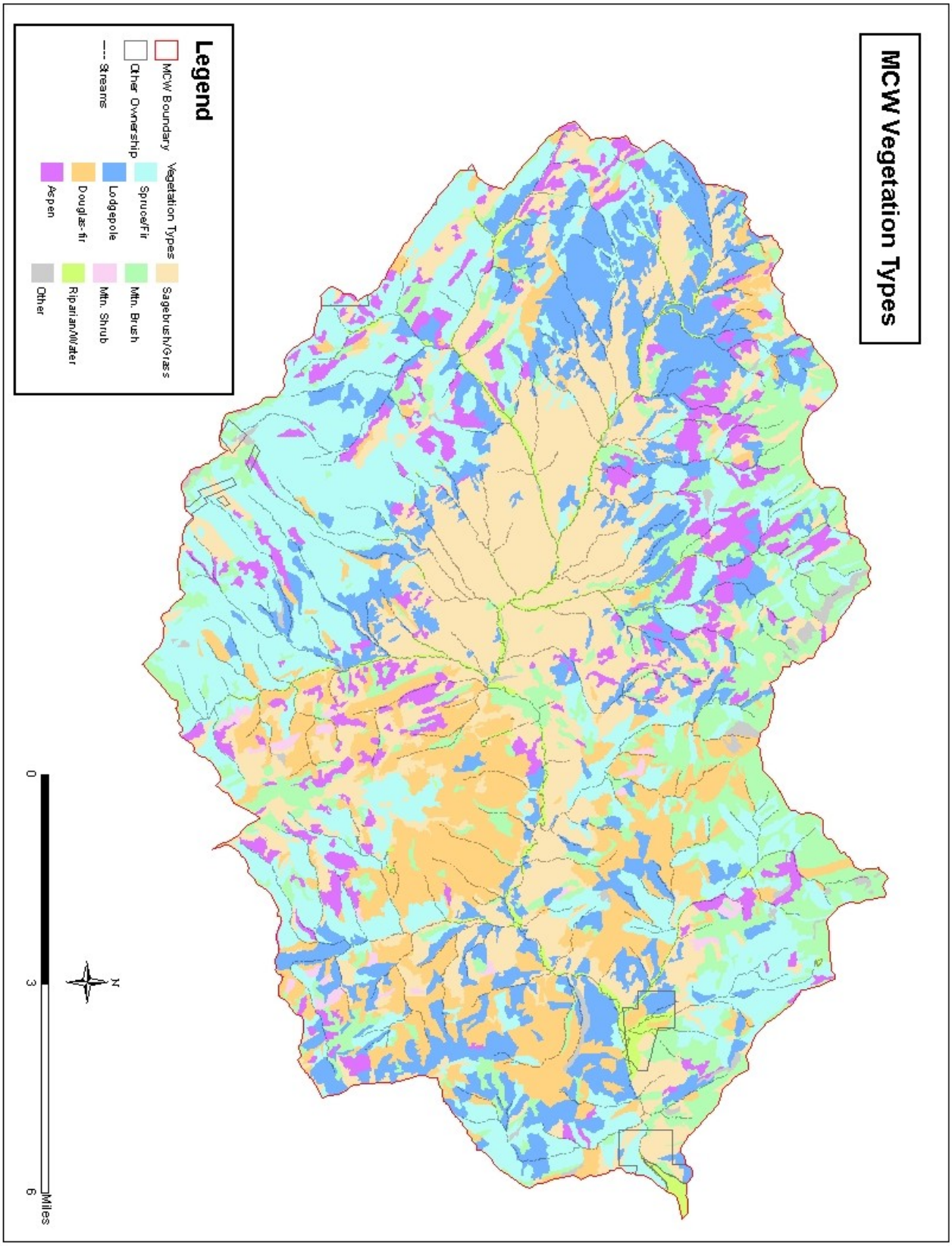
**Figure 3.1-4: Sagebrush types with aspen stringers and encroaching conifer**

**Figure 3.1-5: Spruce/Fir type.** This is typical of the high elevation spruce/fir stands within the MCW.

**Figure 3.1-6: Mtn. Brush & Mtn. Shrub types.** An example of the mountain brush & shrub mix within the MCW. Also an excellent example of the Landscape mosaic north of McCoy Creek.

**Figure 3.1-7: Landscape Mosaic.** The mosaic of forested types look south of McCoy Creek towards Caribou Mtn

**Figure 3.1-8: Vegetation Types for MCW**



### 3.1.1 Structure

At the landscape scale, a balance of age/structure classes is highly desirable. An imbalance in structural classes can put the landscape at risk and reduces its resilience to catastrophic events. *The Caribou National Forest and Surrounding Area Sub-Regional Assessment of Properly Functioning Condition* pointed out that a balance of structure classes was highly desirable (USDA 1996). The Revised Caribou N.F. Forest Plan (RFP) incorporated this idea and adopted desired future conditions (DFC) related to ranges of structure and even carried it to the point that it set goals for mature/old at the forest scale (30 to 40% for conifer and 20 to 30% for aspen).

Forest structure in the analysis area is out of balance. Across all cover types the mature/old class is over represented. The young/mid class is under represented in all cover types and the seedling/sapling class is seriously under represented in Spruce/Fir, Douglas-fir and aspen. Past timber harvest has contributed some structural diversity to the analysis area accounting for the slightly lower percentage in the mature/old and slightly higher percentage in the seedling/sapling classes for the lodgepole cover type.

Non-forested structure as a whole is slightly out of balance. The sagebrush and mountain shrub cover types are under represented in the early seral and over represented in the late seral. Some structural diversity can be contributed to the spray project in the 1960s and 1980s.

For additional information on the method used to determine structure and species composition refer to Appendix C.

**Table 3.1-1: Reference/Desired Condition, Current Condition and Trend for Structure within MCW**

| Vegetation Type | Landscape Scale Reference/Desired Condition* | | Current Condition | Trend |
|---|---|---|---|---|
| Spruce/Fir | Grass/Seedling/Sap<br>Young/Mid<br>Mature/Old | 0-10%<br>10-30%<br>30-50% | <1%<br><1%<br>99% | The distribution of structure classes across the **landscape is outside the reference/-desired condition**. The lack of disturbance and succession has moved the majority of the stands into the Mature/Old structure class. |
| Lodgepole | Grass/Seedling/Sap<br>Young/Mid<br>Mature/Old | 10-30%<br>30-50%<br>30-50% | 8%<br>2%<br>90% | The distribution of structure classes across the **landscape is outside the reference/-desired condition**. The lack of disturbance and succession has moved the majority of the stands into the Mature/Old structure class. The higher percentage in the seedling sap in this type can be contributed to timber harvest. |
| Douglas-fir | Grass/Seedling/Sap<br>Young/Mid<br>Mature/Old | 10-30%<br>30-50%<br>30-50% | <1%<br>1%<br>99% | The distribution of structure classes across the **landscape is outside the reference/-desired condition**. The lack of disturbance and succession has moved the majority of the stands into the Mature/Old structure class |
| Aspen | Grass/Seedling/Sap<br>Young/Mid<br>Mature/Old | 20-40%<br>20-40%<br>20-40% | 0%<br>8%<br>92% | The distribution of structure classes across the **landscape is outside the reference/-desired condition**. The lack of disturbance and succession has moved the majority of the stands into the Mature/Old structure class. |
| Sagebrush/ Grass | Balance range of structural stages<br>• Early Seral<br>• Mid Seral<br>• Late Seral<br>40% of area with >15% Canopy Cover | <br>20-40%<br>20-40%<br>20-40% | <br>8%<br>33%<br>59%<br>59% | The distribution of structure classes across the **landscape is outside the reference/-desired condition**. The lack of disturbance and succession has moved the majority of the stands into the mid-late structural stages. |
| Mountain Brush | Balance range of structural stages<br>• Early Seral<br>• Mid Seral<br>• Late Seral | <br>20-40%<br>20-40%<br>20-40% | <br>24%<br>37%<br>39% | The distribution of structure classes across the **landscape is within to the reference/-desired condition**. |
| Mountain Shrub | Balance range of structural stages<br>• Early Seral<br>• Mid Seral<br>• Late Seral | <br>20-40%<br>20-40%<br>20-40% | <br>4%<br>46%<br>50% | The distribution of structure classes across the **landscape is outside the reference/-desired condition**. succession has moved the majority of the stands into the mid-late structural stages |

*The reference/desired structural ranges for the forested types is based on the desired structure in the FPR FEIS.
* Stands with multiple structure classes represented were included in the oldest structure class.
** The structural stages for non-forested types were determined by using cover percent. Early seral condition is when cover percent is <40%, Mid seral cover percent is 40-70%, and late seral cover percent is >70%

**Table 3.1-2: Structural Percentages and Total Cover Type Acres per HUC 6th**

| Huc | Structure | Spruce/Fir | Lodgepole | Douglas-fir | Aspen | Sagebrush | Mtn.Brush | Mtn.Shrub |
|---|---|---|---|---|---|---|---|---|
| Barnes | gss | 0.0% | 1.9% | 0.0% | 0.0% | | | |
| | ym | 0.5% | 16.7% | 0.0% | 6.4% | | | |
| | m | 99.5% | 81.5% | 100.0% | 93.6% | | | |
| | early | | | | | 5.7% | 66.0% | 0.0% |
| | mid | | | | | 43.1% | 10.4% | 0.0% |
| | late | | | | | 51.2% | 23.6% | 0.0% |
| | **Acres** | **3,600** | **1,005** | **157** | **901** | **2,301** | **514** | **0** |
| Clear | gss | 1.5% | 19.7% | 0.0% | 0.0% | | | |
| | ym | 0.0% | 0.9% | 0.0% | 6.8% | | | |
| | m | 98.5% | 79.4% | 100.0% | 93.2% | | | |
| | early | | | | | 13.4% | 17.1% | 0.0% |
| | mid | | | | | 12.1% | 14.9% | 0.0% |
| | late | | | | | 74.5% | 68.0% | 0.0% |
| | **Acres** | **1,491** | **3,751** | **511** | **951** | **2,909** | **1,135** | **0** |
| Fish | gss | 0.0% | 0.0% | 0.0% | 0.0% | | | |
| | ym | 0.0% | 0.0% | 2.7% | 2.6% | | | |
| | m | 100.0% | 100.0% | 97.3% | 97.4% | | | |
| | early | | | | | 5.6% | 23.3% | 8.1% |
| | mid | | | | | 61.2% | 47.0% | 49.2% |
| | late | | | | | 33.2% | 29.6% | 42.7% |
| | **Acres** | **2,405** | **1,533** | **3,637** | **517** | **2,049** | **1,460** | **200** |
| Iowa | gss | 0.6% | 7.1% | 2.2% | 0.0% | | | |
| | ym | 0.0% | 1.9% | 0.0% | 17.7% | | | |
| | m | 99.4% | 91.0% | 97.8% | 82.3% | | | |
| | early | | | | | 9.3% | 39.3% | 0.0% |
| | mid | | | | | 33.4% | 30.4% | 28.7% |
| | late | | | | | 57.4% | 30.3% | 71.3% |
| | **Acres** | **3,983** | **876** | **2,202** | **1,010** | **3,715** | **1,317** | **122** |
| Jensen | gss | 0.0% | 0.0% | 0.0% | 0.0% | | | |
| | ym | 0.0% | 0.8% | 0.7% | 0.0% | | | |
| | m | 100.0% | 99.2% | 99.3% | 100.0% | | | |
| | early | | | | | 20.1% | 25.0% | 0.0% |
| | mid | | | | | 61.6% | 58.4% | 67.5% |
| | late | | | | | 18.3% | 16.6% | 32.5% |
| | **Acres** | **3,349** | **2,359** | **2,639** | **338** | **1,536** | **2,565** | **70** |
| Wolverine | gss | 0.0% | 0.1% | 0.0% | 0.0% | | | |
| | ym | 1.3% | 0.3% | 0.0% | 4.3% | | | |
| | m | 98.7% | 99.6% | 100.0% | 95.7% | | | |
| | early | | | | | 1.8% | 5.1% | 0.0% |
| | mid | | | | | 15.9% | 22.2% | 0.0% |
| | late | | | | | 82.4% | 72.7% | 0.0% |
| | **Acres** | **2,635** | **1,289** | **103** | **1,059** | **3,742** | **1,802** | **0** |
| **Total** | | **17,462** | **10,814** | **9,249** | **4,776** | **16,253** | **8,792** | **392** |

***gss – Grass/Seedling/Sap, ym – Young/Mid, m – Mature/Old, early – Early Seral, mid – Mid Seral, and late – Late Seral**

### 3.1.2 Species Composition

Table 3.1-3 below describes the reference/desired condition, current condition, and trend for species composition. The ranges displayed in the table represent a reasonable range around the PFC percentages, which are shown as the average. Cover percent was used to determine species composition, and the percentages within the current condition represents the percent of acres which meets the reference/desired condition.

**Table 3.1-3: Reference/Desired Condition, Current Condition and Trend for Composition within MCW**

| Vegetation Type | Landscape Scale Reference/Desired Condition* | Current Condition | Trend |
|---|---|---|---|
| Spruce/Fir | Spruce/Fir 30-100% Ave. >40% | 82% | Spruce/Fir cover percent is more than 40% on 82% of the acres, **within DFC*** |
| Lodgepole | Lodgepole 70 –100% Ave. >80%<br>Other Conifer 0-30% Ave. <20% | 63%<br>37% | Lodgepole pine (cover %) is less than 80% on 63% of the acres, **outside DFC**. |
| Douglas-fir | Douglas-fir 65-100% Ave >75%<br>Spruce/Fir 0-35% Ave. <25% | 91%<br>9% | Spruce/Fir represents less than 9%, **within DFC**. |
| Aspen | Aspen 70–100% Ave 85%<br>Conifer 0-30% Ave. <15% | 57%<br>43% | Aspen is being replaced by conifer. Conifer composition (cover %) is greater than 15% on 43% of the aspen acres, **outside DFC**. |
| Sagebrush/Grass** | Sagebrush dominants historical habitat acres on 95 to 100%<br>Sagebrush does not dominant historical acres on 0-5% | 62%<br>38% | The data indicates that sagebrush composition is **outside DFC.** However, this may be partially due to the way cover types were divided up. |
| Mountain Brush*** | Mosaic of brush and herbaceous understory components. | No Data | Given that structure is within DFC, in general a balance exists. |
| Mountain Shrub*** | Balance of shrub and understory components. | No Data | Given that structure is close to DFC, in general it appears that a balance exists. |

* DFC = Reference/Desired Condition

** Sagebrush historical dominance was based on the total acres of sagebrush & grass cover in 1913 compared to current sagebrush/grass cover type.

** Mountain Brush & Shrub composition varies depending on the shrub type. Info needs to be examined on a site-by-site bases.

**Table 3.1-4: Percent of Cover Type 1913 and now. In 1913 the majority of the analysis area was mapped by vegetation type. That hard copy map was recently digitized. This table is a quick comparison of that information to the most recent vegetation typing. Although the definitions of vegetation type may have not been directly comparable, it makes an interesting comparison. The cover types that have seen the most striking changes are Aspen, which was lost acreage, and Spruce/Fire which has increased. This is likely due to changes in disturbance regimes. More in chapter 4.**

| Vegetation Type | 1913 | Current |
|---|---|---|
| Spruce/Fir | 1% | 25% |
| Lodgepole | 18% | 16% |
| Douglas Fir | 10% | 13% |
| Aspen | 26% | 7% |
| Sagebrush/Grass | 37% | 23% |
| Mtn. Brush | 8% | 13% |
| Mtn. Shrub | | 1% |
| Other | <1% | 1% |

### 3.1.3 Disturbance Regimes

Table 3.1-5 below describes the reference/desired condition, current condition, and trend for disturbance regimes. The data within the data below is based on Barrett's fire regime report (1991), the Caribou National Forest and Surrounding Area Sub-Regional Assessment of Properly Functioning Condition (USDA 1996), and Soda Front Analysis.

**Table 3.1-5: Reference/Desired Condition, Current Condition and Trend for Disturbance within MCW**

| Vegetation Type | Landscape Scale Reference/Desired Condition | | Current Condition | Trend |
|---|---|---|---|---|
| Spruce/Fir | Fire (G6/4)<br>Frequency – Mid Elev.<br>Frequency – High Elev.<br>Regime<br><br>Insects<br>Disease | <br>29-97 Ave. 54 yrs<br>100+ years<br>Mixed to Lethal.<br>Stand replacement events 100-300yrs<br><br>Endemic<br>Endemic | <br>110 Years +<br>Lethal – Stand replacing events likely<br><br>Past Large Fire 0.6%<br><br>Endemic<br>Endemic | Average post settlement fire interval is twice that of the historic fire interval. Probably have lost the mixed severity regime in many sites and stand replacement events are more likely at mid elevation sites.<br>Insect and disease both have increased slightly, but remain at endemic levels |
| Lodgepole | Fire (G6/4)<br>Frequency<br>Regime<br><br>Insects<br>Disease | <br>29-97 Ave. 54 yrs<br>Mixed to Lethal<br><br>Endemic<br>Endemic | <br>110 Years +<br>Lethal<br><br>Timber Harvest 8%<br>Past Large Fire 0.4%<br><br>Endemic<br>Endemic | Average post settlement fire interval is twice that of the historic fire interval. Probably have lost the mixed severity regime in many sites.<br>Insect and disease both have increased slightly, but remain at endemic levels |
| Douglas-fir | Fire (G3/4)<br>Frequency<br>Regime<br><br>Insects<br>Disease | <br>16-66 Ave 41 yrs<br>Non-Lethal to Mixed<br><br>Endemic<br>Endemic | <br>110 Years +<br>Mixed to Lethal<br><br>Timber Harvest 1%<br><br>Endemic<br>Endemic | Average post settlement fire interval is twice that of the historic fire interval. Probably have lost the non-lethal regime on dry sites.<br>Insect and disease both have increased slightly, but remain at endemic levels |
| Aspen | Fire (G4)<br>Frequency<br>Regime<br><br>Insects<br>Disease | <br>16-97 Ave. 54 yrs<br>Mixed to Lethal<br><br>Endemic<br>Endemic | <br>90 Years +<br>Mixed to Lethal<br><br>Endemic<br>Endemic | Average post settlement fire interval in more than twice that of pre-settlement.<br>Insect and disease both have increased slightly, but remain at endemic levels. |
| Sagebrush/ Grass | Fire<br>Frequency<br>Regime | <br>25-76 years<br>Lethal | <br>Approximately 50yrs +<br>Lethal<br><br>Past Large Fire 0.4% | Average post settlement fire interval is approaching the upper range of the historic fire interval. |
| Mountain Brush | Fire<br>Frequency<br>Regime | <br>25-76 years<br>Mixed | <br>Approximately 50yrs +<br>Mixed Severity | Average post settlement fire interval is approaching the upper range of the historic fire interval. |
| Mountain Shrub | Fire<br>Frequency<br>Regime | <br>50-70years<br>Mixed to Lethal | <br>Approximately 70 yrs +<br>Non-lethal to Mixed | Average post settlement fire interval is approaching the upper range of the historic fire interval. Lethal fire regime for maple has changed to non-lethal. |
| Riparian | | No Data | No Data | |

## 3.1.4 Noxious Weeds

### Reference Condition

Noxious weeds in the McCoy Creek Watershed Area were either not present or were very small isolated infestations during the early 1900's and therefore was not documented during the 1913 map exercise. Past problems were not from noxious weeds, but from undesirable vegetation, which would become established in areas such as sheep bedgrounds, where abuse had occurred. Wyethia (mulesear) and tarweed are the main undesirable species that have invaded these abused areas. Past abused areas, where these undesirable species occurred, account for less than 1 percent of the total watershed acres.

### Current Condition

Noxious Weeds occur within the analysis area as relatively small, scattered infestations.
The McCoy Creek Watershed area is part of an Integrated Weed Management Area as described in the Caribou-Targhee Weed Management Strategy (2000) and is also included in the Highlands Cooperative Weed Management Area. Noxious weeds found within the project area are, Spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), and musk thistle (*Carduus nutans*). The District along with the Highlands Cooperative Weed Management Association map any new or existing weed infestations and monitor for control purposes. The District has an active noxious weed treatment program carried out by certified applicators. The Caribou National Forest Noxious Weed Strategy (EA, 1996) and Caribou-Targhee Noxious Weed Strategy (2000) include strategies for reducing and eliminating these and other noxious weeds.

To better understand and document past undesirable plant problem areas (i.e. Wyethia, tarweed) several Parker 3-step and nested frequency studies have been located in historic bedgrounds, where past abuse has taken place. These studies indicate an upward trend in vegetation, with an average of 77 percent of the vegetation in the intermediate or desirable category. These studies also indicate an average ground cover of 68 percent in these historic bedground sites. Overall, the studies show the vegetation trend in these areas are moving toward desirable species, and the percent ground cover is increasing as well.

### Trends

Land disturbance activities such as roads, grazing, past logging, and recreation increase the potential for noxious weed establishment in the watershed analysis area. Increased motorized vehicle use within the McCoy Creek Watershed Area as well as the dispersal of noxious weed seeds by wildlife and recreational stock are also contributing factors to the spread of noxious weeds.

## 3.2 Hydrologic Processes and Water Quality

### 3.2.1 Introduction

**Issue Indicators:**
- **IWWI watershed ratings**
- **PFC assessments**
- **Pfankuch channel stability**
- **AIZ/Upland Road Density**
- **Number of road crossings**
- **Hydrologic Disturbance**
- **Beneficial Use Impairment**
- **Use, impact and recovery trends**

Watershed and hydrologic data used in this report was collected for USGS Hydrologic Unit Code (HUC) level 6 watersheds, individual streams, and in some cases for individual reaches of streams. Data sources include the North End Sheep AMP Revision, Barnes Creek Burn, York Creek Gravel Pit and Alpine Fuels Project. Six individual HUC-6 subunits comprise the McCoy Basin HUC-5 subwatershed. Basic information for the HUC-6s is shown in Table 3-6. Differences in scales and errors in the existing USGS HUC-6 delineations prompted editing of existing HUC-5 & 6 layers for this project, therefore acreages listed in the below table will differ from the original USGS data. The numbering of HUC-6s in McCoy basin increases in an upstream (westerly) direction.

**Table 3-6: HUC-6s and Major Streams of McCoy Basin**

| HUC-6 | Named Streams | Acres | % of basin |
|---|---|---|---|
| 170401041101 | Bitters Cr, Jensen Cr, Hell Cr, York Cr | 13,456 | 19% |
| 170401041102 | Fish Cr, Comb Cr, Box Cyn | 11,952 | 17% |
| 170401041103 | Lake Cr, Iowa Cr, Bilk Cr, Taylor Cr, Anderson Gulch, Kirk Cr | 13,529 | 19% |
| 170401041104 | Miners Delight Cr, Wolverine Cr, Camp Cr, | 10,919 | 16% |
| 170401041105 | Clear Cr, Pole Cr | 10,950 | 16% |
| 170401041106 | Barnes Cr, City Cr, Keenan Cr, Spring Cr | 8,713 | 13% |

### Current Condition

### 3.2.2 Overview of Major Hydrologic Impacts and Risks

The most injurious impacts to the streams in the basin resulted from placer, dredge and hydraulic mining practices that took place mostly in the late 1800's, affecting most streams that drain Caribou Mountain. Old, mostly breached canals on the mountain increase the drainage density and efficiency, routing runoff more quickly to streams and thereby increasing flood peaks. Many creeks have undergone substantial aggradation and loss of channel stability from the mining spoil dumped in channels. Historic intensive sheep grazing has reduced or eliminated the "O" and "A" horizons in many areas, reducing the soil-hydrologic "sponge" capability, thereby increasing storm runoff volume and peaks. The result is that many channels have been enlarged and/or wholly destabilized, including downcutting of existing channels and gullying in steeper upland areas. Soils in a substantial portion of the basin are derived from poorly cemented siltstones and mudstones, which are non-cohesive silts of low infiltration capacity. These generally have sparse cover, are erosive and prone to slumping. Where this occurs near channels, particularly along native surfaced roads and motorized trails near streams, sediment

delivery is high due to easily rutted running surfaces, eroding ditches and increased surface flow distances of runoff.

### 3.2.3 Inland Water West Initiative Ratings

Inland Water West Initiative (IWWI) ratings are reconnaissance level (preliminary) assessments of stream and watershed health, risk and major problems (USDA-FS, 2000). They were developed as a "first cut" of watershed analysis and are generally based on limited data or in some cases on preliminary professional judgment and observation only. They were completed in 2000 and used HUC 6 drainages as the reporting units. Three of the IWWI ratings are most applicable to hydrology and watershed conditions: 1) Watershed Geomorphic Integrity, 2) Watershed Water Quality Integrity, and 3) Watershed Vulnerability, with these ratings displayed in Table 3-7, Table 3-8, and Table 3-9 respectively. Watershed Geomorphic Integrity reflects soil-hydrologic function as a sponge-and-filter system to absorb and store water, and physical soil-stream resilience. Water Quality Integrity reflects overall water quality in a subwatershed. It is derived from the damaged segments layer. Water quality impacts include bank damage, sediment loads, channel modification, flow disruption, thermal change, chemical contamination, and biological stress. Watershed vulnerability reflects inherent risks of conditions becoming degraded if certain sensitive lands in the watershed are disturbed (existing conditions are addressed under Geomorphic Integrity).

Lower ratings signify better condition or lower risk. A rating of 1 indicates 100% of stream segments (perennial and intermittent reaches) and/or watershed area is in dynamic equilibrium, properly functioning condition, or has soil-hydrologic function (soil-hydrologic sponge) in excellent or good condition relative to natural potential condition. A rating of 2 indicates an intermediate state, with up to 20% of stream segments or watershed area damaged, with recovery possible through natural means fostered by changes in management with no more than a minimum of capital investment. A rating of 3 indicates damage is widespread (e.g. more than 20%) to streams and watershed area is damaged and that outlay of capital investment and revised management is required, and that management changes must complement other recovery efforts. Where percent certainty of the rating is less than 90% in the rating, two values are given (e.g. 2-3) and the percent certainty relates to the primary (first) rating. The secondary rating is the second most likely condition or the way the watershed is "leaning," if the primary rating is correct. Where they are known, general sources of management causing change (impact) or risk of impacts is given, ranked in decreasing order of importance.

**Table 3-7: IWWI Rating of Geomorphic Integrity**

| HUC-6 | Primary rating | Percent certainty | Secondary rating | Sources of change |
|---|---|---|---|---|
| 170401041101 | 1 | <59 | 2 | Grazing |
| 170401041102 | 2 | 70-90 | 3 | Roads, Grazing |
| 170401041103 | 3 | 60-70 | 2 | Mining, Grazing, Roads |
| 170401041104 | 2 | >90 | N/A | Mining, Grazing |
| 170401041105 | 2 | 70-90 | 1 | Roads, Grazing |
| 170401041106 | 3 | 70-90 | 2 | Mining, Roads, Grazing |

1= 100% good, 2 = 0-20% damaged, 3 = >20% damaged

**Table 3-8: IWWI Rating of Watershed Water Quality**

| HUC-6 | Primary rating | Percent certainty | Secondary rating | Sources of change |
|---|---|---|---|---|
| 170401041101 | 1 | <59 | 2 | Bank damage, excessive sediment |
| 170401041102 | 2 | >90 | N/A | Bank damage, excessive sediment, thermal change |
| 170401041103 | 2 | 70-90 | 3 | Bank damage, channel modification, thermal change |
| 170401041104 | 2 | 70-90 | 3 | Channel modification, bank damage, excessive sediment |
| 170401041105 | 2 | >90 | N/A | Excessive sediment, bank damage |
| 170401041106 | 2 | 70-90 | 3 | Channel modification, excessive sediment, bank damage |

1= 100% stream segments good, 2 = 0-20% damaged, 3 = >20% damaged

**Table 3-9: IWWI Rating of Watershed Vulnerability**

| HUC-6 | Primary rating | Percent certainty | Secondary rating | Potential threats |
|---|---|---|---|---|
| 170401041101 | 2 | >90 | N/A | |
| 170401041102 | 3 | >90 | N/A | Landslides, Erodible soils |
| 170401041103 | 2 | 60-70 | 3 | Erodible soils |
| 170401041104 | 2 | <59 | 3 | Erodible soils |
| 170401041105 | 3 | >90 | N/A | Erodible soils, Landslides |
| 170401041106 | 3 | >90 | N/A | Landslides |

1= 100% good, 2 = 0-20% damaged, 3 = >20% damaged

### 3.2.4 Other Stream Assessment Techniques

Rather than the usual division into three categories (Pritchard, 1998), many Properly Functioning Condition (PFC) analyses use five rating classes, using subdivisions of FAR developed by Robert L. “Lee” Leffert, Caribou Forest Hydrologist (1989-2005). PFC is the best rating, indicating that the stream has enough of its natural protecting attributes to withstand a 25-30 year flood without suffering substantial damage. However, it does not indicate that it is pristine, nor is there a rating given for pristine (a.k.a. Potential Natural) condition. “Functional at Risk-High” indicates that the stream is nearly functioning properly, but that minor problems or risk factors are present that make the stream susceptible to further degradation. “Functional at Risk-Moderate” indicates that the stream is mid scale, having substantial problems or risk factors, but still providing a moderate level of functionality relative to the natural potential. ”Functioning at Risk-Low” indicates a stream has a relatively low level of functionality and/or serious risk factors or problems that could easily cause degradation to a Non-functional state. “Non-functional” means that vegetation, landform, or energy dissipaters such as large woody debris are so compromised that little or no system protection or function is provided. They may also be at great risk of further losses that would increase the negative impacts to stream reaches below. Table 3-10 lists PFC ratings. Some PFC ratings were completed in January 1998 as an office exercise only by the Forest Hydrologist and District specialists who had some familiarity with these segments. Some ratings are from the GIS layer “Cnf_strm_pfc” for which no PFC form could be located, other ratings were from completed forms. A few ratings of channel stability were completed, using the protocol developed by Pfankuch (1978). Some stream assessments include an ocular estimation of Rosgen stream type (Rosgen, 1994).

**Table 3-10 Proper Functioning Condition Ratings**

| Stream - Reach | PFC | Trend | Year | Source | Pfankuch |
|---|---|---|---|---|---|
| Anderson Gulch | FAR-L | | | | |
| Barnes Cr – upper | FAR-M | | | 2 | |
| Barnes Cr – lower | FAR-L | | | 2 | |
| Bilk Cr | NF | | 1998 | 1 | |
| Box Cyn | FAR-H | N | | 2 | |
| Camp Cr upper | FAR | U | 1998 | 1 | |
| Camp Cr | FAR-M | | | 2 | 136 |
| City Cr upper-mid | FAR | U | 1998 | 1 | |
| City Cr lower | FAR-M | U | | 2 | |
| Clear Cr | PFC | NA | | 2 | |
| Comb Cr | FAR-H | | 1998 | 1,2 | |
| Fish Cr | FAR-H | | 1998 | 1,2 | |
| Fish Cr – upper | FAR-M | N | 2003 | 1 | 80 |
| Hell Cr | PFC | NA | | 2 | |
| Iowa Cr – above Bilk | FAR | N | | 1 | |
| Iowa Cr – below Bilk | NF | NA | 1998 | 1 | |
| Keenan Cr - upper | | | | | 97 |
| Keenan Cr - lower | | | | | 60 |
| Kirk Cr | PFC | NA | 1998 | 1,2 | |
| Lake Cr | PFC | NA | 2003 | 1,2 | |
| McCoy – upper | FAR | U | 1998 | 1 | |
| McCoy – Barnes to outfitter | FAR-L | U | | 2 | |
| McCoy – outfitter to Hell | FAR-M | U | | 2 | |
| Miners Delight | FAR-M | | | 2 | 104-120 |
| Pole Cr | PFC | NA | | 2 | |
| Spring Cr | FAR-H | D | | 2 | |
| Taylor | PFC | NA | | 1,2 | |
| Wolverine Cr | PFC | NA | 1998 | 1,2 | |
| York Cr | FAR | N | 2004 | 1 | |

Sources of PFC Data: 1 = available data sheet; 2 = Forest GIS layer only, NA = Not available

## Reference Condition

Historic (pre-European settlement) conditions for hydrologic processes and water quality are not quantitatively known. Presumably the states of riparian areas, though dynamically changing, were probably usually somewhere between proper functioning condition and Potential Natural Condition (PNC), with a late seral vegetative community. Exceptions to this would have occurred following major disturbances or combinations of disturbances such as fire, drought, or major insect/disease outbreaks when the communities were at least partly reset entirely or to an early seral state and may have been in “functioning at risk” condition until recovery from major disturbances had occurred. As described in the current condition, there is a high degree in variability in levels of disturbance in the streams and sub-watersheds in the basin. The south-flowing Wolverine and Kirk Creeks overall show the fewest disturbance effects (or greatest resilience) to disturbances and therefore in most respects would be the best available examples of streams in reference condition. The most important factor for this is that unlike the streams to their south, they drain the southern flank of Big Elk Mountain in an area underlain by

sedimentary rocks. The north-flowing streams to their south, including Anderson, Barnes, Bilk, Iowa, and City Creeks drain Caribou Mountain contain sediments derived from igneous rocks and were disturbed by dredge and/or hydraulically mining for the gold associated with them. In addition, at least the lower reaches of Wolverine and Kirk are of somewhat lower gradient and type and are somewhat more resilient to channel disturbance.

### 3.2.5 Water Quality and Beneficial Uses

Table 3-11 gives data on known beneficial uses of waters for McCoy Basin available as of 2003. As of 2006, no streams in the basin are rated by IDEQ as having impaired beneficial uses. As of 2006, all streams in McCoy Basin are reported as "not assessed" in the IDEQ water quality web mapping page (IDEQ, 2006). McCoy, Fish and Comb Creeks were on the 1996 303(d) list, but were dropped from the 1998 and subsequent lists once flow and BURP data had been collected (IDEQ, 1998). DEQ at least informally generally considers streams of less then 1cfs baseflow as not supportive of a cold water fishery. Many of the tributaries of McCoy Creek are under this threshold. McCoy Creek drainage is included in the Palisades Basin TMDL (Zaroban & Sharp, 2001), which was completed in 2001, but no streams in McCoy basin have any specified loads, pollutant reduction targets or special management direction under the TMDL. Most frequent identified pollutants for impaired streams elsewhere in the Palisades Basin are sediment and flow alteration.

**Table 3-11: Beneficial Uses**

| Stream - Reach | CWB | SS | PCR | SCR | DWS | AWS | IWS | WH | AE |
|---|---|---|---|---|---|---|---|---|---|
| Barnes Cr: Upper | E | | | DE | | E | D | D | D |
| Barnes Cr: Lower | E | | | DE | | E | D | D | D |
| McCoy Cr: below Fish Cr | E | E | | | | | D | D | D |
| McCoy Cr: Iowa Cr - Fish Cr | E | E | | | | | D | D | D |
| McCoy Cr: Clear Cr - Iowa Cr | E | E | | | | | D | D | D |
| McCoy Cr: source – Clear Cr | E | E | | | | | D | D | D |
| Wolverine Cr | E | E | | | | | D | D | D |

Key: E = Existing Use; D = Designated Use; DE =Designated and Existing Use.
CWB = Cold Water Biota; SS = Salmonid Spawning; PCR = Primary Contact Recreation; SCR = Secondary Contact Recreation; DWS = Domestic Water Supply; AWS = Agricultural Water Supply; IWS = Industrial Water Supply; WH = Wildlife Habitat; AE = Aesthetics

Automated recording water temperature sensors (Hobos) were placed in several streams recording hourly from June 5 to October30, 2003 by IDEQ (IDEQ, 2003). A spreadsheet model developed by IDEQ "DEQ-PRO" derived criteria from the hourly data. These include mean daily average (MDA), the average of all daily averages; the mean daily high (MDH), the average of all daily highs; the mean daily low, the average of all daily lows; the highest daily average, the highest average of all hourly temperatures for any one day; the max 7-day maximum, the highest high temperature for any 7 days in a row and the maximum 7-day average, the highest average daily temperature for any 7-days in a row. These values are shown in Table 3-12. Stations for the tributaries are just above their respective confluences with McCoy Cr.

**Table 3-12 Stream Temperature Data**

| Location | MDA (° C) | MDH (° C) | MDL (° C) | HDA (° C) | Max 7-day max. | Max 7-day ave. |
|---|---|---|---|---|---|---|
| Clear Cr | 14.0 | 16.7 | 11.1 | 20.5 | 24.8 | 20.2 |
| Iowa Cr | 11.6 | 18.2 | 6.7 | 18.2 | 25.1 | 17.1 |
| McCoy Cr above Hell Cr | 13.3 | 16.2 | 10.4 | 20.0 | 23.9 | 19.5 |
| McCoy Cr above Palisades Res. | 13.2 | 16.9 | 9.8 | 20.0 | 23.8 | 19.4 |
| Wolverine Cr | 12.1 | 18.2 | 7.1 | 18.9 | 24.9 | 18.1 |

**MDA** = mean daily average; **MDH** = mean daily high; **MDL** = mean daily low .
**HDA** = Highest daily average

## 3.2.6 Wetlands & Springs

A total of 16 springs and 230 acres of wetlands have been mapped for McCoy Basin (USDI-FWS, date varies), as shown in Table 3-13. Most of the mapped wetlands are willow/beaver complexes along the channels of McCoy, Spring and Iowa Creeks. Many small, unmapped wetlands are found in the Barnes Creek drainage in particular, many of them along stream channels and at the heads of smaller perennial tributaries. Most or all of the tributaries to Barnes Creek, and many other creeks originate in springs that are also unmapped. The actual number of springs in the basin is likely to be from three to five times greater than the 16 that have been mapped, and possibly as many as ten times more springs may be present.

**Table 3-13: Mapped Wetlands and Springs**

| HUC-6 | Springs | Wetland units | Wetland acres |
|---|---|---|---|
| 170401041101 | 4 | 3 | 20.92 |
| 170401041102 | 2 | 18 | 32.87 |
| 170401041103 | 2 | 33 | 64.37 |
| 170401041104 | 0 | 10 | 2.69 |
| 170401041105 | 4 | 25 | 74.09 |
| 170401041106 | 4 | 15 | 34.93 |
| Grand Total | 16 | 104 | 229.87 |

## 3.2.7 Hydrologic Disturbance

Disturbance of vegetation can alter hydrologic response. Thirty percent disturbance is commonly acknowledged as a reasonable threshold of change for measurable increases in water yield in small basins (Rothacher, 1970), and is the maximum under a Forest Plan guideline (USDA-FS, 2003). GIS and other derived spatial data were used to calculate total acres of disturbance. Temporary disturbances are mostly fires, timber harvest activities and reclaimed routes. Longer term disturbances include current motorized routes, hydraulic and sluicing minerals exploitation, recreation sites and concentrated livestock use. Table 3-14 summarizes known hydrologic disturbance from all the above sources, and shows that known disturbances are less than 10% per HUC-6 and 4% in the McCoy Basin as a whole.

**Table 3-14 Total Hydrologic Disturbance**

| HUC-6 | Total Acres | Acres Disturbance | Percent disturbance |
|---|---|---|---|
| 170401041101 | 13,456 | 76 | 0.6% |
| 170401041102 | 11,952 | 41 | 0.3% |
| 170401041103 | 13,529 | 1,136 | 8.4% |
| 170401041104 | 10,919 | 155 | 1.4% |
| 170401041105 | 10,950 | 1,065 | 9.7% |
| 170401041106 | 8,713 | 605 | 6.9% |
| Total/Average | **139,038** | **6,158** | **4.4%** |

Hydrologic disturbance by motorized routes are of particular concern for several reasons. Routes in AIZs are of higher concern because they are usually the greatest single source of sediment delivery to streams (Furniss, et al, 1991), the effect often being greatest where they cross streams. Roads in upland areas are less likely to directly contribute sediment, but cumulatively can modify hydrologic response by decreasing infiltration and moving runoff waters more quickly to streams. This increases peak streamflows, which can contribute to destabilization of stream channels. Table 3-15 summarizes stream crossings and densities of known motorized routes by HUC-6.

**Table 3-15: Motorized Routes and Stream Crossings**

| HUC-6 | Upland route density | AIZ route density | Perennial stream crossings | Intermittent stream crossings |
|---|---|---|---|---|
| 170401041101 | 1.4 | 2.5 | 6 | 8 |
| 170401041102 | 0.8 | 2.2 | 4 | 4 |
| 170401041103 | 1.6 | 1.8 | 9 | 4 |
| 170401041104 | 1.6 | 1.2 | 3 | 4 |
| 170401041105 | 2.0 | 1.9 | 8 | 4 |
| 170401041106 | 2.2 | 4.8 | 21 | 16 |
| Average/Total | 1.6 | 2.2 | 51 | 40 |

## 3.2.8 Narratives on Individual Streams

### Anderson Gulch

Anderson Gulch is a steep, northeast flowing stream in a shallow V shaped valley tributary to Iowa Creek, entering it below Bilk Creek. It was rated Functioning at Risk Moderate in 1998 without a field visit, but alterations to the channel by historic mining below the road belie a non-functional state. They include “windrow” dredge piles of gravel piled up to 4’ high along the channel so that they function as an artificial levee for much of the reach, isolating the stream from the floodplain. Above the road, a now defunct diversion ditch removed water from the channel and transported it in a ditch along the south side of the valley for use in mining elsewhere south of the creek. A cobble field of several acres denuded of all fines by sluicing is along the channel above the road. As in other creeks with extensive historic mining impacts, large quantities of sediment were washed down the channel, including soils that were in the cobble field. Some of this sediment has been deposited in the lower gradient/energy channels of Iowa and McCoy Creeks. Historic mining has drastically altered the lowest ¼ mile of the creek

so that it essentially has been channelized. The reach below the road should be re-rated as nonfunctional due to extensive destabilization and aggradation of the channel.

### Barnes Creek

Barnes Creek is a tributary to McCoy Creek that flows north and joins with Spring Creek to form McCoy Creek. It has been rated as Functioning at Risk Moderate, and is at present a Rosgen B3, except that the highest reaches are A3. The primary current disturbances include roads, dispersed recreation and occasional illegal placer mining. An active diversion from the creek is located about ½ mile above the upper road crossing, diverting water along the west bank going to a sluicebox more than a mile downhill at the head of a cobble field of several acres created by historic placer mining. Mining activity in the creek, abandoned channel segments and ephemeral side drainages has altered stream morphology over most of the length. Piles and short windrows of gravels and small cobble material from placer mining are very common along channel in lower half of the creek, and occasional piles are found in the upper reaches nearly to the spring at the main headwater above the road. The piles are extensive enough to isolate/degrade channel interaction with the floodplain. Past mining continues to increase bedload in the channel, affecting lower areas. In particular, the widening/shallowing of the channel and decrease of channel gradient at the lowest road crossing has become a knickpoint for bedload deposition, with the channel of Barnes Creek destabilized at and below that point. Mining of channel gravels and fines appears to have shifted the dominant channel bottom from gravel to cobble. Where present, the cobble dominated channels are stable to the point of being artificially static to the point of being essentially “channelized”. Thick riparian vegetation lines most of the channel where dredge piles are not present. Heavy concentrations of downfallen trees are present in and near the riparian zone. Small, heavily vegetated unmapped wetlands near the channel are common along most of the middle and part of the upper reaches. A BURP survey in 1994 in the lower part of the creek just above the confluence with Spring Creek rated the reach as a Rosgen “B4” stream type and measured a gradient of 2%. Another BURP survey the same year 1 mile northeast of the Monte Cristo Mine in the NE¼ of the NW¼ of the SW¼ of Section 33, T03S R44E rated this stream as a Rosgen “G4” stream type with a gradient of 1.1%. Both of these BURP surveys listed forestry, grazing, mining, roads and recreation as obvious human factors affecting the reaches.

### Bilk Creek

Bilk Creek is a northeast flowing tributary to Iowa Creek. It flows through the Caribou City mining district. It was rated as Functioning at Risk Moderate in 1998, but field visits to the creek in 2003 indicate it could be a “poster child” for a non-functional stream. The channel has been completely destabilized for the entire length, with cobble/boulder mining spoil from the extensive hydraulic mining around Caribou City aggrading the channel bottom in that reach to the point that all baseflow is subsurface. The channel stability rating for the upper reach is = poor, with upper bank mass wasting = fair, lower bank cutting = good, lower bank deposition = fair-poor, bottom size distribution & percent stable = poor, scouring and deposition = fair. Remnants of several now defunct diversion ditches are visible along the north bank of the stream to mining activities offstream. One series of dredge spoil windrows several acres in size about ½ mile above the road crossing is one likely location of use. High pressure hydraulic mining along stream terraces and sidehills has left large highwalls along the valley margins and caused a enormous increase in sediment supplied to the stream. This led to a drastic alteration of the

pattern, plan and profile of the stream and what observation suggests is many meters of channel and floodplain aggradation and grain size distribution. Vast quantities of coarse to very coarse material are present at the surface in the middle and lower reaches of the stream, forming a wide, cobble to gravel-dominated floodplain, with dredge spoil piles interspersed within the floodplain. Part of this overwhelming sediment load forms in a delta at the mouth of Bilk Creek that blocks nearly all of the floodplain of Iowa Creek at that point. Much of the channel and floodplain appear to be downcut in the upper reaches, with side drainages also downcut near their confluence with Bilk Cr. The remaining sediment at the surface in the middle and lower reaches appears to be too large for the remaining surface stream to move in all but the most catastrophic flow events. As this material was moved by the application of high-pressure hydraulic mining, there is no realistic expectation for the stream channel to move it at bankfull flow. For this reason, the stream is not expected to heal itself by moving the sediment downstream in any conceivably normal time frame. Most likely much of the former surface flow now travels beneath the surface within the thick layer of aggraded coarse sediment piled on top of the now buried former channel.

### Box Canyon Creek

Box Canyon Creek is a southeast flowing stream, flowing through mostly hilly terrain and entering McCoy Creek below Caribou basin about one mile above Fish Creek. It has been rated Functional at Risk high, leaning toward PFC. A portion of the lower reach has impaired bank stability, which appears to at least in part to be due to an old road which has since been closed.

### Camp Creek

Camp Creek is a northeast flowing tributary to McCoy Creek parallel and similar in character to Miners Delight Creek. The lower reaches have downcut and eroded banks where it flows through areas underlain by the Wayan formation, which decomposes to a non-cohesive silty soil of low productivity, making this reach very sensitive to disturbance. Willows are present, but only in small numbers, all of which are decadent age, strongly hedged to a “mushroom” shape and many plants sit on soil pedestals. What little herbaceous plants are present are mostly upland plants rather than the sedges that should be present. Sediment delivery to the creek is substantial in the lower reaches due to the exposed high bank areas and low ground cover in the AIZ. The uppermost reaches are in much better condition, with sufficient sedges, willows and woody debris to stabilize the channel.

### City Creek

City Creek is a generally north flowing stream that discharges into Barnes Creek. It has been rated Functional at Risk Moderate. The middle reach below the cascade is a Rosgen B4/B5, with the channel stability rated as = fair, with upper bank mass wasting = good, lower bank cutting = excellent, lower bank deposition = good, bottom size distribution & percent stable = good, scouring and deposition = good. The lower reach below the more disturbed middle reach is a B4/B5, with the channel stability rated as = fair, with upper bank mass wasting = good, lower bank cutting = good, lower bank deposition = fair, bottom size distribution & percent stable = good, scouring and deposition = fair.

### Clear Creek

Clear Creek is a major southeastern flowing tributary of McCoy Creek draining much of the northwestern part of the Basin. It has been rated in a Properly Functioning Condition. Much of the lower reaches are a series of stable beaver dam-willow complexes. The FR077 crossing, which had been a sediment source to blockage by beavers was reconstructed in 2004 with a larger culvert and graveling, reducing sediment from this source. Upgrades to crossings of some smaller tributaries are in the works. The stream substrate was generally gravel and sand. In 1994 The BURP crew data indicates the stream just above the mouth as a Rosgen "B4" stream type with a channel gradient of 3%. The BURP survey listed sheep grazing, mining and recreation as obvious human factors affecting the reach.

### Comb Creek

Comb Creek is a west flowing perennial tributary to Fish Creek. It has been rated as Functional at Risk high, leaning toward PFC. It was not visited for this study.

### Fish Creek

Fish Creek is a north flowing stream in a narrow, V shaped valley, and is a major tributary to McCoy Creek, discharging to it below Caribou Basin. As a part of this project, it was rated Functional at Risk Moderate, where it previously was rated Functional at Risk High. The reason for the change is that there is a marked lack of herbaceous riparian species present along the greenline, and a short stubble height in the aquatic influence zone (AIZ). A substantial amount of "increasers" including *Wyethia* and *Rudbeckia* were noted in some of the larger streamside meadows in the AIZ. A Pfankuch channel stability assessment was also completed and rated the stream at 76, only marginally in the good condition class. The 2000 Forest Service fisheries summer field crew observed very heavy grazing throughout the drainage sufficient to affect bank stability, including denuding and cutting of streambanks. They also observed sediment entering the stream from trails and the denuded banks. They also listed roads and recreation as other obvious human factors affecting the reach, and that a beaver complex was also affecting the reach. Riparian vegetation highly vegetated with willows, dogwoods, sagebrush, grasses and forbs. Large woody debris is distributed regularly along the stream. The substrate consists of cobble and gravel. A stream survey in 2001 rated the stream 200 meters above the mouth as a Rosgen "B4" stream type with a gradient of 3%.

### Hell Creek

Hell Creek is a small, northwest flowing tributary to McCoy Creek, joining it between Fish and Jensen Creeks. It has been rated to be in Properly Functioning Condition. It is in a narrow, very steep canyon.

### Iowa Creek

Iowa Creek is a major north flowing tributary to McCoy Creek. The reach below Bilk Creek has been rated as Non-functional. The primary cause is the addition of very large quantities of sediment from historic mining activities, and in particular on the Bilk Creek tributary. This has destabilized the channel below Bilk Creek. The channel is now braided from Bilk Creek down to McCoy Creek but has recovered somewhat. The finer fraction has mostly washed away, leaving an overabundance of cobble sized material that will be extremely slow to move farther down through the lower gradient streams lower down in the McCoy drainage system. A BURP

survey 100 meters above the bridge near the confluence with McCoy Creek completed in 1994 rated the creek as a Rosgen "C4" with a gradient of 2%. A survey completed in 2001 40 meters above the mouth rated the stream as a Rosgen "D4" with a gradient of 2.5%. They listed grazing, roads, mining and recreation as obvious human factors affecting the reach, inception of lots of blue-green algae, and that a beaver complex was also affecting the reach.

### Keenan Creek

Keenan Creek is a small perennial east flowing tributary to City Cr. It has not been PFC rated. The upper reach is a Rosgen B5/A5, with the channel stability rated as = fair, with upper bank mass wasting = fair, lower bank cutting = good, lower bank deposition = fair, bottom size distribution & percent stable = fair, scouring and deposition = good-fair. The lower half flows through a series of abandoned, but mostly stable beaver ponds. The lower reach is a B3/B4, with the channel stability rated as = good, with upper bank mass wasting = good, lower bank cutting = excellent, lower bank deposition = good, bottom size distribution & percent stable = excellent, scouring and deposition = excellent - good.

### Kirk Creek

Kirk Creek is a south flowing tributary to McCoy Creek, joining with it in the Caribou Basin between Wolverine and Iowa Creeks. The upper reaches have been rated as Properly Functioning Condition. The middle and lower reaches have not been PFC rated. The IWWI ratings are: Geomorphic Integrity = 3-2 with mining the primary source of change, range management second, and roads third; Water quality = 2-3 with bank damage as primary source of change, channel modification second and thermal change third; Watershed vulnerability = 2-3 with highly erodible soils the predominant factor.

### Lake Creek

Lake Creek is a small, north flowing tributary to McCoy Creek, discharging to it between Iowa and Box Canyon Creek. It has been rated to be in Properly Functioning Condition. Most of the creek is very high gradient, in a steep-sided valley with the channel well protected by a very thick and stable willow/dogwood complex. The combination of relatively low flow, few or no pools and a cascade reach in the lowest part makes it unlikely to have fishery potential.

### McCoy Creek

McCoy Creek is the largest stream and watershed, forming the bounds of the study area, with a total drainage area of 106 square miles. It originates in the western portion of the study area and flows eastward across the study area, eventually emptying into Palisades Reservoir. The upper reach of the stream flows in a steep sided V shaped valley. The McCoy Creek Road runs along the north bank of the stream, and a sheep driveway runs along much of the south bank of the creek. The road constricts the floodplain over part of the length. Though the sheep driveway has been moved a short distance from the channel over much of its length, it is still close enough in places to result in sediment delivered to the stream from rill and overland flow.

The reach from Barnes Creek to Clear Creek (Outfitter camp) was rated as Functioning at Risk Low, with impacts from mining, roads, and grazing given as the impacts. The reach from Clear Creek (Outfitter camp) down to the forest boundary was rated to be Functional at Risk Moderate. Riparian vegetation consists of thick stands of willows in the upper reaches and patches of

willows and dogwood in the lower reach. There is a former USGS gaging station near the forest boundary. The mean annual streamflow at that point is 85 cfs, and the 2-yr flow is about 615 cfs. Several BURP surveys have been completed in McCoy Creek. In 2001 a survey 0.9 miles upstream of the Brockman Road Junction rated the creek as a Rosgen "E4" stream type with a gradient of 2.0%. It listed roads and recreation as obvious human factors affecting the reach. A survey in 2001 0.4 miles downstream from the Iowa Creek Bridge rated the creek as a Rosgen "C4" stream type with a gradient of 1.2%. It listed grazing, roads and recreation as obvious human factors affecting the reach, and that a beaver complex was also affecting the reach. A survey in 1994 150 meters above the confluence with Clear Creek rated the stream as a Rosgen "C4" with a gradient of 2.5%. It listed grazing and recreation as obvious human factors affecting the reach. A survey ¼ mile above the Caribou Guard Station rated the stream as a Rosgen "G4" stream type with a gradient of 2%. It listed mining, roads and recreation as obvious human factors affecting the reach.

### Miners Delight Creek

Miners Delight is a northeast flowing, three forked stream tributary to McCoy Creek draining part of Caribou Basin, discharging to McCoy Creek just below and flowing parallel to Camp Creek and is similar in size and nature to Camp Creek. There are areas of eroding banks in the reache immediately north of the road. Flow in the creek is reduced to a trickle or intermittent in late summers of drought years. The creek has been rated as Functioning at Risk Moderate, and most is classified as a E6/G6, except in the uppermost parts of each fork, which are rated A3/A3+. The upper reach of the west fork (the fork names as Miners Delight on USGS maps) is a G3/4, with the channel stability rated as = good, with upper bank mass wasting = good, lower bank cutting = excellent, lower bank deposition = excellent, bottom size distribution & percent stable = excellent, scouring and deposition = excellent. The upper east fork is a B3, with the channel stability rated as = good, with upper bank mass wasting = excellent, lower bank cutting = excellent, lower bank deposition = excellent, bottom size distribution & percent stable = excellent, scouring and deposition = excellent. A failed diversion fed a ditch along the east bank, most likely to a mining site elsewhere. The middle fork, which has by far the largest late summer flow due to some springs, is a B4, with the channel stability rated as = good, with upper bank mass wasting = good, lower bank cutting = excellent, lower bank deposition = excellent-good, bottom size distribution & percent stable = good, scouring and deposition = excellent-good.

### Pole Creek

Pole Creek is a tributary to Clear Creek. It is rated in a Proper Functioning Condition. A BURP survey in 2001 just above the road crossing rated the stream a Rosgen "E6" stream type with a gradient of 1.8%. It listed grazing, roads and recreation as obvious human factors affecting the reach. The crossing and approach of FR077 was reconstructed and graveled in about 2000, decreasing sediment delivery to the creek. Crossings of small north-flowing tributaries to Pole Creek are in the works. When completed, they would further decrease sediment delivery from the road.

### Spring Creek

Spring Creek is a southeast flowing stream that joins with Barnes Creek to form McCoy Creek. It has been rated Functioning at Risk high. However the upper reaches of the perennial

north/east fork starting about ¼ mile above the road continuing up to the spring feeding the creek is greatly degraded, with downcutting and numerous abandoned channels. It appears to be slowly stabilizing at present, with the cause being due to the loss of beavers combined with historic intensive sheep grazing/bedding, which destabilized the channel many years ago. The lower reach of the creek is in a steep-sided "V" valley, with the road cut into the north bank. There is a slump originating on the hill above the road at one point. Previously the slumping material was merely disposed of by pushing it over the bank where it slid down the hillside to the creek below. Over time the volume of the material was sufficient to block the floodplain and part of the channel. This practice has been stopped, but part of the floodplain is still blocked.

### Taylor Creek

Taylor Creek is a north flowing tributary to Iowa Creek, joining it above Bilk Creek. It is rated as being in Properly Functioning Condition. It was not visited for this analysis.

### Wolverine Creek

Wolverine Creek is a south flowing tributary to McCoy Creek, draining the north-central portion of the basin. It has been rated in a Properly Functioning Condition, however there are some short reaches of downcut channel on two of the tributaries. They are in wedges of fine sediment (old beaver complexes?), but all of the rest of the creek reaches are stable and functioning properly.

### York Creek

York Creek is a small, very steep gradient, mostly south flowing tributary to lower McCoy Creek just west of Jensen Creek. Portions of the lower reach have been downcut up to 4' deep where they pass through a thick wedge of fine-grained material, but the upward movement of the headcut is being stopped by a small patch of willows and cottonwoods right at the road crossing. A portion of the middle reach is also downcut, but only about a foot or less. The creek has a rather high sediment load. Some of it is coming from the lower downcut reach which is expected to cut laterally and form a new floodplain once downcutting has stopped. A portion of the sediment is natural, raveling from soft, steep slopes next to the south bank of the creek in the upper reaches where the creek is dominated by a nearly impenetrable thicket of large woody riparian vegetation. A gravel pit is approved and awaiting development along the east bank of the creek, which would occupy part of the floodplain.

## 3.3 Soil Productivity & Quality

### 3.3.1 Soil Properties

#### Reference Condition

Soils change very little over long periods of time. Geology changes over much longer time frames than even soils. The thrust-faulting, folding and block faulting processes would be unchanged. Likewise, there would be no difference in the parent material or soil properties from which the present day soils weathered. The same fluvial, residual and gravitational transfer processes would still result in about the same areas of unstable slopes, and the same potentials for soil erosion, soil hydraulic conductivity and amount of inherently low productive soils. The soils susceptibility to compaction, displacement and puddling would be the same.

Weather conditions however, do vary. Historically, between 1880 and 1920, the western United States experience more arid conditions and more intense thunderstorms (John Lott, 2000). Vegetation patterns would also adjust to weather changes and could ultimately change the ph of the soil in local areas. Stream volumes could be expected to adapt to precipitation patterns by expanding or contracting, therefore changing the geomorphology of watersheds to varying degrees

#### Current Condition

Below are two tables of soil families and some of the most important properties for management considerations in the Caribou and Targhee Forest portions of the watershed. These tables include only the soils within the Forest Service boundaries and are taken from the Soil Survey of the Caribou National Forest. The second table is taken from the Targhee National Forest Ecological Unit Inventory.

**Table 3.3-1: Soil Properties for the CNF portion – McCoy Creek Watershed**

| Data | Soil Family Association & Slope | Range Productivity | Unstable | Compaction Hazard | Erosion Hazard | Hydro Group | Parent Material | Acres |
|---|---|---|---|---|---|---|---|---|
| 061 | Venable-Argic Cryaquolls-Coski Families complex 0 - 5% | h,h,mh | s,s,s | h,h,l | l,l,l | D,D,A | sedimentary | 338 |
| 081 | Red Spur-Harkness Families assoc. 10 -20% | h,l | s,ms | m,h | m,h | C,D | sedimentary | 1,821 |
| 083 | Beaverdam-Nisula-Toponce Families assoc.10 - 30% | mh,ml,h | ms,ms.ms | h,m,h | m,h,m | D,C,D | mix sed metamor | 4,372 |
| 100 | Starley-Ketchum-Farlow Families complex 15 - 50% | vl,l,mh | s,s,s | m,l,h | h,h,m | D,B,B | sedimentary | 793 |
| 156 | Whiteman-Starman-Judkins Families complex 35 - 55% | vl,vl,l | mu,mu,mu | m,l,m | m,m | D,D,B | mix sed metamorphic | 1,646 |
| 202 | Swede-Blaine-Povey Families complex 20 - 35% | m,m,mh | mu,s,s | m,m,m | m,m,m | B,B,B | mix sed metamorphic | 2,357 |
| 203 | Judkins-Redfeather-Swede Families assoc. 40 - 55% | l,l,mh | s,s,ms | m,m,m | h,h,m | B,D,B | mix sed metamorphic | 2,429 |
| 317 | Harkness-Blaine Families assoc. 15 - 30% | vl,m | u,ms | h,m | h,m | D,B | sedimentary | 7,993 |
| 330 | Beaverdam-Swede-Toponce Families complex 5 - 25% | mh,h,h | mu,ms,ms | h,m,h | m,m,m | D,B,D | sedimentary | 6,234 |
| 332 | Swede Family-Typic Cryoboralfs Fine loamy-Typic Cryoboralfs 20 - 45% | m,m,l | mu,mu,mu | m,m,m | h,h,h | B,C,D | mix sed metamorphic | 1,700 |
| 360 | Swede-Rooset-Nisula Families complex 35 - 55% | m,mh,l | mu,u,mu | m,h,m | m,m,m | B,C,C | sedimentary | 127 |
| 362 | Swede-Dranyon-Nisula Families complex 20 - 50% | m,mh,m | u,u,u | m,m,m | m,m,m | B,B,C | mix sed metamorphic | 904 |
| 370 | Cloud Peak-Farlow-Swede Families complex | l,m,mh | u,u,u | m,h,m | m,m,h | B,B,B | sedimentary | 2,517 |
| 430 | Swede-Chittum-Blaine Families complex 40 - 60% | m,l,m | u,u,u | m,m,m | m,h,m | B,D,B | mix sed metamorphic | 3,463 |
| 431 | Redfeather-Nielsen-Dranyon Families complex 45 - 70% | vl,l,mh | u,u,u | m,m,m | h,h,m | D,D,D | mix sed metamorphic | 1,666 |
| 454 | Toponce-Swede-Dranyon Families complex 25 - 50% | m,mh,mh | u,u,u | h,m,m | m,m,m | D,B,B | sedimentary | 1,102 |
| 500 | Swede-Dranyon-Toponce Families complex 20 - 35% | m,h,mh | mu,mu,u | m,m,h | m,m,m | B,B,D | sedimentary | 904 |
| 501 | Toponce-Swede-Beaverdam Families complex 35 - 50% | h,mh,mh | u,u,u | h,m,h | m,m,h | D,B,D | sedimentary | 681 |
| 502 | Dranyon-Beaverdam-Blaine Families complex 20 - 50% | h,mh,m | ms,mu,mu | m,h,m | m,h,m | D,B,D | sedimentary | 861 |
| 503 | Swede-Mikesell-Nisula Families complex 35 - 55% | mh,l,m | mu,u,u | m,h,m | m,h,m | B,C,C | sedimentary | 1,954 |
| 602 | Judkins-Farlow Families assoc.35 - 55% | l,m | mu,mu | m,h | h,m | B,B | sedimentary | 2,452 |
| 603 | Ericson-Farlow-Swede Families complex 50 - 60% | l,m,m | u,u,u | m,h,m | m,m,m | C,B,B | mix sed metamorphic | 1,897 |
| 608 | Swede-Blaine-Starley Families complex 30 - 60% | m,m,vl | mu,mu,mu | m,m,m | m,m,h | B,B,D | mix sed metamorphic | 2,079 |
| 610 | Beaverdam-Toponce-Ericson Families complex 35 - 55% | mh,mh,l | u,u,mu | h,h,m | h,m,m | D,D,C | sedimentary | 931 |
| 901 | Beaverdam-Blaine-Nisula Families complex 30 - 50% | mh,m,l | mu,mu,mu | h,m,m | h,m,m | D,B,C | sedimentary | 4,368 |
| 910 | Harkness-Beaverdam-Rooset Families complex 35 - 60% | m,m,m | u,u,u | h,h,h | h,h,h | D,D,C | sedimentary | 1,789 |
| | | | | | | | Total | 57,377 |

Hazard ratings: h=high m=moderate l=low Color codes: orange=high hazard yellow=slightly lower hazard
"hmm" = Only one of the soil families has a high rating and two families rate moderate (<50% area has high hazard potential)
"hhm" = Two soil families have a high risk rating and one family rates moderate (50 – 75% area has high hazard potential)
"hhh" = All three soil families have a high risk rating (over 75% area has a high hazard potential)

**Table 3.3-2: Soil Properties for the Targhee Ecologic Units**

| Soil # | Soil Series | Plant Association | Slope % | Erosion Hazard | MW Hazard | T Value | Hydro Group | Acres |
|---|---|---|---|---|---|---|---|---|
| **1112** | Huckridge (60%) Paloborolls (20%) | ABLA/VAGL,PAMY/PSME/0SCH | 4 - 35 | h,m | u | 5,5 | B,B | 34 |
| **1170** | Yodal (80%) | Tall Forb | 4 - 35 | l | u | 5 | B | 344 |
| **1175** | Yodal (80%) | Tall Forb | 35 - 60 | l | u | 5 | B | 237 |
| **1219** | Lagall (40%) Povey (25%) Fritz (15%) | ABLA/PHMA5,PSME/ARTRV | 35 - 70 | l,m,m | u | | B,B,B | 1,053 |
| **1303** | Edgway (30%) Jumpstart 25%) Tophat (25%) | ABLA/OSCH,PAMY, ABLA/THOC, | 15 -50 | m,m,l | u | 5,5,5 | B,C,C | 8,118 |
| **1316** | Koffgo (30%), Rock Outcrop (15%), | ABLA/THOC | 40 - 70 | m, - | u | 4, | C, -, B | 732 |
| **1332** | Quirt (80%) | ARTRP4/FEID | 15 - 35 | h | | 5 | D | 575 |
| **1333** | Quirt (50%), Tetonia (30%) | ARTRP4/FEID,ARTRP4/SYOR2/FEID | 4 - 15 | h,m | | 5,5 | D,B | 329 |
| **1970** | Cryoboralfs (40%), Cryochrepts (40%) | ABLA, PSME/BERE,SYOR2 | 4 - 15 | h,l | | 3,3 | D,C | 297 |
| **2606** | Cryaqualls (80%) | SALIX/GRAMINOIRD | 0 - 6 | m | | 3,3 | D,D | 290 |
| | | | | | | | **Total** | **12,009** |

Hazard ratings: h=high m=moderate l=low u=unstable soils
"hmm" = Only one of the soil families has a high rating and two families rate moderate (<50% area has high hazard potential)
"hhm" = Two soil families have a high risk rating and one family rates moderate (50 – 75% area has high hazard potential)
"hhh" = All three soil families have a high risk rating (over 75% area has a high hazard potential)

Both the Caribou and the Targhee National Forest soil information have been merged together in this watershed analysis to produce the maps used to show potential soil hazards to management activities. This is necessary because a portion of the analysis is on the Targhee side of the Forest. The two soil surveys were done separately, before the Forest Service combined to create the Caribou-Targhee National Forest.

### Soil Erosion Potential and Ground Cover

Erosional processes have influenced all of the landforms in the watershed area. The Wayan, Twin Creeks, Garnett and Preuss Formations, along with quaternary alluvium and colluvium, all have high natural erosion potential (USDA Forest Service, Caribou NF, 1997). Erosion is also a factor of slope and soil type. Many of the soils in the McCoy watershed have evolved from weathered shale, limestone, mudstone and siltstone (Digital Idaho Geology Map). These are fine-grained rocks that tend to weather into soils high in clays and silts, which are easily eroded when the protective ground cover is removed (USDA. 1995).

Ground cover is an indicator for soil erosion potential. Ground cover can also include rock fragments (larger than ¾ inch), and plant litter (leaf or duff). Canopy cover also helps shield the soil beneath from the forces of raindrop impact and reduces or eliminates erosion. Potential ground cover for the Caribou – Targhee National Forest depends on the natural range of variability by cover type (USDA Forest Service 1997).

**Figure 3.3-1: 65% Groundcover at the mouth of Fish Creek**

When ground cover is between 60 and 70 percent, the erosion hazard is minimal. A decrease in ground cover to 40% substantially increases erosion rates (Noble 1963).

**Table 3.3-3: Groundcover estimates based on the Natural Range of Variability (Soda Springs – 1997)**

| Covertypes | Minimum | Maximum | Average |
|---|---|---|---|
| Sagebrush | 45% | 92% | 72% |
| Aspen | 63% | 98% | 86% |
| Conifer | 68% | 99% | 89% |
| Tall Forbs | 33% | 78% | 53% |
| Big Tooth Maple | 62% | 94% | 82% |
| Mountain Brush | 48% | 93% | 75% |

### Trend

Soil properties usually change very slowly over long periods of time with out disturbance. Natural disturbances include fire, landslide or mass soil movement, as we; as natural rates of erosion. Native American impact on the disturbance regime was basically the use of fire.

This has changed dramatically with the influx of European emigration in the late 1800's. Their arrival marked the beginning of various land management activities. Most land management actives have a negative impact on soils. A comparison of current conditions with the starting the point of 1800, would conclude that trend would be downward for the soils. This would not reflect

the improvements in management practices that have taken place since the Forest Service became the land manager of the area within the watershed analysis area in 1907. This marks the beginning of an organized attempt to manage resource values for future use (Heidi Heyrend-Range Specialist Report, 2002). Before the Forest Service could put into place some management directives in 1913, soil damage had already reached some severe reduction of productivity (Al Winward-Regional Forest Ecologist, personal communication, 2002).

According to the Forest Plan, 65% to 70% ground cover is required to maintain soil productivity. As in previous years, the 2000 monitoring has recorded an average if 85% to 90% ground cover on sites (Caribou-Targhee National Forest 2001). Good vegetation cover is an indicator in range soil productivity. The trend is improving but in some areas, projects are still needed to restore areas with less than adequate ground cover, such as sheep bedding grounds, livestock driveways, and areas of decadent sagebrush on mountain sideslopes on erosion prone soils

### Inherent Low Soil Productivity

Areas of inherently low soil productivity exist throughout the watershed. Certain soil properties are responsible for this lack of vegetation regeneration, such as low available water-holding capacity (AWC), shallow rocky soils, south and west facing aspects, and shallow ridgelines. A little over a quarter of the land base in the McCoy watershed has low range soil productivity rating (28%). Good management decisions and careful monitoring are especially important in these areas as regeneration or restoration is likely to be compromised by limiting soil properties.

#### Trend

For the most part, inherently low productivity is more a function of soil properties than human induced activities. Trend is static.

### Slope Instability or Mass Wasting Potential

Due to the thrust faulting, folding and other faulting of weak soft sedimentary parent materials, approximately 80% the watershed (55.820 ac.) has unstable or marginally unstable mass stability rating. These areas have a potential to be subject to mass wasting and landslides. Formations that have unstable soils are the same formations that have a high erosion rate and are associated with slope instability (Wayan, Twin Creeks, Garnett, Preuss Formations and quaternary alluvium and colluvium). Visual indictors are hummocky side slopes, with pistol-grip tree bases, and evidence of old landslides or debris flows. Soils in some areas have a high shrink-swell clay component.

Information from the North End Sheep AMP (John Lott – Specialist Report 2003) states landslides are common in the analysis area (Olsen et al. 1970). In the past ten years, several landslides have been documented in the head of Spring Creek, McCoy Creek and Barns Creek and in the north portion of Jensen Creek (Foos, 2003). Most of the recent landslides have occurred under natural conditions during the springtime when soils were saturated and shear strength weakened. Although sheep trailing has occurred on some of these areas there has been no documented evidence that sheep grazing has caused landslides (Landslide Monitoring Report 1995). Some of the landslides in McCoy Creek are a result of the road prism crossing unstable landforms.

**Figure 3.3-2: Landslide activity southwest of the Caribou Guard Station**

Numerous small slides were visible from over-steepened slopes near drainages all along portions of McCoy Creek. This is also applicable to most of the smaller creeks that are tributaries to McCoy. Inland West Water Initiative data shows that lands slides are a major factor in the watershed vulnerability category in Barnes, Box Canyon, City, Comb, Fish, Keenan and Spring Creek. Water saturation is the probable factor in most failures. These areas have natural occurring slides and are not necessarily related to management activities.

### Trend

Natural landslides will continue to occur on these areas when climatic conditions cause the surface soil mantle to become saturated with water. When saturated, soils can over come the factors of gravity and surface friction and landslides and debris flows are initiated. While the inherent geomorphic instabilities of geology, land type associations and soils still have the same properties as in the 1800's, human management activities have had impacts.

In Caribou Mountain area, placer mining had a substantial effect on accelerating soil instability. In the last 15 to 20 years, the increased use of ATV's and other off road vehicles potentially posses a threat for soil movement. However, since active mining has ceased in the area, except for gold panning, the trend is slightly upward, toward improvement.

## Compaction

Compaction results in a decrease of soil porosity and an increase in soil strength (resistance to penetration). Compaction is detrimental when it limits aeration, root penetration, and water infiltration, and plant growth reduced. Indicators can be soil structure changes (massive or platy

structure) and an increase in soil strength, measured by resistance to a soil shove, penetrometer, or having higher bulk density readings ($g/cm^3$) when compared to a sample taken in the undisturbed area. Another indicator for detrimental compaction is to compare the annual decrease in tree growth in forested areas or a decrease in plant vigor in range vegetation. (USDA, 2003. USDA, 2001).

In transects taken in several allotments (Caribou Basin, Della Basin, Fish Creek and Iowa Creek) areas of compacted soils were detected using a soil shovel to gage the relative pressure required to penetrate the soil surface. Small surface samples were taken to exam the soil structure. Since the samples were not taken with a known undisturbed reference, and bulk densities were not obtained, quantitative data is not available for a meaningful comparison. However, pockets of increased resistance to the shovel averaged about 10–15% of the allotment. A logical reason, other than compaction, could be that inclusions of soils with higher clay content were responsible for the increase. Only about 5% of actual surface layer had the typical platy structure associated with severe compaction. Most were affected in the first one or two inches and would likely be mitigated by freeze-thaw processes. (Casey Foos – field notes 2003, Krueger et al. 2002).

Compaction is associated with livestock act ivies, such as, salting and bedding areas, water sources (tanks or ponds), holding corrals and trailing. Logging, wood cutting and road building also have the potential to compact soils. Recreation activity is another source of compaction from dispersed camping and off road vehicle use.

#### Trend

With the increase in human activity in the area for recreation uses (camping, hunting and off road vehicle and ATV use), the potential for an increase in compaction is high and the trend downward.

### Soil Displacement Potential

Soil displacement is the movement of soil from one place to another by erosive or mechanical forces. It is considered detrimental when an area one meter by one meter or larger, has lost either 5 cm or ½ of the humus enriched topsoil, whichever is less. Detrimental soil loss is considered to occur when topsoil loss exceeds the soil loss tolerance value for the specific soil type. Indicators for loss of organic matter are the loss of the humus-rich surface soil (Task Team Edits, FHS 2509.18. 2002). Soil displacement potentials are not listed in the soil survey and no data exists to identify them. displacement most typically occurs with heavy machine operations where the topsoil is totally or partially removed. Windthrow is a natural cause that would result in soil displacement.

#### Trend

See Timber Harvesting and Grazing sections under the management activity heading below.

## 3.3.2 Management Activities

### Reference Condition

#### History

Information for the early history of the McCoy watershed area is taken from *An Early History of the Caribou Area*, compiled by the US Forest Service by Roy H. Daniel, the then District Ranger in Soda Springs, Idaho, and presented to Bernice Leavitt. The date is unknown but the information is available at the Montpelier District Office, Montpelier, ID.

The first white men to enter the area that is now the Caribou-National Forest, was a subgroup of the W.P. Hunt party. Five men formed a small exploratory unit that explored the Blackfoot River, Portneuf River, Bear River, Salt River, Grey's Lake, Bear Lake and other parts of the Caribou area. Game was plentiful and by 1819 the Northwest Fur Company sent a trapping expedition to this area to exploit the large beaver populations. By 1824 the beaver harvest was luring men from all over the continent.

The big and small game animals of all species, and fur bearing mammals were the most important resources of the intermountain area both to the white men and the Indians. These animals meant life itself; food, clothing and a basis for industry. Conflict became inevitable between the two groups as the flood of white entrepreneurs decimated the animal population. By 1845, the buffalo were literally slaughtered in the Caribou area. By the 1870's deer, elk, antelope and mountain sheep became scarce and continued to diminish in number until 1930. Mountain sheep and antelope, along with the buffalo, were completely eliminated from the Caribou area. The last grizzly bear was seen in 1920; wolverine was unreported after 1925 and wolves had been practically eliminated since 1930.

#### Emigrant Settlement and Transportation Development

To supply large number of trappers, Fort Hall was built in 1834 on the east shore of the Snake River. In 1840, the first light wagons left Fort Hall and the wagon trail to the west to Fort Walla Walla on the Columbia River. By 1943, the Oregon Trail emigration started to attract thousands of people from the east, and by 1852 had crested to 15,000 pioneers going west. In l857, the Lander trail was built as a southern short cut that went though the present Caribou Forest. Segments of this route continue to this day as part of the Forest Service road system. Roads have steadily increased in the Caribou-Targhee National Forest. The McCoy Creek watershed has a open road density today of 0.5 miles/miles[2.]

#### Grazing

The first records of observations of vegetative ground cover were described as "abundant bunch grasses" in 1832. Remarks made by a guidebook for emigrants in 1858 mentions the abundance of good forage along the Lander's Trail and recommend this route for stock use.

The first extensive use of forage was by cattle and horses. Many thousands of them trailed through the Caribou area over the old Oregon Trail starting in 1836. The larger range cattle outfits out of Nevada and Utah entered the area around 1868. By 1875 there were large numbers of cattle. Since early cattle ranches had very little hay stored for the winter, 85% of the cattle starved during the winters of 1888-1889.

Sheep first appear in the area in 1883, and by 1893 they also had reached large numbers. In 1905 sheep had become overstocked, with an estimated number of 150,000 to 200,000 head in the Soda Springs area alone. In 1912, an association of sheep men leased these lands from the state and put them under a form of regulated grazing. At the time of the creation of the Caribou Forest, most of the sheep ranchers resented the efforts of the newly created Forest Service to regulate any aspect of grazing. Two years of drought in 1888 and 1889 left the sheep population diminished somewhat. Personal records from 1901 from ranchers tell of very poor forage and range conditions over much of the range over a period of years, turned area intro a dust bowl. Erosion was evident and widespread.

Recovery was very slow, as valuable topsoil had disappeared. By 1926, conditions on the Forest Service lands had started to make a noticeable improvement under allotment management regulations that the government imposed. Since this time the trend has steadily improved in the area. Data was compared for ground cover measurements, taken in 2002, with ground cover from transects taken in 1960 on sagebrush/mountain shrub habitat types. The data shows an increase in ground cover of about 10 percent over conditions found in the 1960s (John Lott- Forest Soil Specialist Field Notes, 2002). This upward trend may be attributed to better management and reduced livestock numbers.

### Current Condition

Most areas in the McCoy watershed analysis area have and will continue to have livestock grazing (sheep allotments with the exception of the Caribou Basin Cattle and Horse Allotment), timber harvesing, gold panning and recreational uses such camping, hiking, horseback riding and off-road vehicle use (in designated areas). Fire and forest health issues also include thinning projects and removal of diseased and dying trees (Barnes Creek Burn). Past mining activity is evident in the Caribou Mountain area and mining claims are still scattered in the Barnes Creek area. No active mines are currently in the watershed, however gold panning is still prevalent, especially in Barnes Creek.

#### Past Logging

Data from 1971 to 1991 shows 997 acres of timber sale units have been harvested from the McCoy watershed (Doug Heyrend - Soda Springs Forestry). These logging sites where not inspected for detrimental soil disturbance during the data collection period for this analysis. The amount of detrimental soil disturbance for compaction, displacement, or erosion is unknown. However, three timber sales were monitored in 2004. Bulk density samples where taken to determine if growth limiting threshold for compaction were present, and transects were used to estimate the amount of ground disturbance on the harvested units. Results of this monitoring indicate that detrimental soil disturbance from logging is between 7 to 8% or less (Swan Flat, Casey Foos – 2004, Willow Creek, Cheatbeck Basin; John Lott, 2004). From conversations with Foresters Doug Heyrend and Mel Moe at the Soda Springs District (October and November 2003), some logging units in the northern portion of Pole Creek and Spring Creek (1990-1991 Brockman Timber Sale) have not been very successful in the regeneration of conifer species.

### Trend

Timber harvests in the past have not covered a large area in the watershed. Forest wide, most timber sales (70%) have exceeded the guidelines of 15% detrimental soil compaction. However, 50% of the non-harvested samples also exceed soil compaction standards. The cause could be due to the extent of soil damage at the beginning of the 1900's because of uncontrolled livestock populations. Post-harvest down woody debris standards are exceeded on 85% of the timber sales checked (Caribou -Targhee National Forest 2001). This represents an upward trend for soil productivity in the future. When balanced with compaction, the general soil trend is stable or slightly improved.

## Mining

Present mining includes three very small operations in the Caribou Basin area. Combined these operations disturb less than 5 acres per year. Recreational gold panning has become more popular in recent years.

The old mining towns of Caribou City, on Bilk Creek, and Keenan, on Keenan and Barnes Creek were the sites of large placer mine operations. Both cities were deserted after a few years but mining has continued sporadically to the present (Roads, Rocks, Rails & Trails). This type of mining has left a lasting mark on many of the streams in the area, changing their geomorphic integrity. These would include Barnes, Bilk, Camp, City, Iowa, Keenan and McCoy Creek (Inland West Water Initiative, 1998). Approximately 1,258 acres of disturbance in the form of soil-less rock piles left over from large hydraulic water cannons and dredging still exists (Field notes: Casey Foos,2002, Darrel Vandeweg , Forest Geologist ).

### Trends

The placer mining operations have long ceased. There are no open pit mines. While the alteration of stream morphology is still present today, compromising the properly function condition, the soils that were dislodged and washed away by water canons are permanently removed from the site. The soil condition trend is stable or slightly improving.

**Figure 3.3-3: Upland sheep allotment north of Fish Creek**

## Livestock Grazing

Livestock grazing is the most active current management activity in the McCoy watershed. Sheep, with the exception of the Caribou Basin cattle and horse allotment, currently graze allotments in the analysis area. A data gap exists on exactly where and to what extent sheep have contributed to soil disturbance caused by time spent in shaded riparian and forested areas during the day. Data is also lacking on

cattle trailing in the Caribou Basin Allotment.

Ground cover transect measurements were taken by John Lott, Forest Soil Scientist for the Caribou Targhee, in 2002 for the North End Sheep Allotment Revision. His analysis indicates an average ground cover above 60 percent in the allotments, with the exception of heavy livestock impacted areas such as the sheep driveway from Spring Creek to the Caribou Basin and livestock holding corrals. Transects where taken in the summer of 2003 in both the sheep allotments and the Caribou Basin Cattle and Horse Allotment (not covered in the North End Sheep Allotment EIS) and indicated an overall average upland range ground cover of 65%, with 75%-80% in most riparian areas, mountain brush and aspen areas (Field Notes, Foos, Soil Scientist). In some places, while ground cover was present, the grasses where grazed to 1- 2 inches. It is probable that a portion of these areas had Poa Bulbosa, an invasive early bluegrass that is naturally low growing. Throughout the watershed there are inclusions of inherently low productive where the soil is very shallow and or rocky or have areas dominated by tarweed or wyethia from past historic disturbances. Spring Creek, Barnes Creek and Pole Creek Allotments have such areas with less than the 60% cover (Lott -2002, Foos, 2003).

**Figure 3.3-4: Camp Creek, Cattle Allotment north of McCoy Creek Road**

Overgrazing and bank trampling along streams by cattle or sheep can compact or puddle the soil and cause the banks to slough off into the stream and down cut. This in turn, causes increased sediment sources and degradation of water quality. The Inland West Water Initiative data indicates bank damage as a water quality element in almost all the streams in the area. In Bilk, Box Canyon, Com, Fish, Iowa, Kirk, Lake, Hell and Camp Creek, bank damage due to livestock is the primary

**Figure 3.3-5: Camp Creek north of McCoy Creek Road in cattle allotment**

factor in water quality. Camp Creek had considerable down cutting and areas with bare soil on banks up to the point of the last fences.

### Trend

In livestock allotments, animals need to be moved from an area when established grazing protocols have been met to prevent over utilization of vegetation. If the ground cover is lacking, the potential for erosion is increased. Compaction is most likely to happen in the early spring when soil moisture is high (Scholl, 1989). Changing the timing of when livestock is permitted into the allotments and then required to be removed, has helped mitigate some of these soil risks. The decrease of livestock from their high in 1907 lessened the potential for soil damage by compaction and erosion. Soil displacement was also greatly reduced by this decrease. The trend is improving for the upland soils (Winward – personal communication – 2002).

## Roads

Un-surfaced roads are a major source of soil erosion, both in the cut and fill portions and the road prism itself (Burroughs and King 1989). Presently, the watershed analysis area has an approximate total of 169 miles of roads and trials, including motorized and non-motorized, open forest service system roads, closed road prisms from timber harvest and roads that have been obliterated. In addition, 28 miles of open roads and motorized trails are within 300 feet of a perennial stream or 150 ft. within intermittent stream or Riparian Habitat Conservation Area (RHCA). The potential for sediment delivery to streams is high in these areas.

### Trend

Roads are a major source of soil erosion. When a stream is in close proximity to a road, the risk of sediment delivery is high. The analysis area has approximately 169 miles of closed/open roads and trails, much of the road prisms are in a non- surfaced condition.

Erosion will continue, as well as sediment delivery, when the roads are in close proximity to a stream. Many roads and trails are near streams and maintenance is not always optimal. Many of the soils have high clay contents. Increased Forest use in the McCoy Watershed is likely, creating increased erosion and rutting. The trend is downward for soil erosion from roads.

**Figure 3.3-6: Side slope and ridges that have inherently low soil productivity**

## Soil Disturbance and Soil Productivity

The Desire Future Conditions for soils in the Forest Plan is to sustain soil productivity by maintaining protective ground cover and both fine and woody residues on the soil surface and to supply and incorporate organic matter for maintenance of physical, chemical and biological processes necessary for nutrient recycling. It also stresses the need to maintain hydrologic functions. Long-term soil productivity is sustained by limiting detrimental soil disturbances, which includes compaction, displacement, puddling, excessive erosion and severely burned soils (USDA. 2003). The total amount of detrimentally disturbed soil cannot exceed the limit stated in the Caribou National Forest Standard and guidelines of 15% of an activity level.

The Revised Forest Plan (USDA. 2003) states that adequate ground cover should be maintained to prevent erosion and sustain soil productivity. By definition it includes rock fragments (larger than ¾ inch), and plant litter (leaf or duff) as well as plants. Research results indicate that in the Intermountain West, a minimum of 60 -70 percent ground cover is needed to effectively control surface runoff of water and erosion by the occasional torrential summer rainstorms (Noble, 1963).

Adequate vegetation cover is an important component to assess soil loss and productivity, because it not only protects the soil surface, but also incorporates organic matter into the soil, both below ground root mass and above ground litter (Mapfumo et al. 2002, USDA NRCS 2001). This is evidenced by the rich dark organic mollic epipedon of range soils within the project area. Productive soils are formed in grassland ecology and contain a range of 1 - 5% organic matter (Buol, Hole and McCracken. 1989). Soils that lose this thick mollic layer, through detrimental ground disturbances or erosion, lose the ability to maintain a soil environment that supports large soil microbial populations that sustain high nutrient cycling and vigorous plant growth.. Soil loss tolerances (T values) are established to make predictions on how much topsoil can be lost yearly and still maintain soil productivity (USDA, NRCS (SCS), 1994, USDA, NRCS. 1996). Generally, the greater the soil depth, the more soil loss can be tolerated before vegetation starts to loss vigor.

Some areas in the watershed analysis have had varying amounts topsoil loss from historic livestock overgrazing. Recovery is slow because it takes approximately 100 to 500 years for the organic matter to incorporate and to build to the depth of 9 inches or more that make up a mollic soil (Jensen 1984).

While it was difficult to know the exact total amount of disturbed acres due to the scope of the project area and data gaps (landslide areas, sheep and cattle day time loafing areas, total extent livestock trailing patterns and impacts to soil from dispersed camping), the known disturbance due to management totaled <1% of the total watershed area.

**Table 3.3-4: Summary Table of McCoy Soil Properties and Disturbances**

| Soil Properties | Acres | % of Watershed |
|---|---|---|
| High Erosion Hazard (>75% of LT) | 4,063 | 6 |
| High Erosion Hazard (50 – 75% of LT) | 19,460 | 28 |
| High Erosion Hazard (35 – 50%of LT) | 21,226 | 31 |
| Unstable/Marginally Unstable Soils | 58,142 | 84 |
| Inherent Low Range Soil Productivity (>75% of LT)[1] | 1646 | 2.9 |
| Inherent Low Range Soil Productivity (50 -75% of LT)[1] | 17,154 | 25 |
| Inherent Low Range Soil Productivity (35 -50% of LT)[1] | 21,511 | 31 |
| Compaction Hazard (50 -75% of LT) | 24,484 | 35 |
| Road Sediment Delivery Potential[2] | 47 | <1 |
| **Soil Disturbance** | | |
| Non-System Roads & Trails | 59 | 0.08% |
| Past Harvest 1971-91 | 70 | 0.10% |
| Past Wildfires 1974-2003 | 27 | 0.04% |
| Range Improvements | 51 | 0.07% |
| Sheep Driveway | 4 | 0.01% |
| Wyethia & Tarweed Monocultures | 199 | 0.29% |
| Exploration Pad Sites | 2 | 0.00% |
| Recreation | 19 | 0.03% |
| **Total Acres of Disturbance** | **431** | 0.62% |
| **% of Watershed (69,519 acres)** | **<1%** | |

[1] No information in Soil Survey on Compaction Hazard Ratings or Inherently Low Range Soil Productivity Ratings for Targhee portion of the Watershed Analysis
[2] Sediment delivery by open roads & motorized trails within AIZs
[3] Monitoring indicates soil disturbance likely to be present from harvest is 7%
[4] Monitoring indicates soil disturbance likely to be present from fires is 10%.
***** LT=soil family polygon area

**Figure 3.3-7: Soil Types within MCW**

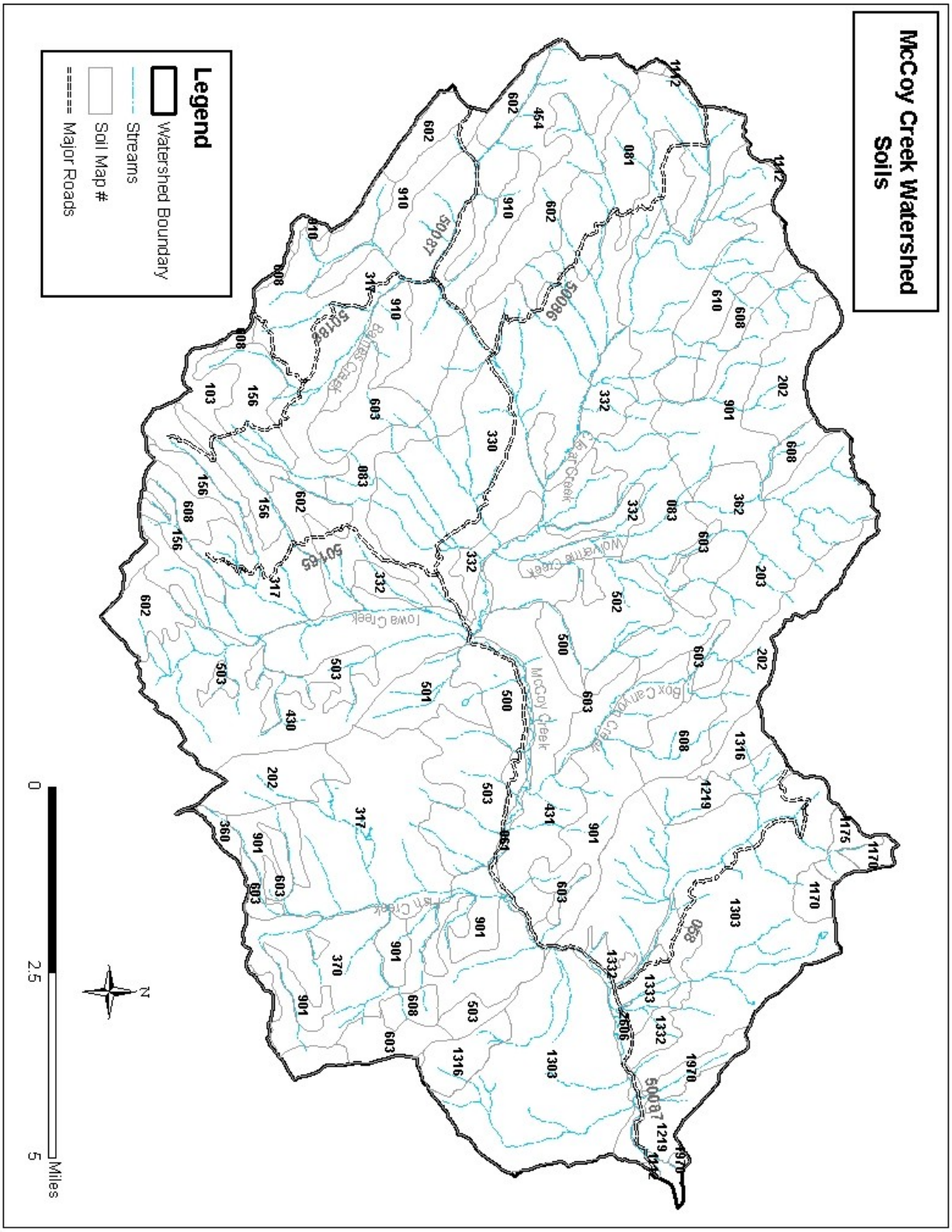


**Figure 3.3-8: Soil Risk Factors within MCW**

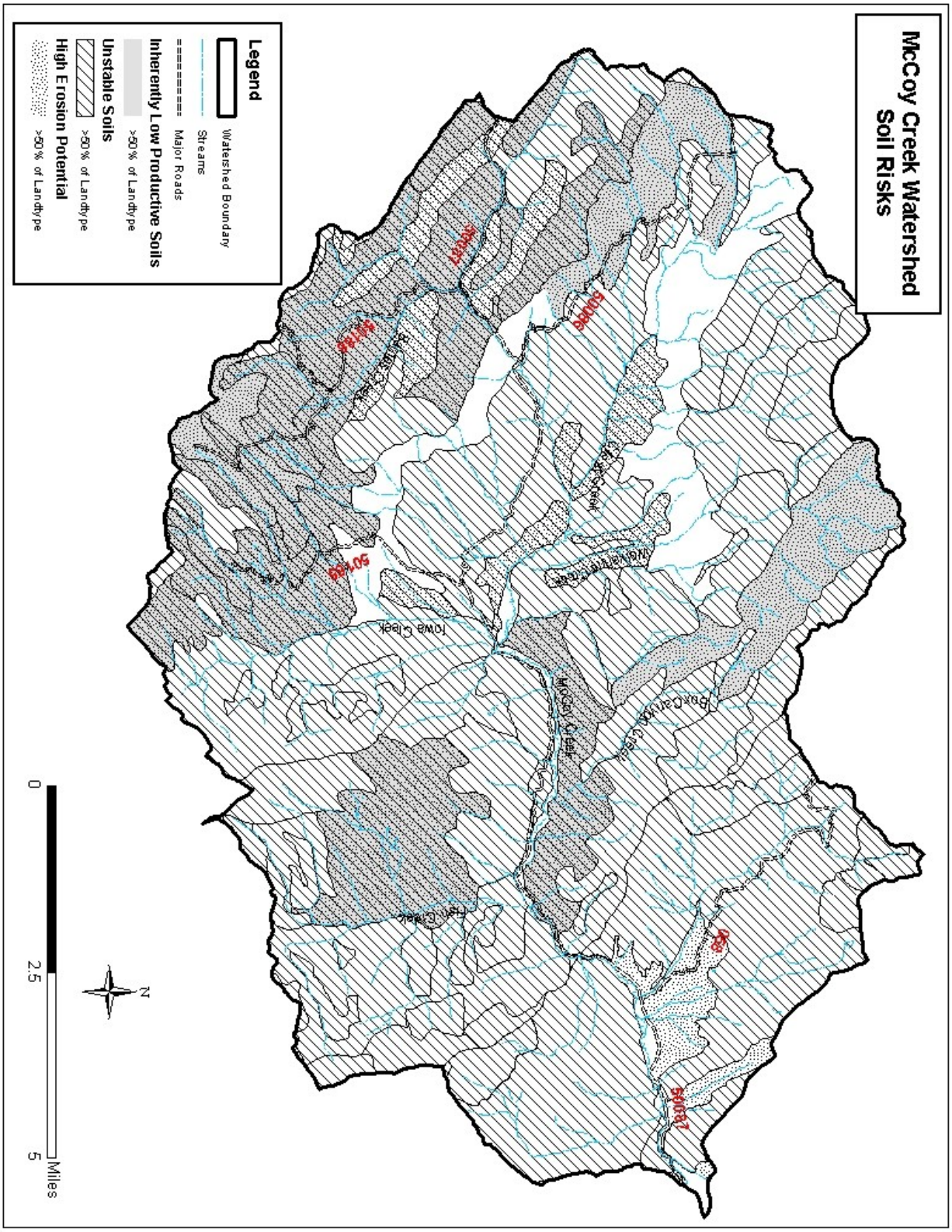
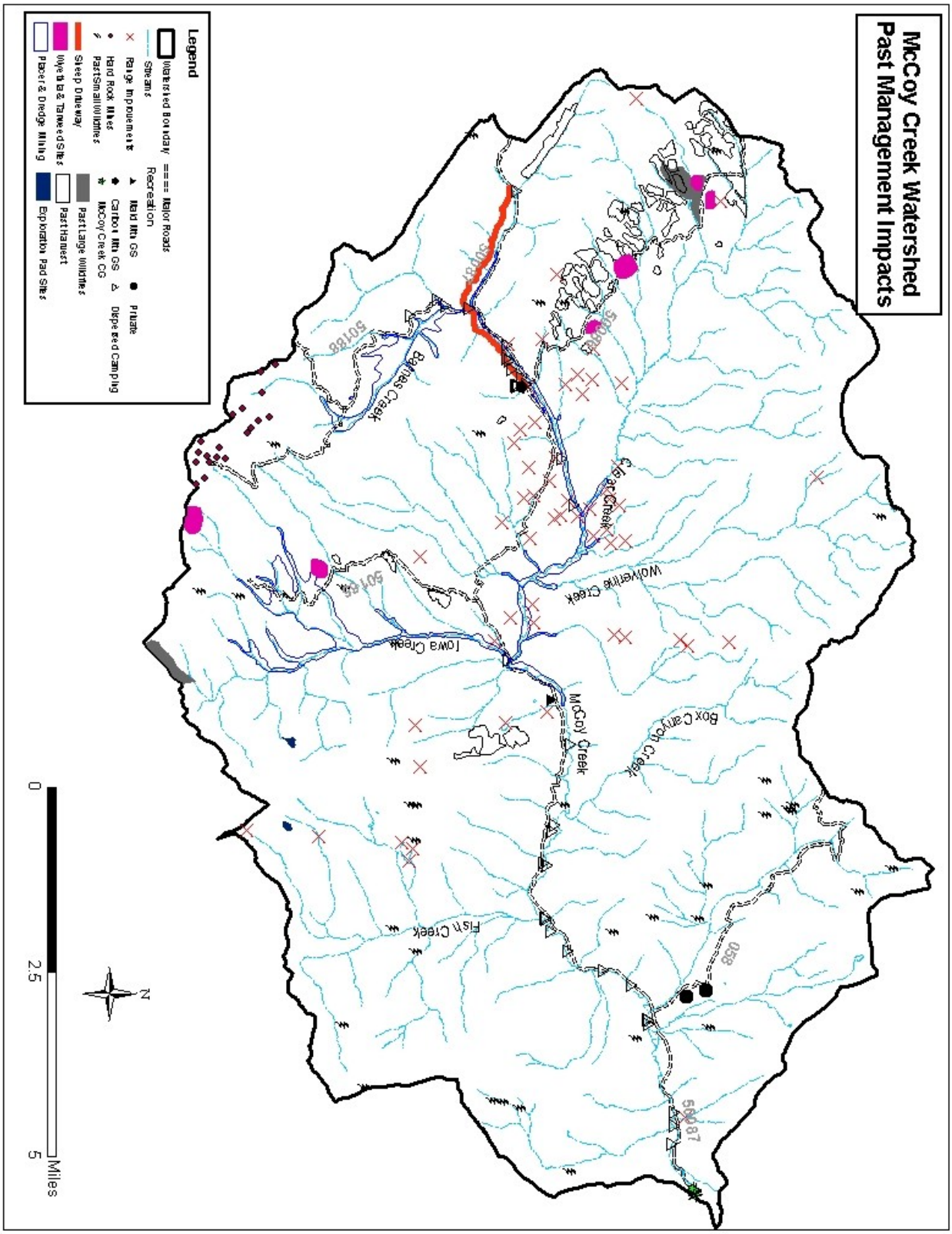


**Figure 3.3-9: Past Management Impacts within MCW**



## 3.4 Native Fish Habitat

Reference conditions and trends was not developed for each of the indicators, however an overall reference condition and trend for fish habitat is provided below.

**Issue indicators:**
- **Population and Presence**
- **Channel & Habitat Disturbances**
- **Barriers**
- **Non Native Species and Disease**

### Reference Condition

Surprisingly, very little fisheries reference data exists for McCoy Creek and its tributaries. It is known that prior to construction of Palisades Reservoir in 1957, a series of cascades or falls near the mouth of McCoy Creek may have limited or excluded upstream fish migration (Schill and Mende 1991). In most years now, reservoir water levels now inundate the cascades and allow fish access to streams of the McCoy Creek Watershed.

In 1968, Idaho Department of Fish and Game used an electroshocker to sample McCoy Creek in a 0.3 mile reach near Caribou Guard Station and in a 0.2 mile reach near the mouth of Wolverine Creek. They captured Yellowstone cutthroat trout, suckers, and sculpin. In the beginning of September, they documented a 10 degrees F difference in water temperatures between their two sample sites. In a letter to Freedom District Ranger Mike Hanson summarizing their data, IDFG Regional Fisheries Management Biologist Paul Jeppson suggested McCoy Creek could possibly be partially restored. However, he thought there would be some benefit to leaving it "showcase the inadequacy of present mining laws."

Although some safeguards exist today, past mining practices were devastating to some of the streams in the analysis area. Dredges turned over the bottom of some streams, depositing substrate in piles on floodplains. Hydraulic mining was also used, causing extreme erosion and the deposition of fine sediment into nearby streams. These practices resulted in shallow streams with high amounts of fine sediment and warm temperatures. The resulting lack of complexity and vegetated floodplains facilitated fast, unrestrained runoff events, further impacting riparian and aquatic habitat.

In 1986, Caribou Forest Fisheries Biologist Tim Burton prepared an Aquatic Habitat Plan suggesting the re-introduction of beaver into Iowa Creek to improve trout habitat. Burton expressed concern regarding the blowout of a beaver dam complex in Iowa Creek that occurred in the early 1970's. He documented high populations of cutthroat trout in the complex prior to it blowing out. The disappearance of the beaver and their dams severely impacted habitat quality in Iowa Creek. He suggested the reintroduction of beaver in the watershed would improve deteriorating habitat (Burton 1986).

The McCoy Watershed is near an interface on the Snake River System between the fine-spotted and large-spotted varieties of Yellowstone cutthroat trout. These varieties are considered by most taxonomists to be the same subspecies because of a lack of geographic isolation and inability to

separate the varieties using meristic characters and current genetic analysis techniques. Both fine-spotted and large-spotted varieties of Yellowstone cutthroat trout occur in the analysis area Within the McCoy Creek Watershed Analysis Area, Yellowstone cutthroat trout populations occur in Barnes, Bilk, Box Canyon, City, Clear, Fish, Iowa, Keenan, Jensen, Miners Delight, McCoy, Pole, and Wolverine creeks. Fish have not been found in Anderson Gulch, Lake, and York creeks. Additional populations may exist in some unsurveyed perennial streams in the analysis area, including Camp Creek, Comb Creek, Hell Creek, Kirk Creek, Spring Creek, and some unnamed streams.

## 3.4.1 Population and Presence

### Current Condition

Within the McCoy Creek Watershed Analysis Area, Yellowstone cutthroat trout populations occur in Barnes, Bilk, Box Canyon, City, Clear, Fish, Iowa, Keenan, Jensen, Miners Delight, McCoy, Pole, and Wolverine creeks. Fish have not been found in Anderson Gulch, Lake, and York creeks. Additional populations may exist in some unsurveyed perennial streams in the analysis area, including Camp Creek, Comb Creek, Hell Creek, Kirk Creek, Spring Creek, and some unnamed streams.

During recent surveys by the Forest, the following additional fish species were found in analysis area streams: mottled sculpin (*cottus bairdi*), Piute sculpin (*c. beldingi*), speckled dace (*Rhinicthys osculus*), longnose dace (*R. cataractae*), redside shiner (*Richardsonius balteatus*), Mountain sucker (*Catostomus platyrhynchus*), and Utah sucker (*C. ardens*). In the late 1980s, the Idaho Department of Fish and Game (IDFG) found mountain whitefish (*Prosopium williamsoni*) and brown trout (*Salmo trutta*) in lower McCoy Creek in the Palisades Ranger District (Schill and Mende 1991). Anglers occasionally catch lake trout (*Salvelinus namaycush*) in lower McCoy Creek (Bill Janowsky, USFS, personal communication). All of the species mentioned above are native to the region except brown and lake trout. A list of the fish species present in each stream known to be fish-bearing is given in Table 3.4-1.

Palisades Reservoir at the base of the analysis area presently contains YCT, kokanee (*O. nerka*), lake trout, brown trout, mountain whitefish, Utah chub (*Gila atraria*), Utah sucker, bluehead sucker (*C. discobolus*), mottled sculpin, Paiute sculpin, speckled dace, longnose dace, and redside shiner (Jim Fredericks, IDFG, personal communication). Of these species, only YCT are currently stocked. These fine-spotted cutthroat trout come from the Jackson National Fish Hatchery and are considered genetically appropriate for stocking in the reservoir.

The YCT in the MCW exhibit fluvial and adfluvial life history patterns. Fluvial YCT seasonally migrate from McCoy Creek to its tributaries to spawn, then return to McCoy Creek. Adfluvial YCT migrate from Palisades Reservoir to McCoy Creek and its tributaries to spawn, then return to Palisades Reservoir. Utah suckers exhibit the same adfluvial life history pattern. The other fish species in the watershed are less migratory and may spend their entire life in a single stream.

**Table 3.4-1: Fish species documented in individual streams of the McCoy Creek Watershed.**

| Stream name | Fish species | Source |
|---|---|---|
| Barnes Creek | YCT, SCU | IDFG (1986), USFS (2003) |
| Bilk Creek | YCT | USFS (2003) |
| Box Canyon Creek | YCT, SCU | USFS (2003) |
| City Creek | YCT | USFS (2003) |
| Clear Creek | YCT, SPD, LND, MSC, PSC, UTS, RSS | IDFG (1986), USFS (2000) |
| Fish Creek | YCT, SCU | IDFG (1986), USFS (2000) |
| Iowa Creek | YCT | IDFG (1986) |
| Jensen Creek | YCT | IDFG (1986) |
| Keenan Creek | YCT | USFS (2003) |
| McCoy Creek | YCT, BNT, LKT, MWF, SPD, LND, SCU, MTS, RSS | IDFG (1986), (Bill Janowsky, USFS, personal communication) |
| Miners Delight Creek | YCT, SCU | USFS (2003) |
| Pole Creek | YCT, SCU, DAC | USFS (2000) |
| Wolverine Creek | YCT | IDFG (1987) |

***YCT= Yellowstone cutthroat trout, BNT = brown trout, LKT = lake trout, MWF = mountain whitefish, SPD = speckled dace, LND = longnose dace, DAC = unidentified dace, MSC = mottled sculpin, PSC = Piute sculpin, SCU = unidentified sculpin, MTS = mountain sucker, UTS = Utah sucker, and RSS = redside shiner.**

Thirteen (81%) of the 16 perennial streams surveyed contain YCT (refer to Table 3.4-2). Approximately 58 miles of stream are occupied by the species within the analysis area. Population estimates range from 80 to 2,512 YCT per mile. The total population in all streams combined is estimated at about 42,000 YCT. Actual abundance probably fluctuates a great deal from year to year due to natural factors.

**Table 3.4-2: Population estimates for YCT in individual streams of the McCoy Creek Watershed at the time of the most recent survey.**

| Stream name | Perennial mileage | Estimated number of YCT per mile* | Estimated total YCT population | Survey method |
|---|---|---|---|---|
| Barnes Creek | 3.3 | 81 | 267 | Three-pass electrofishing |
| Bilk Creek | 3.5 | 1,006 | 3,521 | Single-pass electrofishing |
| Box Canyon Creek | 4.1 | 660 | 2,706 | Single-pass electrofishing |
| City Creek | 0.8 | 338 | 270 | Single-pass electrofishing |
| Clear Creek | 5.4 | 184 | 994 | Single & multiple pass electrofishing |
| Fish Creek | 4.5 | 362 | 1,629 | Single & multiple pass electrofishing |
| Iowa Creek | 3.8 | 499 | 1,896 | Multiple pass electrofishing |
| Jensen Creek | 5.1 | 252 | 1,285 | Multiple pass electrofishing |
| Keenan Creek | 1.0 | 80 | 80 | Single-pass electrofishing |
| McCoy Creek | 15.5 | 1,004 | 15,562 | Multiple pass electrofishing |
| Miners Delight Creek | 1.9 | 97 | 58** | Three-pass electrofishing |
| Pole Creek | 3.8 | 362 | 1,376 | Single-pass electrofishing |
| Wolverine Creek | 5.0 | 2,512 | 12,560 | Multiple-pass electrofishing |
| **ALL COMBINED** | **57.7** | **-** | **42,204** | **-** |

***Estimates based on numbered passes are conservative and based on summing the number of fish collected during all passes at all locations. Estimates derived from a single pass are highly conservative.**
****Only 0.6 mile of this stream contains fish.**

The YCT population in Barnes Creek is low in comparison to other streams. This is especially true when considering stream size; all smaller streams have more dense fish populations than Barnes Creek. Box Canyon Creek has an abundant YCT population. City Creek has a low total YCT population in comparison to other streams. McCoy Creek has an abundant YCT population, which may be a result of high productivity in some tributary streams because McCoy Creek itself appears to have a high level of stream sedimentation. Miners Delight Creek has the lowest total YCT population of any stream in the MCW.

## 3.4.2 Channel and Habitat Disturbance

### Current Condition

#### Properly Functioning Condition

Properly functioning condition assessments, used to rate a stream's ability to withstand a major flood event without suffering substantial channel damage, identify impacts to streams and riparian areas from a variety of sources, in the analysis area. Those sources include mining, roads, recreation, and livestock. Streams rated PFC have the best rating. While it is generally assumed that those streams provide good quality habitat for YCT, there is no implication that conditions are pristine or that there are no unacceptable effects. Waters rated Functional-At Risk High have a minor problem that makes them susceptible to degradation. Functional-At Risk Moderate indicates a stream is mid scale. Functional-At Risk Low indicates that there are factors that could easily cause a stream to become nonfunctional. Streams rated Nonfunctional clearly lack elements needed for system protection or function, may be at risk of even further degradation, and may be having a negative impact on downstream waters. Streams with ratings lower than PFC probably in most cases provide less favorable habitat for YCT than streams that are rated PFC. In some circumstances, however, Functional-At Risk streams support abundant YCT populations. Available assessment ratings for fish-bearing streams, factors contributing to lower-than-PFC ratings, and some specific problems possibly affecting YCT habitat, are reported in the table below.

Properly functioning condition assessments indicate that roads are having, or have had, an effect on the condition of the following fish-bearing streams: Barnes, Box Canyon, City, McCoy, and Miners Delight creeks (See table below).

**Table 3.4-3: Properly Functioning Condition assessment ratings for fish-bearing streams, factors contributing to lower-than-PFC ratings, and some specific problems identified possibly affecting YCT habitat.**

| Stream name | Year | Rating* | Factors contributing to lower-than-PFC ratings | Some specific problems identified possibly affecting YCT habitat (may be local and not represent the entire stream)** |
|---|---|---|---|---|
| Barnes Creek | 1998 | FARUU | Mining, road, recreation, livestock | 1, 2, 3, 4, 7, 8, and 9 |
| Bilk Creek | 1997 | FARM | Mining | Unknown |
| Box Canyon Creek | 1998 | FARUN | Road | None |
| City Creek | 1998 | FARUU | Mining, road, recreation, livestock | 1, 2, 3, 4, 7, 8, and 9 |
| Clear Creek | 1998 | PFC | NA | 4 |
| Fish Creek & tributaries | 1998 | FARH | Unidentified | 4 |
| Fish Creek (upper) | 2003 | FARM | Livestock | 4, 6, 8, 9, 10 |
| Iowa Creek & tributaries (upper) | 1998 | N | Mining, livestock | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 |
| Iowa Creek (lower) | 1998 | FARUN | Mining, livestock | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 |
| McCoy Creek (upper) | 1998 | FARUU | Mining, roads, and recreation | 1, 2, 3, 4, 8, 9, and 10 |
| McCoy Creek (lower) | 1997 | FARUN | Mining, roads, recreation, livestock | 2, 3, 4, and 9 |
| Miners Delight Creek | 1998 | FARUU | Mining, road, livestock | 1, 2, 3, 4, 5, 6, 7, and 8 |
| Pole Creek | 1998 | PFC | NA | 4 |
| Wolverine Creek | 1998 | PFC | NA | None |

***PFC=Properly Functioning Condition, FARM=Functional-At Risk Moderate, FARH=Functional-At Risk High, FARUU=Functional-At Risk unknown level with upward trend, and FARUN=Functional-At Risk unknown level with no apparent trend.**
****1=inactive or unstable beaver dams; 2=sinuosity, width/depth ratio, and gradient out of balance with the landscape setting; 3=riparian zone not widening/not at potential; 4=upland watershed contributing to riparian degradation; 5=lack of a diverse age-class distribution of vegetation; 6=lack of diverse species of vegetation; 7=species of vegetation not indicative of maintaining soil moisture characteristics; 8=vegetation without root masses capable of withstanding high flow events; 9=insufficient vegetative cover to protect banks and dissipate energy during high flows; 10=inadequate source of coarse and/or large woody debris; and 11=excessive erosion or deposition.**

Water temperatures considered excessive for trout have been noted in streams of the analysis area where data have been collected. High water temperatures may reduce growth, survival, reproduction, and abundance of YCT. The high water temperatures can be natural or caused by activities that remove large amounts of shade-producing vegetation. Factors considered most likely to remove enough vegetation to increase water temperatures in the analysis area are livestock and mining. Water temperature problems found in watershed streams by the State of Idaho during 2003 (Lynn VanEvery, Idaho Department of Environmental Quality, unpublished data) are shown in the table below.

**Table 3.4-4: Problems with high water temperatures found in a few fish-bearing streams monitored by the State of Idaho during 2003.**

| Stream Name* | Coldwater aquatic life criteria for maximum (22 °C) and/or average (19 °C) daily water temperatures exceeded? | | | | Salmonid spawning criteria for maximum (13 °C) and average (9 °C) daily water temperatures exceeded? | | |
|---|---|---|---|---|---|---|---|
| | Yes/No | Number of days | | Maximum temperature recorded | Yes/No | Number of days | |
| | | Maximum | Average | | | Maximum | Average |
| Clear Creek | Yes | 27 | 19 | 25 | Yes | 25 | 27 |
| Iowa Creek | Yes | 48 | 0 | 26 | Yes | 24 | 18 |
| McCoy Creek (upper) | Yes | 23 | 9 | 25 | Yes | 25 | 26 |
| McCoy Creek (lower) | Yes | 29 | 9 | 25 | Yes | 25 | 26 |
| Wolverine Creek | Yes | 46 | 0 | 26 | Yes | 25 | 25 |

***Locations: Clear Creek site was near confluence with McCoy Creek, Iowa Creek site was near confluence with McCoy Creek, McCoy Creek upper site was just above confluence with Hell Creek, McCoy Creek lower site was near Palisades Reservoir, and Wolverine Creek site was near confluence with McCoy Creek.**

## Stream Condition

Conditions specific to McCoy, Clear, Pole, Fish, and Iowa Creeks have been documented during recent stream surveys. They are described below.

### McCoy Creek

McCoy Creek is a tributary to the South Fork of the Snake River. It flows into Palisades Reservoir. It was surveyed by the Forest Fish Distribution Crew in 2000. Lower McCoy Creek was classified as a Rosgen C channel type. The stream and many of its tributaries have been affected by gold mining and dredging. Dredge piles are still observable in riparian areas and floodplains. The riparian vegetation of lower McCoy Creek was dominated by willow and dogwood. The riparian overstory was sparse and consisted of Douglas fir and subalpine fir. Stream banks were more frequently cut and sloughing in areas where riparian shrubs were absent. Stream substrate was dominated by cobble and gravel. Fine sediment was common. There were several areas where FS Road 50087 encroached upon lower McCoy Creek. Stream bank erosion often occurred in those areas. A stream channel stability assessment was conducted on lower McCoy Creek and it was rated as good.

Upper McCoy Creek (upstream of Clear Creek) was generally a B Rosgen channel type. Riparian vegetation was dominated by a dense willow complex. Sagebrush and lodgepole pine were dominant vegetation located upslope. Beaver activity, including dams and ponds, was frequently encountered. A stream channel stability assessment was conducted on upper McCoy Creek and it was rated as good.

McCoy Creek is a Yellowstone cutthroat trout stronghold stream. Although non-native brown trout and lake trout have been previously reported in the stream, Yellowstone cutthroat trout were the only salmonid observed during this recent survey. Both fine-spotted and large-spotted varieties were collected. There are both resident and adfluvial (historically fluvial) life history

patterns exhibited in the stream. Adfluvial and fluvial fish migrate upstream from larger water bodies to spawn and their offspring rear in the stream. Adfluvial fish spend most of their life in a lake (in this case, Palisades Reservoir) and fluvial fish spend most of their life in a river. Dace, sculpin, and shiners were also observed in the fish community.

Barnes, Miners Delight, City, Keenan, Spring, Camp, Wolverine, Kirk, Box Canyon, York, Jenson, Hell, Lake, and Comb Creeks are some unsurveyed tributaries to McCoy Creek. Perennial segments of these streams have the potential to support Yellowstone cutthroat trout populations for at least part of the year.

### Clear Creek

Clear Creek is a major tributary to McCoy Creek. Clear Creek was surveyed by the Forest Fisheries Crew in 2000. It flowed through a wide, U-shaped valley. Willows, sagebrush, grasses, and forbs dominated the riparian area for the lower reaches. The upper slopes surrounding the stream were vegetated with sagebrush and lodgepole pine. The stream meandered through the valley and often consisted of multiple channels. Bank cutting frequently occurred near meander bends. This bank cutting delivered sediment to the stream. In some areas, the stream meandered and cut into the toe of slopes, causing mass wasting. The stream substrate was dominated by gravels and sand. Fine sediment was present in pool tail-outs and on stream edges. Beaver activity was common. Near the mouth of Pole Creek, Clear Creek changes its characteristics. Multiple stream channels transitioned into a higher gradient, single channeled stream as the survey progressed upstream. Stream channel stability was rated as good.

Yellowstone cutthroat trout, sculpin, sucker, dace, and shiners were observed in Clear Creek.

### Pole Creek

Pole Creek is a tributary of Clear Creek, in the McCoy Creek Watershed. It was sampled by the Forest Fish Survey Crew in 2000. Willow dominated the riparian area and beaver activity, including dams, was frequent. Yellowstone cutthroat trout, sculpin, and dace were collected. The small size of the cutthroat trout indicated Pole Creek is likely a spawning/nursery area for the species.

### Fish Creek

Fish Creek is a tributary to McCoy Creek. Fish Creek was surveyed by the Forest Fisheries Crew in 2000. Fish Creek flows through a narrow valley. Riparian vegetation was dominated by willow, dogwood, bog birch, sagebrush, grasses, and forbs in the understory. Lodgepole pine dominated the overstory, but often occurred outside the riparian area. Cottonwood occurred in the riparian area of the lower reach of the stream. Large instream wood was frequent throughout the survey. Stream substrate was dominated by cobble and gravel. The frequency of fine sediment increased as the survey progressed upstream. Channel stability was rated as good.

Upstream of the mouth of the West Fork, the surveyors reported that sheep grazing along the stream was intensive in some locations. Sheep trails and droppings were common along the stream. Bank instability was common in the areas of the stream heavily used by sheep, contributing sediment to the stream.

Yellowstone cutthroat trout and sculpin were observed in Fish Creek.

### Iowa Creek

Iowa Creek is a tributary to McCoy Creek. The stream has a wide fluctuation in annual discharges. Average annual bankful flow is approximately 95 cfs and low flows are below 5 cfs. The stream has been impacted by past gold dredging. Small scale suction dredging still occurs on the stream. In the early 1970's, a large beaver dam complex occurred in lower Iowa Creek. Since then, the dams blew out and beaver left the area. Without beaver, the stream has become unstable. Taylor and Bilk Creek are unsurveyed minor tributaries to Iowa Creek. Perennial segments of these streams have the potential to support Yellowstone cutthroat trout populations.

## Roads

Roads increase the impact and risk to aquatic organisms from human activities providing access. Human activities and potential activities include trail construction and use, angling and other recreation, introduction of nonnative fish species and diseases, livestock management, mining, timber harvest, and fire suppression. The portion of the road system within AIZ is of greatest concern because of its proximity to streams.

More directly, roads have impacts of their own. Effects are greatest when roads are situated within AIZs. The presence of roads within AIZs may result in sediment delivery to streams, especially at stream crossings, drainage ditches and culverts, and where soil is sidecasted onto steep slopes above stream banks during road maintenance. Where the amount of sediment in the stream substrate increases, the food supply and reproductive success of trout is generally reduced. Sediment delivery is minimized at stream crossings if there are properly installed bridges, culverts, or hardened fords. Roads with a gravel surface deliver less sediment to streams than do unimproved roads. Roads within AIZs may also affect fish habitat by isolating floodplains; restricting lateral channel migration; and reducing riparian vegetation, shade, and the input of wood and other organic matter.

There is a total of 59 miles of open roads in the McCoy Creek analysis area. Thirty-four percent (20 miles) of the open road miles are situated within AIZs. Of the open road mileage within AIZs, approximately 11 miles are graveled and 9 miles are ungraveled. The only graveled road is the McCoy Creek Road (FS Road 50087).

There are 37 open road crossings of perennial streams, of which 13 are fords, 21 have culverts, and 3 are bridges. Of ford crossings, two have been hardened with rock to reduce stream sedimentation. Four of the road ford crossings are located on the Barnes Creek Road (FS Road 50188). The lowest Barnes Creek crossing visually appears to be delivering the highest amount of sediment to a stream even though it is a hardened crossing. High sediment delivery occurs there because of the crossing width and amount of motorized use.

Sediment delivery through drainage ditches and culverts appears to be highest along the mostly unimproved Brockman Road (Route 50086) in the Clear Creek drainage. The portion of this road within AIZs has about 22 drainage ditches or culverts, of which 20 show signs of sediment delivery (Louis Berg, USDA Forest Service, unpublished data). Sediment delivery is noticeably absent or minimal near a crossing of Pole Creek where a short segment of the road has been

graveled. The graveled McCoy Creek Road within AIZs has about 39 road drainage ditches, of which 27 show signs of sediment delivery but in generally lower amounts than occurs along the Brockman Road.

Delivery of sediment by sidecasting of soil during road maintenance is apparent along the McCoy Creek Road, particulary in the vicinity of Spring Creek. In this area, there are about 8 locations where material cleaned from drainage ditches to clear culvert openings has been routinely dumped onto steep banks above the stream (Louis Berg, USDA Forest Service, unpublished data).

Streams most likely to accumulate sediment and have fish populations impacted by it are those with a combination of low gradient and low maximum water flows. Ranking of fish-bearing streams by gradient, from lowest to highest, is as follows: McCoy Creek, Clear Creek, Keenan Creek, Miners Delight Creek, Iowa Creek, Pole Creek, Wolverine Creek, Barnes Creek, Fish Creek, Jensen Creek, City Creek, Box Canyon Creek, and Bilk Creek. Although sediment delivery may not affect fish habitat in some moderate- to high-gradient streams, those streams may transport sediment downstream to low-gradient waters and cause problems there.

### Trails

Trails are another potential source of sediment delivery to streams, particularly at stream crossings used by motorized vehicles. Trails can have some of the same effects on fish that roads do. Sediment delivery is minimized at trail stream crossings where there are properly installed bridges or hardened fords. Proper drainage design of trails also reduces sediment delivery.

Properly functioning condition assessments on fish-bearing streams do not mention trails as a factor affecting any stream. Sediment delivery to streams from trails appears to be low in comparison to other sediment sources in the analysis area.

There are a total of 72 miles of motorized, non-motorized, and closed trails within the MCW. Eighteen percent (13 miles) of the trail miles are motorized, sixty-nine percent (50 miles) are non-motorized, and thirteen percent (9 miles) is closed trails. Twenty trail miles occur within AIZs, of which approximately 3 miles are open to some form of motorized use at least seasonally and 17 miles are closed to all motorized use all year. There are 83 trail crossings of perennial streams, of which 3 are open to motorized use and 80 are closed to motorized use. Of the 80 stream crossings closed to motorized use, one appears to be receiving illegal use by motorized vehicles. That closed crossing is a ford of fish-bearing Keenan Creek. Crossings of perennial streams by trails open to motorized use are assumed to be all fjords. None of the motorized ford crossings have been hardened with rock to reduce stream sedimentation.

### Recreation

Recreational activities, when concentrated and intense in riparian areas, may impact fish through an increase in sediment delivery to streams because soil is compacted and vegetative ground cover is lost. There is approximately 24 acres of disturbance from dispersed camping that is located within AIZs.

Properly functioning condition assessments indicate that recreation is one activity that is having, or has had, an effect on the condition of Barnes, City, and McCoy creeks. The YCT population in Barnes Creek is low in comparison to other streams. This is especially true when considering stream size; all smaller streams have more dense fish populations than Barnes Creek. City Creek also has a low total YCT population in comparison to other streams. McCoy Creek has an abundant YCT population, which may be a result of high productivity in some tributary streams because McCoy Creek itself appears to have a high level of stream sedimentation.

There is only one developed campground in the analysis area. It is located near the confluence of McCoy Creek with Palisades Reservoir. Recreational impacts are very noticeable here within the AIZ of McCoy Creek when reservoir water levels are low, but the stream lies within the reservoir basin and provides only periodic habitat due to inundation by the lake. Recreational impacts are minor in comparison to reservoir effects here.

Several dispersed campsites are adjacent to streams in the analysis area. These are most evident along McCoy Creek, where about 22 are present. Some bare stream bank was observed at six of 19 campsites checked along McCoy Creek during 2003. A total of about 150 feet of stream bank appeared disturbed by recreation. The amount of sediment delivery from recreation looked low in comparison to other causes of bank disturbance.

Angling is a form of recreation that affects YCT. Yellowstone cutthroat trout cannot be legally harvested in the analysis area but some mortality occurs as a result of stress and hooking injuries. There is the potential for anglers to illegally introduce undesirable nonnative fish species and unintentionally introduce diseases which could impact YCT.

### Whirling Disease

There is potential for whirling disease to reduce and even eliminate some YCT populations if its causative agent *Myxobolus cerebralis*, a parasite, enters the watershed. Whirling disease has been discovered in nearby Jacknife Creek and some other streams of the Salt River drainage. If the disease enters the analysis area at any location, it would probably spread to all trout-bearing streams in the watershed. It could cause high mortality of young cutthroat trout, reduce fitness of older YCT, and give more resistant brown trout an advantage resulting in replacement of some YCT populations by brown trout. Fish collected and tested from McCoy Creek in 2000 were not infected with the parasite. Additional samples were collected in 2003 but have not been tested yet.

### Livestock

Livestock effects on streams containing YCT may include trampled and less stable banks, increased soil erosion and sediment delivery to stream substrate, increased stream width, reduced stream depth, loss of undercut banks, reduced pool depth, reduced bank vegetation, reduced shade,

increased water temperatures, and increased nutrient and bacterial inputs. These changes may contribute to degraded habitat, resulting in decreased reproduction, growth, survival, and abundance of fish. Properly functioning condition assessments indicate that livestock are having, or have had, an effect on the condition of Barnes, City, Fish, Iowa, McCoy, and Miners Delight creeks.

Inspections of Jensen and McCoy creeks during 2003 revealed additional conditions affecting YCT habitat that may be caused by livestock (Louis Berg, USDA Forest Service, unpublished data). At Jensen Creek, which has a low fish population for its size, about 25% of the stream bank was eroding near the confluence with McCoy Creek for undetermined reasons. Livestock impacts appeared minimal elsewhere in this stream. In some portions of sheep allotments on McCoy Creek (near the Iowa Creek confluence, below the Fish Creek confluence, and about 2 miles above Palisades Reservoir), more than 20% of stream banks were eroding. No livestock activity currently occurs in the riparian area of the Caribou Basin Cattle and Horse Allotment, which covers about 30% of McCoy Creek's stream mileage.

### Mining

Gold mining activity has occurred throughout much of the watershed analysis area. On several streams, this has involved large quantities of substrate or bank material. Large-scale changes to streams and riparian areas have resulted, most noticeable of which is the deposition of piles of gravel on stream banks. Other possible effects of mining include increased sediment delivery to stream substrate, increased stream width, reduced stream depth, loss of undercut banks, reduced pool depth, reduced bank vegetation, reduced shade, increased water temperatures, reduced bank flooding, and reduced channel sinuosity. Some of these changes may contribute to degraded habitat, resulting in decreased reproduction, growth, survival, and abundance of fish. Dredging or hydraulic mining of large volumes of material has not occurred for decades, and recovery of some habitat elements important for fish has probably occurred. Some smaller-scale mining continues but it appears to have comparatively little effect on YCT habitat. Properly functioning condition assessments indicate that mining has had an effect on the condition of Barnes, Bilk, City, Iowa, McCoy, and Miners Delight creeks. Loss of shade-producing riparian vegetation as a result of past mining may have at some streams increased water temperatures to levels undesirable for YCT. Water temperatures considered excessive in relation to standards for coldwater aquatic life were noted in Iowa and McCoy creeks during 2003 (Lynn VanEvery, Idaho Department of Environmental Quality, unpublished data) (Table 3.4-4). Mining is not the only factor that may be causing high water temperatures; natural conditions and livestock grazing are other possible factors.

### Timber Harvest

Timber harvesting may be detrimental to YCT habitat if not performed properly. Removing trees from steep slopes may cause erosion and sediment delivery to streams. Constructing roads for timber harvesting may result in stream sedimentation. Removing trees from riparian areas may reduce the quantity of woody debris in streams. Impacts of timber harvests on fish habitat are lessened when steep slopes are avoided, riparian areas are buffered, and roads are designed and located properly.

Projects to harvest timber that have occurred since about 1970 involve about 748 acres in the vicinity of Clear Creek drainage, 161 acres near tributaries to Iowa Creek including Bilk Creek, 4 acres near the Camp Creek tributaries, and 85 acres along one side of Spring Creek. No YCT habitat problems identified as linked with timber harvest have been noted on these streams.

#### Fire Suppression

Fire suppression may also be detrimental to YCT habitat. It results in the buildup of excessive amounts of fuel that can cause fires devastating to fish through high temperatures, destruction of riparian vegetation and, with storm or snowmelt runoff, delivery into streams of high quantities of sediment and toxic ash.

Fire suppression also may result in conifer encroachment on aspen and associated loss of beavers important for maintaining quality fish habitat in some streams. Beneficial effects of beavers include the addition of woody debris to streams, creation of large-pool habitat for adult fish and nursery habitat for young fish, trapping of fine sediment above dams and creation of clean spawning gravels below dams, and maintenance of the water table and riparian area. When beaver dams are abandoned, there is a tendency for severe erosion and release of fine sediment. Beaver are currently active in some analysis area streams and noticeably absent from others. Absence of beaver seems to correspond with scarcity of aspen near streams. Beaver activity has been noted recently in these fish-bearing streams: Box Canyon Creek, Clear Creek, lower Fish Creek, upper and lower McCoy Creek, Pole Creek, and Wolverine Creek. There are inactive or unstable beaver dams, or lack of beaver activity, on Barnes Creek, City Creek, upper Fish Creek, Iowa Creek, upper McCoy Creek, and Miners Delight Creek. Habitat problems for YCT in upper Fish Creek are believed linked with loss of beavers.

Another negative aspect of fire suppression is the potential for introduction of undesirable aquatic organisms in water moved between drainages during fire-fighting efforts. Although no such introductions have been documented in the analysis area, the possibility of the whirling-disease-causing parasite *Myxobolus cerebralis* or brook trout entering the watershed are concerns.

Since about 1974, a total of 41 fires have been reported in the Soda Springs District-portion of the analysis area. Partly due to fire suppression efforts, the total burned area is limited to an estimated 272 acres. The largest fire involved 133 acres spanning Pole Creek (summer of 2000), a stream that currently has a good fish population for its size. The second largest fire involved 74 acres of the Trail Creek fire (summer 1988) and included a small portion of an unnamed perennial tributary to Taylor Creek in the Iowa Creek drainage. Other fires have involved much smaller acreages and have at most had a minor effect on riparian areas.

### 3.4.3 Barriers

#### Current Condition

Another common effect of roads on fish is the creation of partial or complete fish passage barriers where culverts are improperly installed. Culverts can be barriers due to vertical water drop, high velocity, length, and/or debris blockage. Seven culverts along the McCoy Creek Road checked for ability to pass fish in 2003 are considered partial or complete barriers (Louis Berg, USDA Forest

Service, unpublished data). These barriers occur on the following perennial streams: Lake Creek, McCoy Creek, Miners Delight Creek, and three unnamed waters. Lake Creek in 2003 did not have a fish population above or below its culvert despite what appeared to be good quality habitat. Stream distance below the culvert is short, and insufficient accessible habitat is a likely reason for absence of fish. In McCoy Creek, a 2003 survey indicated that YCT had 32% higher density below a culvert than above it. Sculpin had 154% higher density, and longnose dace had six times higher density, below the culvert than above it. Fish were present in Miners Delight Creek in 2003 below its culvert but not above, although YCT used to occur upstream (Derek Hinckley, personal communication). Drought-induced low water flows are the probable reason for loss of fish in upper Miners Delight Creek. Recolonization of upper Miners Delight Creek is not possible because of the culvert. The unnamed streams with barrier culverts have not been surveyed to determine fish presence and culvert effects on fish populations.

There are several improperly sized culverts which, if blocked with debris, could cause road wash-out and stream sedimentation. One of these is located where the McCoy Creek Road crosses Spring Creek. Another exists where the Brockman Road crosses an unnamed tributary of Pole Creek.

### 3.4.4 Non-Native Species

#### Current Condition

Some nonnative trout species have the potential to impact YCT through hybridization and introgression, reducing genetic purity. Fortunately, no species capable of breeding with YCT have been found in streams of the analysis area. Fish observed during surveys in various streams in 2003 did not appear hybridized.

Nonnative trout species that may compete with and prey on YCT do occur in the McCoy Creek Watershed. These species are brown and lake trout. They are present only in lower McCoy Creek near Palisades Reservoir. Although there is no indication that the abundance or distribution of these species is increasing, expansion of distribution is possible in the case of brown trout. Suitable water temperatures for brown trout occur in some upstream waters. Lake trout, which apparently are more suited to lakes than streams, are not present in high enough numbers in McCoy Creek to have much effect on YCT there. Lake and brown trout probably prey on YCT migrating into Palisades Reservoir and may therefore reduce the number of fish available to reenter McCoy Creek during the spring spawning season.

#### Overall Trends

Riparian and aquatic habitat in the analysis area have been affected by land management activities, particularly including mining/dredging, road and trail building/maintenance, and livestock grazing. Dispersed camping, fire suppression, and timber management have affected riparian areas and streams in the analysis area to a lesser extent.

No trends can be reported for fish population density since most data only consists of baseline surveys conducted recently. However, we assume fish production in these streams is less than what occurred prior to mining activities that significantly impacted these streams in the past.

Although more non-native fish occur in the analysis area than in the past, their presence in the fish community is still not significant.

The creation of Palisades Reservoir probably increased the accessibility to McCoy Creek for migratory fish. Prior to the reservoir, a series of cascades occurred near the mouth of McCoy Creek. It is unclear what impact they had upon the migration of fish into the stream. It is likely they were at least partially passable during right flow conditions and when roughness was added by concentrations of large wood. After the reservoir was formed, the cascades are inundated most years, allowing fish to easily migrate into the stream. The ready migration of large adfluvial Yellowstone cutthroat trout into McCoy Creek and its tributaries increases the vigor and potential for long term viability of the stream populations.

The lake has added an adfluvial component to the YCT population in the MCW. This component migrates between McCoy Creek (and likely its tributaries) and lake. Growth of fish may be enhanced in the lake. A downside of the lake is that it provides habitat for large brown and lake trout that may prey on YCT, reducing the number of fish available to reenter McCoy Creek during the spring spawning season.

## 3.5 Wildlife Habitat

### 3.5.1 Habitat & Populations

#### Reference Condition

Pre-settlement population or even presence within the watershed is unknown for many TES/MIS species. A description of the required habitat for specific species is used as the desired habitat conditions.

The gray wolf occurred historically in the northern Rocky Mountains, including mountainous portions of Wyoming, Montana, and Idaho. The drastic reduction in the distribution and abundance of this species in North America was directly related to human activities, particularly extensive predator control efforts by private, State, and Federal agencies. The natural history of wolves and their ecological role was poorly understood during the period of their eradication in the conterminous United States. As with other large predators, wolves were considered a nuisance and threat to humans. (USDI 1994b).

There are five verified records of lynx taken in Caribou County in 1947 and two from Bonneville County in 1955. Two lynx have been recorded as taken in Bear Lake County and there are additional anecdotal accounts of lynx in the valley. Verified records of lynx in Wyoming after 1920 are rare. A lynx was collected in 1940 at Hoback Rim in northwestern Sublett County and another in 1949 near Afton, Lincoln County. A lynx was trapped in Cache County, Utah in 1991. (Ruggiero and others 1999, 226, 230-231). These five counties surround the McCoy Creek Watershed so it can be assumed that lynx would have been found here periodically and probably associated with cyclic population increases in their northern home ranges. Recent analysis of vegetation in the Southern Boreal Forests has concluded that this watershed and actually most of the Caribou National Forest probably only provided linkage habitat for lynx between the Greater Yellowstone area and the Uinta Mountains.

Bald eagles are found along large bodies of water and nest in large trees with strong branches to support the weight of their nests. Open water with perch sites and carrion (road kill and wild ungulates) is important winter habitat. The first major decline in the bald eagle population probably began in the mid to late 1800s due to shooting for feathers and trophies, carrion treated with poisons, loss of forests providing nesting habitat, and the use of dichloro-diphenyl-trichloroethane (DDT) and other organochlorine compounds. Pre-settlement populations are not known but populations are slowly increasing in the region.

Spotted bat (*Euderma maculatum*) - Suitable roosting habitat is 0.8-2.2" wide cracks & crevices in limestone or sandstone cliffs (Groves et al. 1997, 284) (Gillies 2004 draft). Pre-settlement presence is unknown. (

Townsend's (Western) big-eared bat (*Corynorhinus townsendii*) – Maternity and hibernation colonies occur exclusively in caves and mine tunnels. (Groves and others 1997, Spahr and others 1991). There is no known naturally occurring habitat that meets these criteria within the watershed.

Wolverine (*Gulo gulo*) - Alpine cirque and talus slopes are important for den sites and is available in limited quantity within the watershed. Travel corridors are usually located in spruce/subalpine fir forested areas near natural openings with limited human activity and an adequate prey base (prefers carrion). The movements of dispersing or spatially unattached wolverine may include lowland vegetation communities generally considered nontypical in nature for wolverine (Copeland, per. Comm.). Pre-settlement presence is unknown. (Ruggiero and others 1994, Groves and others 1997, Spahr and others 1991)

Harlequin duck (*Histrionicus histrionicus*) – use relatively undisturbed, low gradient, meandering mountain streams with dense shrubby riparian areas & woody debris for nesting (Groves and others 1997, 67) and (Spahr and others 1991). The watershed is at the southern edge of this ducks range in North America. Harlequin ducks were observed at the edge of the project boundary in 1989. Pre-settlement presence is unknown.

Northern goshawk (*Accipiter gentilis*) nest in a mature & old-growth (aspen and conifer) forest stands with closed tree canopies, high density of large trees on slopes <30% & northerly exposures. They prey on birds & mammals within forest canopy. (Reynolds et al 1991, Groves and others 1997, and Spahr and others 1991). Pre-settlement population is unknown.

Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) - use undisturbed native shrub-grassland, with high structural diversity (Paige and Ritter 1999). Sharp-tailed grouse dancing grounds, nest sites, and brood sites are found in areas containing big sage, arrowleaf balsamroot, bluebunch wheat grass, mountain shrub, and riparian cover types. Grass and forbs are needed for cover. (Groves and others 1997 & Spahr and others 1991). CST grouse inhabit rangeland communities in the 12- to 20-inch precipitation zone. Pre-settlement population is unknown, but populations have declined in recent years.

Greater sage-grouse (*Centrocercus urophasianus*) – are associated with sagebrush stands on foothills, plains, and mountain slopes (Groves et al. 1997, 94) (USDA 2003a 3-224). Pre-settlement population is unknown, but populations have declined in recent years.

Great gray owl (*Strix nebulosa*) - use nests abandoned by hawks or on the tops of snags in mature lodgepole pine or subalpine fir forests bordering small openings or meadows (Hayward 1994). They prey on voles, mice etc. along edges of clearings. (Groves and others 1997 & Spahr and others 1991). Pre-settlement presence is unknown.

Flammulated owl (*Otus flammeolus*) - are obligate cavity nesters usually in mature Douglas-fir forests and aspen with open canopies (30-60%) and forage on insects in edge habitat. (Hayward 1994, Groves and others 1997, Spahr and others 1991). Pre-settlement presence is unknown.

Boreal owl (*Aegolius funereus*) - nest in tree cavities in mature subalpine fir or Engelmann spruce forests with a high density of large trees and forage on small mammals, birds and insects. (Hayward 1994, Groves and others 1997, Spahr and others 1991). Pre-settlement presence is unknown.

Three-toed woodpecker (*Picoides tridactylus*) - nests in snags. They feed on bark beetle larvae usually in subalpine fir habitat types (spruce-fir and lodgepole pine in a variety of successional stages). (Groves and others 1997 & Spahr and others 1991). Local population levels are reflective of conifer tree mortality. Pre-settlement presence is unknown.

Payson's bladderpod *(Lesquerella paysonii* ) – are associated with open gravelly sites on exposed ridges and gravelly openings at high elevations. (USDA 2003a, 3-271)

Migratory bird populations that use riparian habitat, especially willow habitats may have been slightly higher due additional willows occupying riparian that has not been converted. Wetlands have decreased due to road construction, mining, and Palisades Reservoir. Migratory bird populations that use sagebrush were higher due to lack of treatments of big sagebrush. See sage-grouse section above.

Mule Deer - "Populations have declined since the 1950s and 1960s statewide. Because they are adapted to transitional, seral habitats, and because management activities (prescribed burning) are not occurring at historic levels, populations are not expected to rise to those levels. Generally, annual mortality is due to predation, winterkill, accidents, hunting, weather, and possible competition with elk and disease (Kuck and Compton, 1999). Additions to hunting regulations have included antlerless opportunities designed to stabilize or reduce populations. Recent population declines in part of southern Idaho are a result of severe winters when significant winter mortality occurred. Generally, for mule deer, the buck:doe ratio minimum objective is fifteen bucks per one hundred does (15:100)." (USDA 2003, 3-236)

Elk - "Elk are distributed across Idaho and are classified as habitat generalists. Elk populations can be influenced by human harvest. Because harvest is highly influenced by access on public lands, the most critical habitat factor facing managers is the use of roads (Kuck and Compton, 1999). Overall, elk populations statewide are near all time highs and objectives are generally

being met statewide for total cows, bulls, and adult bulls; however, some zones are not meeting these objectives. The IDFG Plan objectives for elk include: Adult bull:100 cow and total bull:100 cow ratios. Areas on the Forest are generally meeting or exceeding objectives." (USDA 2003, 3-236)

Beaver – Early exploration of western North America was largely due to the search for beavers by trappers. Size estimates of the pre-European beaver population in North America were 60-400 million animals or the equivalent of 10-60 animals per mile of stream and river. Trapping nearly eliminated the beaver population and the subsequent quantity and quality of riparian habitat declined. Data specific to the watershed is not available.

Western boreal toad (*Bufo boreas*) and – Northern leopard frog (*Rana pipiens*) are found in ponds, lakes, reservoirs, and slow-moving rivers and streams (Groves and others 1997, 6). Pre-settlement, this habitat would have been found in association with beaver ponds.

## Current Condition

Gray wolf (*Canis lupus*) (USDI 1994a, 1994b) – There are 24 miles between the McCoy Creek Watershed and the Gros Ventre pack near Jackson, WY, the watershed is considered within the dispersal distance of wolves (Smith and others 2000). There was an unconfirmed wolf sighted on the Brockman Road in 1999, and one south of the watershed. Wildlife Services took a wolf on private land 9 miles northwest of Soda Springs on November 21, 2000; removed a wolf from Utah in November, 2002, and two in Cokeville, WY March 2003. Regulated and controlled wolf mortality is possible from wolf – human or livestock interaction but is outside the control of the USDA Forest Service. Illegal killing is also possible but the amount of total mortality has not prevented the expansion and increase of the wolf population as needed to meet recovery targets. Conflicts are expected if wolves were to attempt to become established in the watershed.

The McCoy Creek Watershed is within the Yellowstone nonessential experimental population area. Thirty breeding pairs of wolves, with an equitable and uniform distribution throughout the three states for three successive years constitute a viable and recovered wolf population. Of approximately 110 packs (groups of 2 or more wolves), 66 packs met the definition of "breeding pair," defined as an adult male and female raising 2 or more pups until December 31. This made 2004 the fifth year in which 30 or more breeding pairs were documented within the 3-state area. Recovery criteria have been met for removing Northern Rocky Mountain wolves from the Endangered Species list. Wolf Management Plans for Idaho and Montana have been completed and approved by USFWS. The Wyoming Management Plans is still under reviewed. The USFWS will not propose that the wolf population be delisted until Wyoming state laws and their state plan can assure that Wyoming's portion of the NRM wolf population will remain secure without the ESA protections. (USDI et al. 2005).

Canada lynx (*Lynx canadensis*) - Primary vegetative types (lynx habitat), as described in the Lynx Conservation Assessment Strategy (LCAS) (Ruediger and others 2000) (USDI 2000) are patchy and disjunct on the Wasatch-Cache and Caribou National Forests and do not provide suitable lynx habitat. Forest Plan (2003) standards and guidelines provide for early seral vegetation to reach maturity as outlined in the LCAS for lynx habitat. Vegetation in the watershed provides habitat to

support linkage between the Greater Yellowstone area and the Unita Mountains (Ashley NF). However, existing and future conditions of the private lands between the pieces of National Forest lands may cause the biggest barrier to wildlife that attempt to migrate between these areas. Elk and deer mortality on US Highway 30 indicate that migration by large mammals is attempted but sometimes not successful. Highway 30 has been widened in areas to three or four lanes to improve vehicle safety but no new measures will be in place to assist migration. Housing development is expected to slowly increase on private land in the future. This may have the most impact to suitable linkage habitat.

Bald eagle (*Haliaeetus leucocephalus*)– The McCoy Creek watershed is a tributary of the South Fork of the Snake River on the southwest corner of the Greater Yellowstone Ecosystem (GYBEWG 1996) in Idaho bald eagle management zone 18, the southeast corner of Idaho (Beals and Melquist 2001, 5). Bald eagles nest on the edge of Palisades Reservoir and have been seen in Caribou Basin during the nesting season. Five breeding areas associated with Palisades Reservoir have been sporadic in recent years. It appears that these fluctuations are a product, in large measure of two primary factors, spring weather and reservoir level. (Whitfield et al. 2003, 6). All of the nests are outside of the watershed boundary.

Townsend's (Western) big-eared bat (*Corynorhinus townsendi*i) – There are no known caves in the watershed. Roosting sites may occur in the watershed. They may occasionally use buildings, bridges, and tree cavities for night roosts. They are extremely sensitive to human disturbance. Actual occurrence is unknown but mining and buildings have artificially created roosting habitat. A high percentage of forested vegetation in the mature and older age class with an increase in large diameter snags also represents a trend toward greater potential habitat.

Wolverine (G*ulo gulo*) – The McCoy Creek Watershed is within the home range of wolverines that may use suitable denning habitat found on Snowdrift Mountain and along the Salt River Range (Ruggiero et. al 1994). Occurrence has been documented on Caribou Mountain in the watershed, and the Bear River Range, and possible wolverine tracks were found on Hawks Peak on the Preuss Range (USDA 2002). There is also a sighting northeast of the watershed. Radio collared wolverines are currently occupying the Teton and Grays River ranges. An increase in snowmobile use in suitable denning habitat may impact wolverine reproduction success if they exist in the watershed.

Harlequin duck (*Histrionicus histrionicus*) – use relatively undisturbed, low gradient, meandering mountain streams with dense shrubby riparian areas & woody debris for nesting (Groves and others 1997, 67) and (Spahr and others 1991). Harlequin ducks were observed at on McCoy Creek one mile upstream from Jensen Creek (District Boundary) in 1989. Ducks have not been seen during recent surveys. The lower reaches of McCoy Creek provides marginal habitat due to lack of vegetative cover and disturbance from the parallel road.

Northern goshawk (*Accipiter gentilis*) - Suitable nesting and foraging habitat (Groves and others 1997, 80) is found in the McCoy Creek Watershed. There are no known goshawk nests within the watershed. Actual occurrence is unknown but considered high in relationship to acres of mature stands aspen and conifer. See vegetation section.

Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) – Suitable habitat (Groves and others 1997) is found in the McCoy Creek Watershed but leks have not been identified in or near the project area (IDFG 2001a). Individual birds have been seen south of Grays Lake (IDFG 2002). Good nesting and brood rearing habitat has been found on the valley bottoms and rolling foothills usually on private or BLM lands around agriculture lands. CRP lands provide approximately 2/3 of this nesting and brood rearing habitat. The mature stands of aspen, chokecherry, and serviceberry provide winter habitat. Very little of the existing acres are in early seral due to lack of recent disturbances in these community types.

Sage-grouse were hunted by resident miners but are not known to be currently reproducing in the watershed. Surveys in 2004 (IDFG 2004) did not locate any birds. Past sagebrush treatments have reduced the density of sagebrush canopy cover. Ground cover of non-senescent grasses/forbs as cover/forage is available in larger quantities in rested or deferred grazing pastures. Overall, the sage grouse population has declined in the recent years.

Great gray owl (*Strix nebulosa*) - Suitable nesting and foraging habitat (Groves and others 1997, 131) is found in the McCoy Creek Watershed. Owls have also been observed a few miles southeast of the watershed in Trout Creek. There is one observation of a great gray owl in the Clear Creek drainage of the watershed. Actual occurrence is unknown but considered high in relationship to acres of mature stands of lodgepole pine and sub alpine fir. See vegetation section.

Flammulated owl (*Otus flammeolus*) - Suitable nesting and foraging habitat (Groves and others 1997, 125) occurs in forested stands in the McCoy Creek Watershed. Flammulated owls are known to occur west of watershed north of Alpine, WY (B.Alford Per. Comm.). Actual occurrence is unknown but considered high in relationship to acres of large diameter aspen and Douglas-fir with cavities. See vegetation section.

Boreal owl (*Aegolius funereus*) - Suitable nesting and foraging habitat (Groves and others 1997, 134) is found in forest stands in the McCoy Creek Watershed. Actual occurrence is unknown but considered high in relationship to acres of mature stands of subalpine fir and Engelmann spruce. See vegetation section.

Three-toed woodpecker (*Picoides tridactylus*) - Suitable nesting and foraging habitat (Groves and others 1997, 152) is located in the McCoy Creek Watershed. Actual occurrence is related to conifer recently killed by bark beetles. See vegetation section.

Payson's bladderpod *(Lesquerella paysonii* ) - The one known population of Payson's bladderpod on the Caribou National Forest is on Caribou Mountain associated with open gravelly sites on exposed ridges and gravelly openings at elevations 9,200-9,803 feet. Livestock grazing has not been identified as an impact to this plant.

The McCoy Creek Watershed contains riparian, non-riverine wetlands, and sagebrush shrublands. These are the highest priority habitats for migratory landbirds identified in the Idaho Bird Conservation Plan (Ritter 2000) used to meet the objectives of Executive Order #13186. The plan identifies objectives and conservation measures for each habitat.

Riparian with dense grasses/shrubs (60-80% crown cover, 6' tall, 20 acres with scattered openings), open tree canopy with balanced age classes (snags), and abundant flowers is the preferred condition and can be found in the watershed. However, mature aspen along live water is declining from conifer invasion. Tall willows are providing bird habitat but beaver are impacting willows and aspen on the banks. Riparian habitat for all bird species has been reduced by water fluctuations in Palisades Reservoir, road construction, recreation use, and mining along stream banks. Riparian habitat has also been reduced through livestock grazing and noxious weed introductions (Ritter 2001, 26).

A net increase of wetlands will improve habitat features important for birds. Wetlands have changed form and may actually have increased in extent because of livestock water developments.

Sagebrush (specifically big sagebrush communities) with at least 25 percent of in early, mid-, and late seral stages, and an adequate ground cover from May 1 to July 15 is the objective for sage grouse, which was chosen as the umbrella species for sagebrush shrublands. Se sage-grouse section above.

The watershed provides spring, summer, and fall habitat but winter range for mule deer and elk is not identified in the Revised Forest Plan.

Mule deer – population levels are meeting state objectives. Deer from Unit 66 go to "90 Percent Range:" (Unit 72) north of Soda Springs in the winter. Deer that winter in Wolverine Creek (Blackfoot River) moved to Lanes Ck, Rasmussen ridge gravel creek, and Henrys cutoff road. Most of the deer that summer in Caribou Basin probably move north and west to Tex Creek. The population of deer in Southeast Idaho fluctuated from 3,600 to 7,400 in the past eight years. (C. Anderson per. com.).

Elk – population levels are meeting or exceeding state objectives. Elk winter on the lower elevations of the McCoy Creek Watershed. Forest Plan winter range prescriptions are not found in the watershed. There was a large increase in elk numbers in the 1990s in southeast Idaho. The numbers have been stable in the last few years (C. Anderson per. com.). Very few elk from Idaho winter in Star Valley or are harvested in Wyoming (Greg Fralick, Wyoming Game and Fish, based on return tag data of harvested elk)

Beaver – Population estimates for beaver throughout the west are 6-12 million animals, a fraction of the original numbers. (Olson and Hubert 1994, 2). Beaver activity is relative to the amount of available food and construction materials. Beaver dams are found on perennial streams throughout the watershed. Some are inactive or are filling in with sediment. Most of beaver dams built on McCoy Creek are broken by high spring runoff. Beaver can and are in some places over utilizing stream bank vegetation causing willow or aspen mortality. McCoy Creek and tributaries contain viable populations of beaver.

Western boreal toad (*Bufo boreas*) – Appear to be declining in Greater Yellowstone Ecosystem and in other parts of western United States (Groves and others 1997, 6). There have been reports of boreal toads in McCoy Creek at Caribou Guard Station and where Brockman Road crosses Clear Creek. Toads have also been seen in the wetland at the Salt River arm of Palisades

Reservoir (S.Patla, Per. Comm.). Surveys in the watershed were conducted in 2003 by Idaho State University in conjunction with surveys in the Greater Yellowstone Ecosystem. The results have not been received.

Northern leopard frog (*Rana pipiens*) – Anecdotal information exists for their decline in Idaho (Groves and others 1997, 11). Surveys of sites with historical sightings, in adjacent watersheds, have not found northern leopard frogs. Actual occurrence is unknown.

## Trends

Recovery Plans are in place to provide for the lynx and wolves. Existing habitat provides linkage between the Unita Mountains and the Greater Yellowstone Area. The LCAS provides standards and guidelines regarding lynx connectivity, movement, and dispersal (USDI Letter 9-13-01 and 2-5-02). Wolves could easily move into the watershed from the Gros Ventre Pack near Jackson, Wyoming. The delisting process can begin when the Montana and Wyoming State Management Plans are completed.

Suitable wolverine denning habitat is found in the watershed at higher elevations where access is limited to snowmobiles. The amount of snowmobile use in these upper elevations is unknown but may increase with increased use and machine performance.

Succession to mature forest stands has created an abundance of habitat for old growth dependent wildlife. There is a lack of young- and middle-age stands to provide the diversity to maintain the composition and structure needed over the long term for wildlife. Many species require a variety of habitats to meet their full life histories. Conversion of aspen stands to conifer could reduce a prominent forest type used by wildlife.

Mortality from competition, insects, and disease in large trees of all species is expected to continue to provide a supply of suitable foraging habitat for three-toed woodpeckers.

Mountain brush is predominately in mature condition and meeting wildlife needs. Disturbance would provide early seral stands and improve the age and structure diversity of these stands.

The trend in rangeland management is to reduce sagebrush densities through prescribed fire to maintain grass and forb production, re-introduce historic fire intervals, and restore watershed functioning. These treatments must comply with the latest sage grouse guidelines of no more than 20 percent of the acres within eleven miles of lek being in early seral condition at one time. Using the best data available at the time, most of the area is still in a mid seral condition following sagebrush spraying. Any unplanned wildfire or future treatments is not recommended until sagebrush canopy cover increases.

Riparian vegetation is providing suitable habitat for migratory birds. Riparian habitat is not at its potential vegetative condition. Any increase in wetland habitat would benefit waterfowl, amphibians, migratory birds and wildlife in general. Recreation use along McCoy Creek is reducing riparian vegetation due to trampling, firewood collection and willow cutting. Beaver are also impacting willows and aspen along the stream banks.

Elk and Deer. Populations meet or exceed State F&G goals. Elk populations continue to show an increase, while deer populations fluctuate greater and are perceived to generally be decreasing. Critical winter range is outside the watershed. Revised Forest Plan prescriptions are designed to maintain low road densities. Assisting IDFG meet their Mule Deer Initiative is recommended. This would include increasing aspen treatments to reduce conifer invasion.

Beaver – Many beaver dam complexes exist in willow dominated riparian habitat. A decline in nearby aspen stands due to encroachment of conifer or past over-utilization by beaver may limit the long-term sustainability of these beaver populations. Beaver dams along McCoy Creek are not large enough to withstand high flows. Some beaver dams are not maintained and water is flowing through deposited sediment and through the dam structure.

# 4.0 Interpretation and Opportunities

The purpose of this chapter is to provide our interpretation of the information displayed in chapter 3 or to put it into a "So What?" context. We also attempted to identify what is broken or out of balance within the landscape/watershed and then to identify some possible opportunities to improve the condition of the landscape.

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### Interpretation of Trend

Each resource specialist has interpreted the trend for the reporting unit i.e. PVEG, HUC, or species, and will describe what caused the trend and what some of the results of the current trend may be. Reporting units should provide more clarity to discuss the cause, and results of, the indicator trends identified in Chapter 3.0. Indicators are all interrelated and a good interpretation cannot be done without discussing all the indicators at once.

> The definition of synthesis in the *Federal Guide for Watershed Analysis is:*
>
> "Synthesis – The integration of separate ecosystem elements to understand the whole system: a primary goal of watershed analysis."

### Opportunities/Recommendations

The management actions that may be taken to reverse or change the current trend.

## 4.1 Vegetation Dynamics

The indicators used to track the Vegetation Dynamics issue (structure, density, species composition, and disturbance regimes), are very interrelated, and the trend (or departure from reference conditions) often has common or closely related causes. Because of this close causal relationship, the interpretation of the trend and the assessment of risk and opportunities will be displayed/reported by cover type.

### Interpretation of Trend

Fire was the disturbance agent that played the greatest role in shaping the structure, density, species composition and pattern of vegetation at the landscape scale, prior to the creation of the Forest Service. Insects, disease and weather also played a role but their affects tended to be at the stand scale.

The vegetation structure, density and species composition that we see today is the result of the fires that occurred prior to the area becoming National Forest and the management that has taken place since. Native American use of fire may have been very important in some types. Post Native American, fire suppression, grazing and mining activities are the management activities that have had the greatest impacts; timber harvest has also played a role.

Early grazing levels directly impacted structure, density and species composition of sagebrush/grass, mountain brush, and mountain shrub and potentially some early succession forest stands. Grazing also had an indirect impact on forest types; it severed as a means of fire control. During the early years of the Forest Service while permitted grazing limits were at the peak there was very little available fine fuel in the sagebrush/grass, mountain brush, and mountain shrub communities, this kept the fires that did occur small.

As permitted animal numbers went down the range conditions began to improve. Fire suppression techniques also improved. The Forest Service became highly effective at suppressing fire post World War II. So fire that had been controlled indirectly by the lack of fine fuel could be controlled by the will of man.

In an attempt to describe this dynamic landscape and the ecology and natural processes that affect it; vegetation age, structure, species composition and fire regime have been assessed using the *Interagency Fire Regime Condition Class Guidebook (2004)*. This method for assessing landscapes uses these same ecological components. Each component was assessed, then using the method outlined in the *guidebook* a fire regime condition class assessment was completed and the results are displayed below.

Fire Regime and Condition class was assessed using a method described by Wendel Hann (2004) and outlined in the *FRCC Guidebook* (2004) for mapping fire regime condition class at the watershed and project level. The assessment determined that the McCoy Creek Watershed had a natural fire regime of "*III – Infrequent Mixed and Surface*" and a condition class of "*2 Moderate Departure from natural conditions.*" The table below shows the condition class for vegetation and fuels and frequency and severity for the forested and non-forested portion of the landscape. The forested landscape was divided into two classes or potential natural vegetation groups (PNVG) based on the apparent natural disturbance regimes in the landscape. The PNVG's used for the forested portion were *Interior West Upper Subalpine forest #1 (SPFI2) and Interior Lower Subalpine forest #5 (SPFI5),* and PNVG for the non-forested portion was *Sagebrush-Cool Mountain Big* (CSAG1) described in the FRCC guidebook and the FRCC website. The SPFI2 and CSAG1 was modified slightly to reflect the information in Barrett's 1994 Fire regime report on the Caribou National Forest.

**Table 4.1-1 PNVG Condition Class**: Condition class definitions can be found in **Figure 4.1-1**

| PNVG (% of project area) | Veg-Fuel Condition Class | Frequency-Severity Condition Class | PNVG Condition Class |
|---|---|---|---|
| SPFI2 (36%) | 2 | 2 | 2 |
| SPFI5 (25%) | 2 | 1 | 2 |
| CSAG1 (39%) | 2 | 1 | 2 |
| **Project Area** | **2** | **2** | **2** |

The landscape overall FRCC departure score was 49, which is the middle range for fire regime condition class (FRCC) 2 (34-66%). FRCC 2 means vegetation composition, structure, and fuels have moderate departure from the natural regime and predispose the system to risk of loss of key ecosystem components. In this landscape the score was driven by the departure in the vegetation/fuels composition and structure much more than the frequency/severity departure, which scored only 28. According to the nomogram at the end of the FRCC report, restoration efforts for landscapes in this condition should focus on restoration of the vegetation composition, structure, and fuels.

The effects of fire exclusion in forests with fire regimes III and IV are more apparent at the landscape scale than the stand level (Long, 2003). This means that viewing a single stand or a small group of stands does not tell the whole picture, (e.g. a mature/old stand or a group of stand is not out of the ordinary, but landscapes dominated by any single stand age structure class are).

It is apparent that vegetation in this landscape lacks age class structural diversity when viewed at the landscape scale. This landscape is mature, dense and species composition is trending towards climax. A landscape in this condition can be considered at moderate risk to loss of key ecosystem components (condition class 2). The lack of diversity in age structure and the high percentage of stands that have a dense understory of subalpine fir (ladder fuels) created by the lack of past disturbance creates a landscape that is susceptible to catastrophic fire, insects, and wind events that are outside the natural range. It also creates a landscape that is less resilient to these type events.

**Figure 4.1-1: Fire Regime & Condition Class Definitions**

Natural (historical) **fire regime classes** from Hardy et al. (2001) and Schmidt et al. (2002) as interpreted by Hann (2004) for modeling landscape dynamics at project and watershed scales.

| Fire Regime Class | Frequency (Mean Fire Return Interval) | Severity | Modeling Assumptions |
|---|---|---|---|
| **I** | 0 – 35+ Years, Frequent | Surface and Mixed | Open forest, woodland, shrub, and savannah structures maintained by frequent fire; also includes frequent mixed severity fires that create a mosaic of different age post-fire open forest, woodlands, shrub or herb patches that make a mosaic of structural stages, with patches generally < 40 hectares. Mean fire interval can be greater than 35 in systems with high temporal variation. |
| **II** | 0 – 35+ Years, Frequent | Replacement | Shrub or grasslands maintained or cycled by frequent fire; fires kill non-sprouting shrubs which typically regenerate and become dominant within 10 -15 years; fires remove tops of sprouting shrubs which typically resprout and dominate within 5 years; fires typically remove most tree regeneration. |
| **III** | 35 – 100+ years, Less Infrequent | Mixed and Surface | Mosaic of different age post-fire open forest, early to mid-seral forest structural stages, and shrub or herb dominated patches generally < 40 hectares; maintained or cycled by infrequent fire. Interval can range up to 200 years. |
| **IV** | 35 – 100+ years, Less Infrequent | Replacement | Large patches generally > 40 hectares, of similar age post-fire shrub or herb dominated structures, or early to mid-seral forest cycled by infrequent fire. Interval can range up to 200 years. |
| **V** | 200+ years | Replacement Mixed, and Surface | Variable size patches of shrub or herb dominated structures, or early to mid to late seral forest depending on the type of biophysical environment. Cycled by rare fire or other disturbance events. Often have complex structures influenced by small gap disturbances and understory regeneration. |

**Condition Classes** from Hardy et al. (2001) and Schmidt et al. (2002) as interpreted by Hann for modeling landscape dynamics and departures from historical or natural range of variability at project and watershed scales.

| Class | Departure | Description |
|---|---|---|
| **Condition Class 1** | Low | Vegetation composition, structure, and fuels are similar to those of the natural regime and do not predispose the system to risk of loss of key ecosystem components. Wildland fires are characteristic of the natural fire regime behavior, severity, and patterns. Disturbance agents, native species habitats, and hydrologic functions are within the natural range of variability. |
| **Condition Class 2** | Moderate | Vegetation composition, structure, and fuels have moderate departure from the natural regime and predispose the system to risk of loss of key ecosystem components. Wildland fires are moderately uncharacteristic compared to the natural fire regime behaviors, severity, and patterns. Disturbance agents, native species habitats, and hydrologic functions are substantially outside the natural range of variability. |
| **Condition Class 3** | High | Vegetation composition, structure and fuels have high departure from the natural regime and predispose the system to high risk of loss of key ecosystem components. Wildland fires are highly uncharacteristic compared to the natural fire regime behaviors, severity, and patterns. Disturbance agents, native species habitats, and hydrologic function are substantially outside the natural range of variability. |

### Spruce/Fir

The cover type represents approximately 41% of the forested acres within the analysis area and is mostly composed of the mature/old structure class (99%). This represents an imbalance in structural stages, which may represent a sustainability problem. A quick comparison of the 1913 data and current condition indicates its overall percent in the landscape has increased significantly. This increase of the spruce/fir type has come at the cost of: Douglas-fir, lodgepole, and especially aspen types. In general patch size has also gotten larger. These changes are likely the result of an interruption in the natural disturbance regime.

The type is difficult to assess because most of the other cover types without large scale stand initiating disturbance will end up here (i.e. dominated by subalpine fir). However, some sites historically experienced very long periods without stand initiating disturbances and stayed in this type for long periods especially at the high elevations. This situation is rare within this assessment area but there are some stands within the area that are well within historical conditions. Most stands in this type however have experience a type conversion due to succession.

### Lodgepole Pine

The cover type represents approximately 26% of the forested acres within the analysis area and is mostly composed of the mature/old structure class (90%). This represents an imbalance in structural stages, which may represent a sustainability problem. Available data also shows species composition shifting to latter successional species such as subalpine-fir. These changes are likely the result of an interruption in the natural disturbance regime.

Timber harvest has created structural diversity by moving mature/old stands to the seedling/sapling and young structure classes. Some the harvest units have decreased the average patch/stand size within the landscape. Historic mining relative activities around Caribou and Keenan Cities have also added some structural diversity this type. A majority of these sites are currently in the young/mid age class.

The high percentage of the cover type in the mature/old structure class (90%) is especially a concern in this short-lived species. The available stand data suggest that most of the mature lodgepole in the assessment area are over 100 years old. This puts it at increase risk of mountain pine beetle epidemics.

### Douglas-fir

The cover type represents approximately 22% of the forested acres within the analysis area and is mostly composed of the mature/old structure class (99%). This represents an imbalance in structural stages, which may represent a sustainability problem. A comparison of the 1913 data and current condition indicates the overall percent of the landscape in the Douglas-fir cover type has only increase slightly. This increase of

Douglas-fir has come at the cost of: mountain brush, aspen and sagebrush types. These changes are likely the result of an interruption in the natural disturbance regime.

Douglas fir can function as a seral or climax cover type. In general on dry sites Douglas-fir functions as a climax species/type and on moist sites it functions more as seral or intermediate species/type. Below an interpretation of the trend is made that tries to distinguish between these two roles for this cover type. This is an attempt to not over generalize.

Dry Sites

Most of the gain in overall area of the Douglas-fir type has been made on these types of sites, where the lack of disturbance has allowed the densities to increase. With a more natural fire regime many of these sites would have been classified as mountain brush because fire would have kept the trees thinned to the point that brush species would have dominated the site.

Moist Sites

The lack of natural disturbance (fire) has created a shortage of seedling-sapling and young/mid structure classes. The high percentage of acres were subalpine fir is percent in the understory indicates a lack of disturbance. Under a more natural disturbance regime these sites would have seen fire slightly less often then the dry sites so would have been dominated by Douglas-fir most of the time. However, due to the mixed severity nature of historic fires the sites structure would have been much more mosaic like. Alpine fir would still be a component, occurring in isolated pockets that had been missed by fire for one or more fire cycles.

### Aspen

The cover type represents approximately 11% of the forested acres within the analysis area and is mostly composed of the mature/old structure class (93%). This represents an imbalance in structural stages, which may represent a sustainability problem. Available data also shows species composition shifting to latter successional species such as subalpine fir. A quick comparison of the 1913 data and current condition indicates its overall percent in the landscape has changed significantly. When looking at the data spatially it is obvious that there has been a change, some areas that were in aspen are now in conifer cover types and some that were mountain brush or sagebrush are now in aspen. In general patch size has also gotten smaller. These changes are likely the result of an interruption in the natural disturbance regime.

Historically fire was likely the dominant disturbance in this type. The absence of fire for 90+ years has allowed the aspen type to reach its current condition of predominantly mature old structure that is succumbing to invading conifer. Under natural conditions stands that reached this point became susceptible to fire and the fire cleared the way for the aspen to successfully sprout and rejuvenate the clone. In the absence of disturbance trees die of old age the clones are unable to sprout replacements due to the existing shade

from the invading conifer. As time passes and the photosynthetic ability of the clone is reduced (i.e. trees die) the ability of the clone to respond to more favorable conditions (disturbance) decreases. Long periods with reduced aspen and increased conifer may also create site conditions that will make in difficult for aspen to recover (i.e. change is soil PH).

Aspen can function as a seral or climax cover type, so generalities can be dangerous. The generalities relate to the aspen where it functions as seral cover type, which is the majority of the acreage within this analysis. Where it acts a climax type conifer are not encroaching, it is encroaching on other types.

## Sagebrush Types

The cover type represents approximately 61% of the non-forested acres within the analysis area and the majority is in a mid-late ecological status (>6 percent canopy cover). This puts the type very close to desired/historical conditions. The sagebrush types within the analysis are mountain big sagebrush *(Artemisia tridentata* var. *vaseyana)* habitat types. Mountain big sagebrush is usually dominant. Mountain snowberry *(Symphoricarpos orephilus)* is also well represented and sometimes codominant. Other shrubs include Wood's rose (*Rosa woodsii*), green rabbitbrush (*Chrysothamnus viscidiflorus*), and antelope bitterbrush (*Purshia tridentata*). They form a medium shrub layer 2 to 3 feet tall. The understory consists of perennial grasses, along with a large number of perennial forbs. Associated grasses and forbs include but not limited to, Kentucky bluegrass (*Poa pratensis*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Idaho fescue (*Festuca idahoensis*), prairie Junegrass (*Koeleria macrantha*)*)*, needle-and-thread grass (*Hesperostipa comata*), Sandberg bluegrass (*Poa secunda*), and bottlebrush squirreltail (*Elymus elymoides).* Most recent research indicates that big sagebrush is the climax species on its present-day range, and that invasion into other types is uncommon. Sagebrush species do not appear to have increased their range on a large scale, but reviewers agree that big sagebrush has increased in density in many places in response to historic grazing and altered fire regimes. The combination of historic grazing and the altered fire regime has also given an opportunity for Douglas-fir, lodgepole, and aspen to slowly move into this type and other non-forested types.

Minor sagebrush community types include Black sagebrush (*Artemisia nova)*, Threetip sagebrush (A*rtemisia tripartita*), Spiked sagebrush (A*rtemisia spiciformis).*

## Mountain Brush Types

The cover type represents approximately 32% of the non-forested acres within the analysis area and has a balanced of age classes. Several tree/shrub species such as chokecherry (Prunus virginiana), serviceberry (Amelanchier alnifolia), gooseberries (Ribes), mountain snowberry, elderberry (Sambucus), and snowbrush (Ceanothus) characterize the mountain brush cover type. These species may occur alone and form rather distinct types or they may have a mixed composition. These species re-sprout after fires and generally prefer slightly higher moisture regimes than sagebrush, with an annual

precipitation of 15 to 25 inches. The mountain brush complex is found intermingled with sagebrush at mid elevations and conifer/aspen forests at higher elevations. This heterogeneous community is important because it provides diversity within a landscape. A variety of herbaceous understory species provides the needed ground cover to help maintain watershed values. The dense growth of snowbrush often inhibits establishment of very many associated undercover forbs and grasses, but its compact growth provides an excellent soil cover.

## Riparian Types

Although riparian area types represent less than 4% of the non-forested acres within the assessment area, they represent a very important part of the ecosystem. Properly Functioning Condition Assessments (PFC) were conducted on a majority of the perennial waters within the assessment area (Districts files). These assessments give us an understanding of the condition of the riparian types.

PFC assessment on streams is a tool that evaluates variety of factors affecting a stream health including hydrologic, vegetative, and soils-erosion deposition. A team of interdisciplinary specialists and others who were familiar with the stream preformed these assessments. Three different rankings are possible including properly functioning condition, functional-at risk, and nonfunctional. The functional-at risk ranking is further divided into a high, medium, or low (high being close to properly functioning) with another category for apparent trend. Other factors contributing to the condition of the stream are also identified. The streams were broken into segments depending upon the type and condition of the stream.

## Mountain Shrub Types

The cover type represents approximately 1% of the national forest acres within the analysis area and is mostly composed of the mid-late ecological status (96%). This represents an imbalance in structural stages, which may represent a sustainability problem.

Bigtooth maple (*Acer)* is the predominant mountain shrub type within the analysis area; it occurs in canyon bottoms and on portions of side slopes with deep developed soils. It is a native, deciduous tall shrub or small tree. Because of the absence of fire, it has expanded its range into some adjacent sagebrush and mountain brush cover types.

Rocky Mountain juniper (*Juniperus scopulorum*) and Curlleaf mountain mahogany (*Cercocarpus ledifoius*) also occur within the analysis area. However, there relative abundance on the landscape is a small percentage of this cover type.

## Opportunities/Recommendations

- The "Condition Class Restoration Context Chart" output with the condition class runs suggests that restoration efforts need to focus on restoring fire effects, vegetation composition, structure and fuels. In other words treatments should be designed to address all the components of the system not just one, such as fuels or structure.
- Once a project area is picked a site-specific assessment should be made for every stand/site to determine the historical/reference type (e.g. was the site once aspen dominated). Stands or sites should be prioritized base on condition, giving priority to those that have the potential to lose an ecological component.
- Look for opportunities to move structure and species composition of forested cover types towards seral conditions with a combination of mechanical and prescribed fire treatments where mechanical treatment is operationally, economically and socially feasible. Where mechanical treatment is not operationally, economically or socially feasible assess options to use prescribed fire or other none traditional type treatments. In all cases the treatments should be designed to mimic the historical fire regime for the type.
- Develop a burning rotation plan for sagebrush/grass and mountain brush types to maintain the current balance of structure and species composition.
- For all treatments the risk to noxious weeds should be assessed and mitigated if possible.

## Data gaps and additional information needs

- Much of the vegetation information used in this analysis is appropriate for use at the watershed scale and for development of an overall watershed existing condition, but should not be used for project planning without close review and on site visits.
- More fire history data is needed for some types.
- A potential natural vegetation classification system needs to be developed for the area so that a better analysis of departure from natural condition can be made. This system should use the existing fire history data plus new data collected for this purpose. A classification system like this would help to account for the acres that have already moved to a new type through succession.

## 4.2 Hydrologic Processes & Water Quality

### Interpretation of Trend

In general, continued recovery by natural means from historic placer mining is likely to be slow, if at all. Bilk Creek is not likely to recover to a semblance of what it likely was through natural means, and effects could cause trend to turn downward in downstream areas. Iowa Creek, Anderson Gulch, Barnes Creek and City Creeks have upward trends and have recovered enough to provide a moderate measure of capability. McCoy does not show as strong an upward trend as the other streams impacted by mining, presumably because in general the impacts were less to begin with. However, it could be that the trend in McCoy and Iowa could turn downward if substantial amounts of the enormous volume of coarse sediment deposited in Bilk Creek and to a lesser extent in Iowa Creek moves downstream to McCoy Creek, as could happen in major flood events.

Recovery of impacts from historic intensive grazing for creeks in the basin have occurred and are continuing for the most part to show an upward trend, but some trends are more strongly upward than others. Lower Miners Delight Creek, York Creek and uppermost Wolverine Creek appear to have a way to go to get back to Proper Functioning Condition, but natural recover is ongoing. Lower Camp Creek, which is in a cattle allotment, has had only a positive recovery trend in the upper reach progressing slowly downstream. However, the lower reach does not appear to be getting worse. Impacts to other creeks from past grazing practices were in general less severe or were not as thoroughly analyzed, but none appear to be getting worse, with most continuing to have an upward trend of recovery. However, creeks draining Caribou Mountain, which were strongly impacted by historic mining, tend to show less recovery from grazing, mostly due to the fact that the mining impacts were so much greater than those from grazing. Recovery from the reduction/elimination of the “O” and “A” soil layers is occurring so slowly as to not be readily apparent.

Impacts to streams from route crossings are a particular problem in areas where silty, non-cohesive soils occur and in these areas the trend is mostly downward. In particular, where unarmored stream crossings are present, effects to channel stability have been substantial and trend is downward. The lowest road crossing of Barnes Creek, combined with mining effects has destabilized the channel of Barnes Creek below that point and the trend is downward, with erosion of the north bank continuing to degrade and contribute sediment to lower reaches. The middle crossing also impacts the stream, but trend is only slightly downward at present. It has not yet damaged the channel as much, though appears likely to continue for the trend to worsen substantially if action is not taken soon. Other ford motorized stream crossings are present in the basin that are causing a downward trend in stream conditions or will do so if crossing use increases or persists. The same is true for motorized routes that are in AIZs, but do not cross streams, but the effect is to a lesser extent.

## Opportunities/Recommendations

- Replace the lowest crossing of Barnes Creek with a bottomless culvert. It should be placed so as to provide for maximum level of bedload transport, which appears to occur only a few feet above the current ford. Reconstruction of the ford is unlikely to solve the problem, as the channel needs to be narrow and deep to move bedload through this point. Fords are by nature difficult or impossible to meet these design criteria and be passable by low-clearance passenger vehicles. Closure and rehabilitation of the old ford crossing should also occur. A new single-thread, narrower, deeper channel needs to be re-established at the old ford and below where it is currently braiding, or bedload deposit will continue to occur, progressing upstream and require ongoing maintenance dredging at the crossing to keep it from failing.
- Repair or replace the middle crossing of Barnes Creek. If action is taken soon, it could still be armored and maintained as a ford crossing. However, if money is available, a bottomless arch culvert would yield more benefit by keeping vehicle wash out of the creek.
- Continue with the current plan to improve several small perennial crossings on FR077 (road to Brockman Creek) and gravel the road, especially within a length at each crossing that drains toward the crossing. Soils at all of these crossings are silty and non-cohesive, making sediment delivery to these tributaries an ongoing problem that feeds downstream to the mainstems of Pole and Clear Creeks.
- Use gravel from the approved but as of yet undeveloped York Creek Gravel Pit to re-gravel all of the McCoy Creek road, and other roads in the area. A high priority should be to gravel wherever the road passes through areas of silty, non-cohesive soils near stream channels. This would decrease sediment delivery to McCoy Creek and tributaries. Other portions of the McCoy Creek road need regraveling, as the current surface is so depleted that the underlying geotextile is becoming exposed. If not re-graveled soon, the geotextile will be lost and road conditions will degrade quickly. If this occurs, more mudholes will develop in the road and traffic will begin to drive around them, widening the road unnecessarily and creating more road impacts to the watershed.
- Assess the possibility of removing at least some of the placer mining spoil material from Bilk and Iowa Creeks, or stabilize it in place to make sure it does not become a continuing source of impact to downstream areas. Particular attention should be given to determining how much could be done in a cost effective manner without further degrading conditions by bringing in the heavy machinery to the channels and AIZs that would have to happen to remove this vast quantity of material. The question of balancing this benefit against the impact of where this material would have to go should also be considered.

## Data Gaps

### Water Quality

- ❑ Placer gold mining was a major activity in McCoy streams, and historically mercury was used for placer gold extraction. However, no analyses for mercury are known to have been done. There is a report that mercury was used (Caribou

EA), but this report presumed that this Mercury had settled into gravels in the bottoms of stream channels and became inert. However mercury is typically not inert in oxidizing environments, which is likely to be the condition in area streams, where well oxygenated water is flowing through permeable gravels. If present, the rate that oxidation of mercury might be occurring is not known. If mercury is becoming mobile at a significant rate, contamination by mercuric compounds may be a water quality and human health issue.

### Groundwater

- No known wells exist in the McCoy watershed, so there is no data on well yield. No large springs are in the flatter, broad valley bottom areas which would reflect basin wide groundwater conditions. No known activities that may have caused significant groundwater pollution have occurred, except for the slight possibility that substantial amounts of mercury could have leached from bottom sediments in losing stream reaches where it could have been used in placer gold extraction. It is unlikely that substantial sewage could escape from the pit toilets at the McCoy guard station and the McCoy campground. As these facilities are new and there are no groundwater wells in the basin, this is not at present an issue.

### Sediment Sources and Travel

- No measurements of sediment delivery from motorized routes, historic mining or other areas disturbed by management have been done for McCoy watershed. No studies of movement of sediment from historical mining through the hydrologic system have been done. Therefore the amount of sediment being delivered, moving through the hydrologic system or the rates of recovery from the excess sediment delivery can be reliably quantified.

### System Morphology, Processes and Dynamics

- Pfankuch channel stability assessments have only been completed for a small number of streams. PFC assessments have been done for a majority, but not all streams. Reference reaches of streams have not been identified in the watershed. Reference reaches could be difficult to establish, due to the ubiquity of historic intensive grazing in the watershed, and that historic mining impacted all streams in the geologically unique Caribou Mountain portion of the basin.

## 4.3 Soil Productivity and Soil Quality

### Interpretation of Trend

Resource management in this area includes 15 sheep allotments, and one cattle allotment. Livestock disturbance are incurred from trailing, salting and bedding grounds, and watering areas. An estimated 254 acres or 0.4% of the analysis area, have been detrimental disturbed from livestock. In the one cattle allotment on Camp Creek, bank disturbance was evident for approximately a quarter mile on each side of McCoy Creek Road.

Approximately 431 acres of soil have been disturbed by past activities, including non-system roads and trails (which some are receiving illegal ATV use), past harvesting, past fires, livestock, exploration pad sites, and dispersed camping. This represents 0.6% of the watershed area.

Almost a quarter of the soils in the Caribou Forest portion of the McCoy Watershed have inherent low range soil productivity. In addition, approximately 80% have a hazard potential for unstable or marginally unstable slopes. With any logging or road building in the watershed, site specific investigations are necessary to avoid areas on old landslides and soils that have evidence of past instability. Shallow soils (less than 20 inches deep) could incur a loss of productivity if they have a high erosion hazard rating and inadequate ground cover. Less inherently productive soils would be more susceptible to detrimental soil disturbances than highly productive soils.

Compacted soils are no longer considered detrimental when bulk density is reduced to below growth limiting levels, either by mechanical means, such as ripping an old road prism or over time by the actions of freeze/thaw or wetting/drying cycles, and burrowing animals and invertebrates (Krueger et al. 2002). The amount of time necessary to reduce compaction depends on the soil texture and the depth of root limiting compaction. When soil erosion rates are less than soil tolerance values, productivity can be sustained and is no longer considered detrimental.

### Opportunities/Recommendations

- Close and obliterate pioneered, non system roads and trails. Revegetate with appropriate grasses and native shrub (sagebrush, maple, willow or other desired species) to hold the soil in place, and create a physical deterrent to discourage further off road use.
- Closely monitor new livestock grazing protocols to move sheep and cattle sooner where problems exist, such as riparian and bedding areas.
- In severely damaged areas, identified by monitoring, remove or fence livestock out, and let the affected area rest.
- For monitoring purposes, create plots in logged units for different prescriptions and logging intensities, spanning 20 to 30 years, to study the effects of soil disturbances overtime.

- Soil and water improvement projects should be identified in a watershed improvement plan. The plan should include specific projects related to recreation and grazing management and treatments required to improve or maintain soil and watershed resources.

### Data gaps and additional information needs

- Updated landslide inventory map
- Verify the current inventory of dispersed camping sites and ground disturbing impacts
- Inventory of livestock loafing areas during the day in riparian areas and in forested ecosystems
- Livestock trailing patterns

## 4.4 Native Fish Habitat

### Interpretation of Trend

Despite a variety of past and continuing impacts to habitat, YCT and other native fish persist in the watershed. There are at least 13 populations of YCT having an estimated total of about 42,000 fish in a total of about 58 stream miles. Some populations have low numbers of fish, but because they have a good connection to other fish-bearing streams it is unlikely that any foreseeable habitat-disturbing activity or stochastic event will cause permanent loss of a population. Impacts to YCT habitat that have occurred and will occur can be offset to some extent by habitat enhancement opportunities.

If whirling disease enters the watershed at any location, which is likely to eventually occur due to its proximity to the nearby Salt River, it will probably spread to all trout-bearing streams. The disease may result in a reduction of YCT numbers in many streams and loss of some populations, but it is unlikely to result in elimination of all YCT from the watershed. No methods for eradicating the disease from wild populations have been identified.

Introduction of a presently absent nonnative trout species such as brook trout could have severe impacts upon native YCT populations in the watershed. Brook trout (*S. fontinalis*), which occur in some streams in the nearby Salt River drainage and perhaps in additional waters connected to the watershed, are probably the largest threat. In many streams in the western United States, brook trout have replaced native cutthroat trout populations. Fortunately, if an undesirable nonnative fish like brook trout appears in the watershed, it could be eradicated with the chemicals rotenone or antimycin before spreading throughout the watershed.

Past and present management activities have impacted aquatic and riparian habitat in streams within the analysis area. Primary impacts are from mining, roads, and grazing. Surprisingly, to date, little restoration work has occurred to address the severe mining

impacts of the past documented in the analysis area. Improvements to roads and grazing practices continue to occur with recent management.

## Opportunities/Recommendations

The following are management action recommendations pertaining to aquatic and riparian habitat and biota, listed by priority.

### Management-related Actions:

- Perform fish passage surveys on problem culverts in Lake, McCoy, and Miners Delight Creeks. Replace the crossings to facilitate fish passage where needed.
- Replace under-capacity culverts where McCoy Creek Road crosses Spring Creek and where Brockman Road crosses an unnamed tributary of Pole Creek.
- Investigate opportunities to change livestock grazing management strategies in Barnes, City, Fish, Iowa, McCoy, and Miners Delight creeks, where livestock grazing have been identified as an impact to properly functioning conditions.
- Remove dredge tailing piles from stream floodplains to re-establish stream connection with their floodplains. Re-establish stream channel morphology and meander patterns where needed.
- Surface Brockman Road and improve drainage.
- Inspect the fords at Barnes Creek. Replace the lowest crossing and any others that are sedimentation problems with a structure (bridge, arch, or culvert).
- Perform a beaver reintroduction surveys on Barnes Creek, City Creek, upper Fish Creek, Iowa Creek, upper McCoy Creek, and Miners Delight Creek. If suitable habitat exists and beaver have not recolonized on their own, initiate a beaver reintroduction program where appropriate.
- Improve maintenance practices of McCoy Creek Road near Spring Creek. Greater care and effort should be invested to decrease the amount of sediment sidecasted towards McCoy Creek during road grading and maintenance.
- Inventory stream crossings of trail system. Correct those crossings that are contributing large amounts of sediment by placing crossing structures or hardening fords.
- Investigate opportunities to stabilize stream banks impacted by livestock grazing in Jensen and McCoy Creek.
- Continue to periodically monitor for whirling disease in the watershed.

### Monitoring-related Actions:

- Follow up, per Forest Plan direction, fish distribution surveys to begin to determine population trends.
- Monitor McCoy Creek Watershed Analysis restoration projects for effectiveness.

## 4.5 Wildlife Habitat

### Interpretation of Trend

The lack of disturbance to most vegetation types has shifted habitat within the watershed towards late successional structure and composition. The consequences of this include a possible decline in some wildlife species and an increase in others, relative to pre-settlement levels. Another consequence is the potential over-use of the remaining early successional acres, especially rangeland types where livestock are part of the equation. Past logging in the Brockman area may have created a type conversion. Replacing lodgepole pine forest with a grass/forb/brush habitat. Mining has changed habitats in localized areas. Forest have recovered but ground cover may take longer due to lack of topsoil. However, no species are known to be threatened with extirpation because of these changes. Wolverine and sage grouse have been petitioned to be listed as threatened.

Large stands of sagebrush do not appear to be over mature (41% early-mid seral condition). Canopy cover of treated sagebrush in Caribou Basin have not reached density to require further treatments. Any future treatments cannot exceed the 20 percent early seral threshold guideline recommended by Connelly et al. (2000).

Linkage habitat is provided for species moving between the Greater Yellowstone area and the Unita Mountains. This is primarily for large carnivores such as the wolf and lynx.

Total acres of riparian habitat may have been lost since pre-settlement through mining, reduction in beaver populations, recreation, livestock grazing, and road building. Beaver populations are not at full potential due to these changes in stream condition and due to loss of food and dam construction materials. However, beaver impacts are excessive in localized areas. Amphibian and migratory bird populations are likely to be below potential due to this loss of riparian acres.

Elk populations are expected to remain stable but deer populations may decline due to changes in habitat, primarily winter range. Summer range will likely remain adequate despite succession of aspen to conifer and some very slow conversion of rangeland types to conifer. Road density can move big game to other areas and decrease hunter enjoyment or success.

### Opportunities/Recommendations

- Protect mature sagebrush - The amount of mature sagebrush providing breeding habitat for Caribou Basin sage grouse should be monitored prior to any proposed treatment to determine compliance with Connelly's (2000) and Idaho Bird Conservation Plan recommendations. Wildfires in sagebrush should be controlled. Any loss of existing stands of sagebrush would limit the ability to treat sagebrush with higher canopy cover in the future while staying within the allowed 20 percent threshold. New, better, and more extensive data on sagebrush

conditions for the watershed may allow for more treatments or may validate a need to exclude treatments for a longer period of time. This is especially important if sage grouse leks are located.

- Increase wetland habitat - Wildlife habitat would increase if the potential vegetative condition of riparian habitat were met. There is an opportunity to increase riparian vegetation for amphibians by fencing the north half of livestock ponds or natural seeps or springs heavily grazed by livestock. (The north half is warmer in the spring.) Any road improvements should include beaver dam potential so the beaver and road are benefited.
- Monitor snowmobile use - Snowmobile use in wolverine habitat should be monitored to determine if there are undisturbed areas for wolverine denning, specifically, Caribou Mountain.
- Maintain the diversity of forest seral stages / Increase aspen stands – A diversity of seral stages of forest would increase mature aspen stands in the long term. An increase in aspen would support beaver dam construction. Bark beetle mortality is at levels to meet woodpeckers' needs.

## Data gaps and additional information needs

- Sage-grouse occurrence in the watershed.
- Amphibian habitat and boreal toad and northern leopard frog locations.
- Wolverine use of the watershed.
- Diversity of aspen and conifer age classes within the watershed.

# 5.0 Issues and Key Questions

The purpose of this chapter is to respond to the key elements of the ecosystem relevant to future land management activities developed in chapter 2. In this chapter the issues and key questions identified and developed by the interdisciplinary team have been answered with a short response to provide the reader with a quick summary of the results of the assessment.

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## 5.1 Vegetation Dynamics

The "Caribou Nation Forest and Surrounding Area Sub-Regional Properly Functioning Condition Assessment" and other similar broad scale assessments have indicated that existing vegetation distribution, structure, and composition are outside the historic range of variability across much of the Soda Springs Ranger District. Therefore, the vegetation within the McCoy Creek watershed assessment area is likely also outside historic ranges, which has the potential to adversely affect ecosystem function.

**Key Questions-**

**Non-Forested Vegetation**

1) How has the structure of non-forested cover types changed? (Indicator - structure class reported by cover type)

   Rangelands, primarily sagebrush communities, appear to have a structure very similar to the desired/ reference condition. Available data indicates that approximately 33% of the sagebrush types have between 6 and 15% crown cover.

2) How has the disturbance regimes of non-forested cover types changed? (Indicator - disturbance regimes reported by cover type)

   The current fire disturbance is 50+ years the historic disturbance regimes was 25 to 76 years. Natural fire has been replaced with total suppression of wildfire. If the current disturbance regime trend continues, it will likely lead to a future imbalance in non-forest vegetation structure.

3) How has the presence of noxious weeds affected native vegetation?

   Small isolated populations of noxious weeds can be found within the watershed. Currently noxious weed populations are not out competing and replace native species. Noxious weed presence and abundance is not increasing, current treatment strategies are control existing populations.

## Forest Vegetation

1) How has the structure of the forested cover types changed? (Indicator - structure class reported by cover type)

   Natural stand development and succession and the lack of any major stand-initiating disturbance since the beginning of the last century has created a landscape with a dangerously high percentage of mature/old structure. Currently all cover types are outside the desired range of structure classes. This lack of balance in structure across the landscape is the driver behind all forest types having a condition class rating of moderate.

2) How has the density of the forested cover types changed? (Indicator - density reported by cover type)

   Densities have increased for all forest cover-types. Succession and stand development has continued without the natural fire disturbances that would have 'thinned' the stands kept the overall densities at a much lower level. This increase in density especially at such a large-scale could lead to an uncharacteristic large fire when it does occur.

3) How has the species composition of the forested cover types changed? (Indicator - species composition reported by cover type)

   Species composition has changed in many of the covertypes due to succession to more shade tolerant species. Subalpine fir has developed in historically fire maintained Douglas-fir and mountain brush sites. Aspen has or is succeeding to conifer species on many acres. Lodgepole pine is succeeding to subalpine fir. Douglas fir is slowly gaining acres into sagebrush and mountain brush sites and loosing acres to subalpine fir.

4) How has the disturbance regimes of the forested cover types changed? (Indicator - disturbance regimes reported by cover type)

   Insect and disease disturbance continues to fluctuate with drought cycles but as the age of the forested vegetation increases susceptibility to more widespread will increase, especially with the high percentage of mature forest.

   The fire regime for all covertypes has been altered such that the relatively frequent, low-to mixed intensity fire opportunity has been lost. Although lethal fire events are natural for all of these covertypes, the loss of the intervening low intensity fires has resulted in an unnatural build-up of live and dead fuels. The result is a higher probability of an uncharacteristic large fire event.

## 5.2 Hydrologic Processes & Water Quality

### Issue Statement

Current or past management may be causing impacts or impeding recovery from past impacts to the hydrologic system, water quality and watershed health.

### Key Questions

1) How are aquatic system morphology, processes and dynamics, including floodplain function, stability of channels and wetlands, changes in flow patterns and the sediment budget impacted by current management? Indicators – a) Proper Functioning Condition, b) Channel stability surveys (Pfankuch), c) AIZ & upland road densities, d) Number of stream crossings, e) IWWI Geomorphic Integrity.

   Impacts to streams from current sheep grazing practices are generally not causing a problem to riparian function, channel stability or wetlands. Impacts to channel stability from cattle grazing, which affects streams in the flatter valley bottom of McCoy Creek are noticeable in some areas, particularly along lower Camp Creek. While conditions do not appear to causing a downward trend in riparian function, in some cases the trend is only static or very slowly upward, apparently due to frequent loafing by cattle in riparian areas during hot periods of summer. There do not appear in general to be any substantial current impacts by current recreational placer mining as measured by any of the indicators from placer mining occurring in the basin. Only one operating sluice box in Barnes Creek fed by a water diversion was found in 2003. All other recreational panning that is allowed is not affecting hydrologic systems in any visible fashion. Impacts by roads in AIZs are occurring and they are impacting riparian function and channel stability at some road crossings. In particular, motorized crossings of Barnes Creek are a trigger for impacts to channel stability both at the crossing and a short reach downstream.

2) Are non-point source pollutants impacting water quality? Indicators: a) AIZ road density, b) number of motorized stream crossings, c) Impairment of beneficial uses, d) IWWI Water Quality Integrity.

   The most critical measure of impacts to water quality from non-point source pollution is the protection of beneficial uses. No streams are on the 303(d) list and there is no identification of beneficial use impairment in the Palisades Basin TMDL, which includes the McCoy Watershed streams. Non-point source pollution from current sheep grazing does not appear to be occurring, except for two small instances: First, on some upper reaches of Keenan Creek where some minor sediment delivery is occurring in a few localized areas due to concentrated trailing down the channel. Second, there are a few locations where sediment transport from the sheep driveway is likely to reach McCoy Creek. Use of the sheep driveway is in the process of being phased out. Some unprotected motorized crossings of area creeks are causing some nonpoint source pollution. Actions in the works or recently completed to reduce impacts to Pole Creek and

Clear Creek and tributaries. Plans are being developed to reduce the sediment problem to Barnes Creek from the lowest motorized crossing. The currently allowed minor amounts of recreational gold panning does not appear to be causing any measurable increase in nonpoint source pollution.

3) Are current levels or trends of hydrologic disturbance affecting water yield or watershed health? Indicators: a) Hydrologic disturbance, b) Road densities.

   Hydrologic disturbance is at very low levels, averaging 4% for the watershed as a whole, and no more than 10% in any HUC-6. This is much less than the 30% disturbance threshold at which measurable increases of water yield are expected to occur. Road densities are not excessive, being marginally within the prescriptions of the Forest Plan.

4) What physical resource characteristics or conditions are present that increase sensitivity to impacts to aquatic resources? Indicators: a) IWWI Watershed Vulnerability, b) patterns and levels of disturbance and resource use.

   Non-cohesive, silty soils are present in some portions of the watershed, in particular in the central part, including Camp Creek, parts of upper Wolverine Creek and elsewhere. These soils are highly sensitive to disturbance, due to their low productivity and high erosivity. Their low productivity leads to low ground cover densities, which in turn means that raindrop impact can dislodge material more easily. Their silty nature reduces infiltration capacity, which means that surface runoff water, such as is yielded from road drainage or rainstorms will travel by overland flow farther over the surface. This means that in some cases protective widths “buffers” prescribed for streams for timber management or other ground disturbing activities may need to be increased in areas where these soils occur. Roads constructed in these materials are more likely to rut an produce sediment, and road ditches are more likely to erode where roads are located on steeper slopes. Therefore surfacing of roads is more needful and more frequent and extensive road drainage features may be required to disperse road drainage more widely where located near streams.

5) How are past management practices or activities affecting the current condition? Indicator: Analysis of use, impacts and recovery trends.

   Historic mining practices have had a profound detrimental effect to streams draining the north flank of Caribou Mountain. In approximate decreasing effect, this would be: Bilk Creek, Anderson Gulch, Iowa Creek, City Creek, Barnes Creek and McCoy Creek. The main effect known at present is the large quantity of sediment, including very large material that was deposited in some streams, taken out of others and/or piled on floodplains so as to constrict flow to the detriment of stream function. Historic intensive grazing has reduced or eliminated the “O” and “A” soil layers in many areas. These layers are critical to the “soil sponge” function, which greatly reduce the potential for overland flow and large rainstorm flood peaks.

## 5.3 Soil Productivity

### Issue Statement

Is soil productivity being maintained now in the watershed? *Soil Productivity in the McCoy Watershed Analysis is being maintained and is trending upward.*

### Key Questions

1) What are the major livestock grazing soil impacts in the watershed?

   Resource management in this area includes 15 sheep allotments, and one cattle allotment. Livestock disturbance are incurred from trailing, salting and bedding grounds, and watering areas. An estimated 254 acres or 0.4% of the analysis area, have been detrimental disturbed from livestock. In the one cattle allotment on Camp Creek, bank disturbance was evident for approximately a quarter mile on each side of McCoy Creek Road.

2) Is recreation use (camping and ATV use) causing a significant increase in soil disturbance, in the form of erosion, sediment delivery or compaction?

   Non-system roads and trails (which some are receiving illegal ATV) and recreation use accounts for only 0.1% of the total area. At the watershed scale recreation use is not causing a significant increase in soil disturbance.

3) How susceptible to management activities are the land types found within the watershed?

   Almost a quarter of the soils in the Caribou Forest portion of the McCoy Watershed have inherent low range soil productivity. In addition, approximately 80% have a hazard potential for unstable or marginally unstable slopes. With any logging or road building in the watershed, site specific investigations are necessary to avoid areas on old landslides and soils that have evidence of past instability. Shallow soils (less than 20 inches deep) could incur a loss of productivity if they have a high erosion hazard rating and inadequate ground cover. Less inherently productive soils would be more susceptible to detrimental soil disturbances than highly productive soils.

4) How much of the watershed has been detrimentally disturbed by past activities?

   Approximately 431 acres of soil have been disturbed by past activities, including non-system roads and trails (which some are receiving illegal ATV use), past harvesting, past fires, livestock, exploration pad sites, and dispersed camping. This represents 0.6% of the watershed area.

5) At what point is an impact to the soil no longer considered detrimental?

Compacted soils are no longer considered detrimental when bulk density is reduced to below growth limiting levels, either by mechanical means, such as ripping an old road prism or over time by the actions of freeze/thaw or wetting/drying cycles, and burrowing animals and invertebrates (Krueger et al. 2002). The amount of time necessary to reduce compaction depends on the soil texture and the depth of root limiting compaction. When soil erosion rates are less than soil tolerance values, productivity can be sustained and is no longer considered detrimental.

## 5.4 Native Fish Habitat

### Key Questions

1) How and to what extent has the historic habitat of Yellowstone cutthroat trout been affected by land management activities, particularly mining, motorized recreation, dispersed camping, transportation system development, and grazing?

   The answer to this question can be found in the Current Conditions and Trends sections of the Fisheries Report. In general, impacts to Yellowstone cutthroat trout habitat are primarily from mining, roads, and livestock grazing. Past impacts from mining is evident in McCoy Creek and some of its tributaries. These impacts have affected Yellowstone cutthroat trout habitat through changes in channel morphology, riparian vegetation, and sedimentation. Road building, use, and maintenance have also affected habitat through changes in stream channel morphology, erosion, sedimentation, and barriers to fish migration. Livestock grazing (sheep and cattle) have affected habitat through stream bank erosion, vegetation trampling, and sedimentation. This impact was likely great historically and has diminished over the last decade or so due to increased monitoring and decreases in livestock numbers.

2) What are the dominant sediment delivery mechanisms in the analysis area and how did they compare with natural processes? Where are the high risk areas?

   The dominant management-related sediment delivery sources in the watershed analysis area are from past and current mining, roads, and livestock. Mining impacts are most prominent in Barnes, Bilk, City, Iowa, McCoy, and Miners Delight creeks. Road impacts are prominent in the analysis area, with 34% of open road miles in the analysis area occurring in AIZs. Properly functioning condition assessments indicate that livestock are having, or have had, an effect on the condition of Barnes, City, Fish, Iowa, McCoy, and Miners Delight creeks. These impacts are different from natural processes that normally contributed sediment to streams in episodic events. The management-related sediment deliveries are more chronic, continuing to contribute a baseline load of sediment to the system. For more information, refer to the Current Conditions section.

3) What upstream migration barriers for fish exist in the analysis area? What actions are required to address these barriers?

   Seven culverts along the McCoy Creek Road checked for ability to pass fish in 2003 are considered partial or complete barriers. These barriers occur on the following perennial streams: Lake Creek, McCoy Creek, Miners Delight Creek, and three unnamed waters. These barriers must be addressed through the replacement of these crossings, as funding is available. For more information, please refer to the Current Conditions section.

4) How and to what extent has native fish in the analysis area been affected by the introduction of non-native fish? What actions are required to address these concerns?

   Nonnative trout species that may compete with and prey on YCT do occur in the McCoy Creek Watershed. These species are brown and lake trout. They are present only in lower McCoy Creek near Palisades Reservoir. Although there is no indication that the abundance or distribution of these species is increasing, expansion of distribution is possible in the case of brown trout. Suitable water temperatures for brown trout occur in some upstream waters. Lake trout, which apparently are more suited to lakes than streams, are not present in high enough numbers in McCoy Creek to have much effect on YCT there.

5) What survey and monitoring should be conducted to gain a better understanding of the quality and quantity of aquatic species habitat and populations?

   This was addressed in the Recommendations section of the report, and include following Forest Plan direction to continue fish distribution surveys to determine population trends and monitoring for restoration project effectiveness.

## 5.5 Wildlife Habitat

The wildlife habitat has been impacted by past and present human activities or natural processes.

### Key Questions

1) How and to what extent have natural events and human impacts affected habitat and populations of Threatened, Endangered, Sensitive, and Management Indicator Species (TES/MIS) and key wildlife species?
   - Succession to late seral vegetation on most forested acres and some rangeland types favors late succession associated species like owls, woodpeckers, and goshawks. Early succession associated species, edge dwelling species, and opportunistic species have lost habitat. The lack of low-intensity thinning fires and stand replacing fires has changed the structural dynamics of forested and rangeland habitat. Fire caused mortality in forested vegetation has not

occurred in the last 100 or more years, reducing this cyclic source of both standing snag and down woody habitat. However, insect mortality has occurred in older-aged forest, causing mortality (snags) and accumulated large down woody debris.

- Aspen forests provide for the most diverse array of wildlife of all of the forested vegetation types. The diversity and quantity of forage (forbs, grasses, aspen shoots, bark, leaves, and buds) greatly exceeds conifer forests. As aspen forests succeed to conifer the forage production drops, affecting big game, birds, and small mammals, many of which are prey carnivores, raptors, and goshawks. Additionally, aspen are prone to various stem decay fungus that provide cavity nesting habitat as live or dead trees. Conifer are not as prone to heart rot as live trees, live longer, and as dead trees are often "hard snags" which fall over before providing cavity nest opportunities. Loss of as much as 45% of the aspen acres existing in the early 1900's represents a significant loss of potential diversity in the watershed.
- No Threatened, Endangered, Sensitive, or Management Indicator Species are known to be adversely affected by this tendency towards advanced successional stages.
- Domestic livestock grazing consumes forage otherwise available for big game and ground nesting and foraging birds. However, elk populations are high and meeting State population goals and deer populations are fluctuating within expected levels. Roads exist within the riparian areas of several streams reducing their potential as wildlife habitat. Beaver and migratory birds are probably below potential because of these lost acres.
- Past treatments of sagebrush has reduced sage grouse habitat, altered the natural composition of understory plants. The effects to wildlife of these changes in plant composition are unknown.
- Logging has provided the only early-seral forested vegetation in the watershed, affecting a small percent of forested acres.
- Increasingly powerful and popular snow machines have the potential to affect wolverine denning if the higher elevations of the watershed are suitable and occupied.
- Fire suppression has reduces early seral condition of all cover types except sagebrush.
- Road building, recreation, livestock grazing, mining and associated early settlements impacted riparian vegetation and wildlife populations.
- No Threatened, Endangered, Sensitive, or Management Indicator Species are known to be adversely affected by human caused impacts except possibly sage grouse.

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# Appendix A

## Roads Analysis

**for the**
**McCoy Creek Watershed Analysis**

**Soda Springs/Palisades Ranger District**
**Caribou-Targhee National Forest**
Bonneville County, Idaho

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## Introduction

The following roads analysis was conducted to assess the existing road system and potential concerns for building new roads within the McCoy Creek Watershed Analysis Area.

## Past Condition

Few roads and trails existed in the McCoy Creek Watershed prior to the early 1840's. Mountain men trappers up and down most of the drainages used trails but no roads of any kind existed. In 1870 gold was discovered in McCoy Creek near Caribou Basin area. The first work on the road from Grays Lake to Caribou City or Iowa Bar (named at that time and many years later after 1920 the name was changed to Caribou City), the road went from Morgan Meadow, head of Tincup and Jackknife Creeks was completed in 1872. In the summer of 1889, Wm. Winschell secured the contract to haul supplies to the mines over this road and he built the Winschell Dug way this same year. The first use of this route was by packhorse train before 1872. Caribou City was opened in 1870 and is credited with a population of 1500 people during the 1870's. The town of Herman along the Grays Lake meadow came into existence about 1875 to serve as a supply center for the gold camps. Roads in the form of wagon trails began to materialize through out area and up a lot of the drainages to accommodate mining activities. By the beginning of the 1900's more sophisticated mining practices begin to appear with two dredging operation in Upper McCoy Creek but both proved unsuccessful because of the shallow ground and rough bedrock. Accesses begin to improve as well to most of the mining operations.

The preconstruction phase of the Palisades Dam project was started early in 1945. Construction was delayed until the close of World War II and until local interests gave satisfactory assurance to the Bureau of Reclamation that they would eliminate the wasteful use of water in the area to be served by the project. Actual construction of the project was initiated in 1951 and completed in 1957. Along with the construction of the dam, road improvements were made on the McCoy Creek Road #087 and a new road

from the dam to Bear Creek was constructed as well as the road from Bear Creek to McCoy Creek #058 was constructed. The dam created a reservoir of 1,401,000 acre-feet capacity. This displaced the main road down the canyon and many minor roads on both sides of the river as well as farmland.

Other roads in the analysis area were developed mainly for forest use such as timber sales off the Brockman Road #086, livestock users and recreation. In the 70's some oil exploration was done on the Caribou and a new improved road was constructed to the drill site on Bald Mountain but then was reclaimed after the drilling was completed. A trail #109 now follows much of the old road system in that area. The McCoy-Herman road was improved with some new relocation of the road in the 1980's.

## Current Condition

This watershed analysis is split by two districts the Soda Springs District and the Palisades District. There are only three main roads in the analysis area, they are: Herman-McCoy Creek Road #087 which is an arterial, gravel surface and receives a lot of traffic from recreation, livestock permittees and in general forest visitors. This road travels through both districts with the major portion of the road being on the Soda Springs District. The road runs from Federal Highway 89 just south of Alpine, Wyoming and goes to Herman, Idaho, which is on the North end of Grays Lake National Wildlife Refuge. The next road is Brockman Road #086 (new number), which takes off of the Herman-McCoy Creek Road near the Caribou Guard Station and goes to the Brockman Guard Station and continues to the county road. This road is a native surface road and in need of some upgrading, surface, drainage etc. It is classified as a collector road and has had several timber sales use this road. This road also crosses both districts and again the most miles are on the Soda Springs District. The last of the three roads is the Bear Creek-Elk Jensen Road #058, which is also a collector. This road goes from the McCoy Creek Road to Bear Creek and is the head of Bear Creek arm on Palisades Reservoir. Only a portion of this road is within the McCoy Creek Watershed Analysis area, it is also a native surface road and narrow in places with portions of it subject to slumping in the spring of the year, especially after a heavy snow fall winter. The whole length of this road is on the Palisades Ranger District. The most use on this road is recreation use but it has had other activities as well.

The rest of the roads in this analysis area are classified as local roads with most of them being high clearance vehicle use. They are made up of roads used for mining activities and timber sale activities and are on the most part native surface roads. Many of the roads on the South side of the analysis area were constructed in rockier soils and the roads do not erode near a bad as on the North side of the analysis area, using McCoy Creek as the center for North and South. Many of the old roads along the Brockman Road were constructed for the purpose of harvesting timber they now have been closed off for full size vehicle use and are used as motorized trails.

## Roads Analysis

Roads analysis is an integrated ecological, social, and economic approach to transportation planning, which addresses both existing and potential future roads (USFS

1999). This roads analysis follows the process outlined in the document "**Roads Analysis: Informing Decisions about Managing the National Forest Transportation System ",** (USFS 1999). This is not a NEPA document, but rather a site-specific analysis. This analysis defines the existing and desired conditions of the road system, and opportunities are identified to move towards the desired condition. This analysis provides a framework to identify road related concerns and management opportunities that can be incorporated into subsequent projects being evaluated through the NEPA process. If necessary, a Forest Plan amendment will be considered.

## Step 1. Setting up the Analysis

- Statement of the objectives of the analysis: *To analyze the present and projected road system needed in the McCoy Creek Watershed Analysis Area*

- List of interdisciplinary team members and participants: *Leon Bleggi, Transportation Planner; Louis Berg, Fisheries Biologist; Darren Olsen, Range Management Specialist; Bill Davis, Recreation Manager; Casey Foos, Soil Scientist; Jim Laprevote, Hydrologist; Dylan Johnson, Fuels Specialist; Ann Keysor, Wildlife Biologist; Scott Gerwe, Minerals Specialist; Mel Moe, Recreation Specialist, Team Leader.*

- List of information needs: *Various analytical tools from each IDT specialist, Forest resource database, and Arc-View maps. Issues for this Analysis Area will drive the intensity of analysis.*

- Plan for the analysis: *The questions from Step 4 of the Roads Analysis were addressed by the IDT.*

## Step 2. Describing the Situation

- Map or other descriptions of the existing road and access system defined by the current forest plan or transportation plan. *Caribou-Targhee National Forest Visitor Map for Montpelier and Soda Springs Ranger Districts. Caribou-Targhee National Forest Travel Map, Palisades and Teton Basin Range Districts. An Arc-View map (**Error! Reference source not found.**) has been produced showing the transportation network in the Analysis Area.*

- Basic data needed to address roads analysis issues and questions. *Each specialist has reviewed his or her resource specialty against the transportation map mentioned above for this Watershed Analysis Area.*

**Figure A - 1: General Vicinity Map of McCoy Creek Watershed**

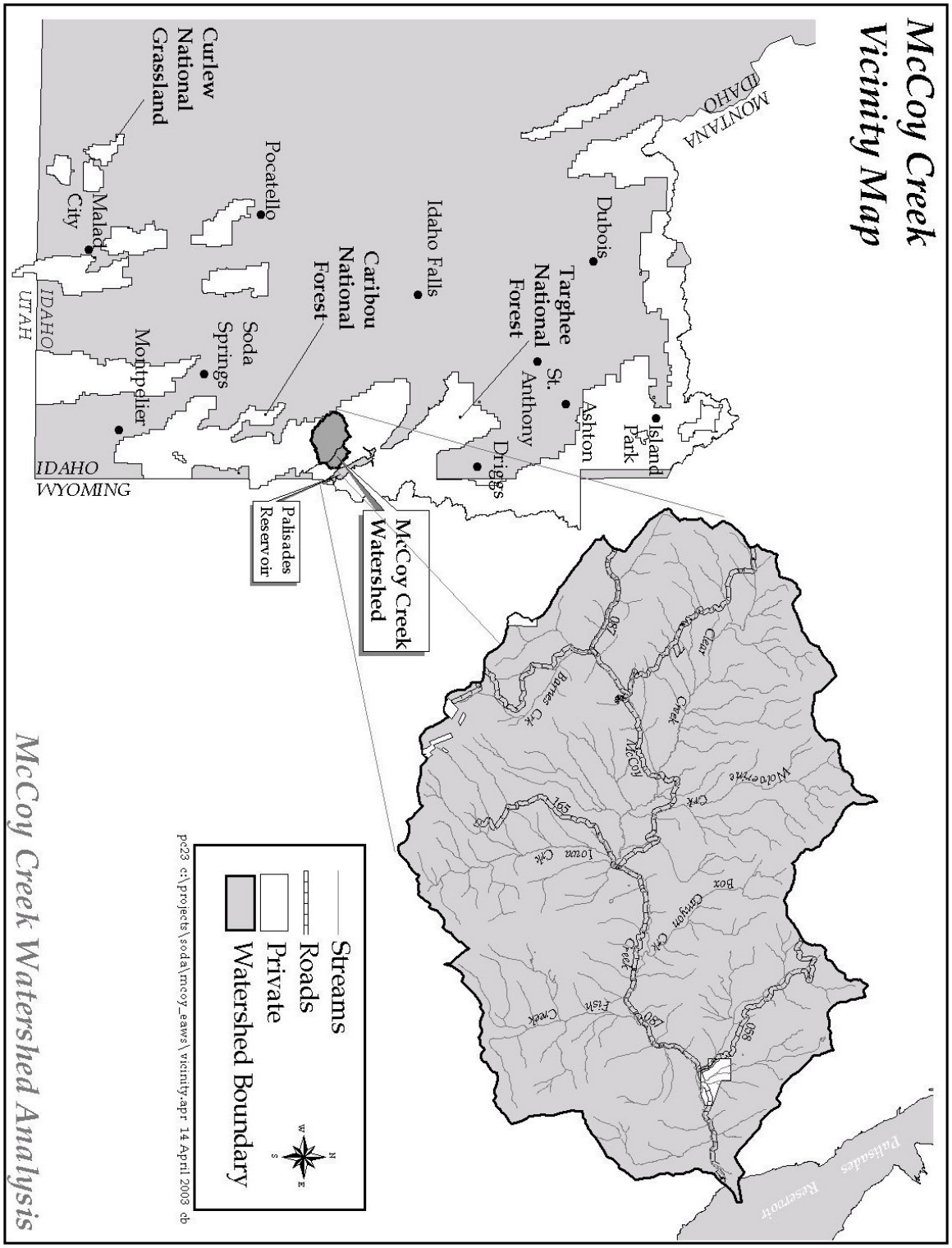


Table A - 1 summarizes the existing condition of classified/unclassified roads associated with the analysis area.

**Table A - 1: Existing Status and Condition of Roads**

| Road Name and Number | Length (miles) | Classified or Unclassified | Open, Closed Year-round, or Seasonally | Surface | Maintenance Level | Service Level |
|---|---|---|---|---|---|---|
| Spring Creek Ridge 20004 | 2.0 | C | OE/ r-t | Native | 1 | D |
| Little Box Borrow Pit 20005 | 0.3 | C | OE | Native | 1 | D |
| Spring Creek Ridge Alt. 20017 | 0.4 | UC | NA | Native | 0 | 0 |
| Boundary Ridge 20034 | 1.35 | UC | NA | Native | 0 | 0 |
| Sheep Camp 20037 | 0.1 | UC | NA | Native | 0 | 0 |
| Miners Delight cutoff 20056 | 1.1 | C | OE | Native | 2 | C |
| Sec 27 Sheep Camp 20057 | 0.4 | UC | NA | Native | 0 | 0 |
| Iowa Creek Camp 20058 | 0.8 | C | OE | Native | 2 | C |
| ( ? ) 20058A | 1.6 | UC | NA | Native | 0 | 0 |
| Little Elk 20062 | 0.9 | UC | NA | Native | 0 | 0 |
| Box Canyon 20073 | 1.8 | | | Paved | | |
| Upper Barns Creek Camp, 20083 | 0.5 | | | Native | | |
| Anderson Gulch 20084 | 1.2 | | | Native | | |
| Caribou Jackknife 20085 | 0.5 | | | Native | | |
| Herman/McCoy 20087 | 23.5 | C | OE | Aggregate | 2 | C |
| Caribou Guard Station 20088 | 0.2 | | | Native | | |
| Brockman 20086 | 12.8 | C | OE | Native | 3 | C |
| McCoy Creek Camp 20089 | 0.5 | | | Native | | |
| Bald Mountain Oil Well Site 20122 | 2.0 | | | Aggregate | | |
| Bald Mountain 20137 | 0.3 | C | | Native | | |
| Clear Creek 20159 | 2.7 | C | OE | Native | 2 | C |

| | | | | | | |
|---|---|---|---|---|---|---|
| Lower Clear Creek 20162 | 2.0 | C | OE | Native | 2 | C |
| Big Elk Mountain 20164 | 0.8 | | | Native | | |
| Caribou City 20165 | 3.7 | *C* | *OE* | Native | 2 | C |
| Iowa Camp 20058 | 0.8 | *C* | *OE* | Native | 2 | C |
| Deep Creek Meadow 20185 | 2.1 | | | Native | | |
| Barnes Creek 20188 | 5.2 | *C* | *OE* | Native | 2 | C |
| Little Elk Mtn. 20284 | 0.9 | *C* | *OE* | Native | 2 | C |
| Pole Creek 20285 | 1.4 | *C* | *OE* | Native | 2 | C |
| Brockman Corrals 20380 | 0.4 | *C* | *OE* | Native | 1 | D |
| Robinson Mine 20381 | 3.2 | *C* | *OE* | Native | 2 | C |
| Elk / Jensen 20058 | 5.0 | *C* | *OE* | Native | 2 | C |
| Miners Delight Cutoff 20056 | 1.3 | C | OE | Native | 1 | D |
| Miners Delight Spur 20215 | 2.7 | | | Native | | |
| Brockman Spur A 21277 (road/trail) | 1.0 | UC | OE | Native | NA | NA |
| Brockman Spur B1 21278-Temp | 0.8 | UC | OE | Native | NA | NA |
| Brockman Spur D1 21282 (road/trail) | 0.8 | | | Native | NA | NA |
| Brockman Spur E1 21284 (road/trail) | 0.9 | UC | OE | Native | NA | NA |
| Upper Clear Creek 21286 (road/trail) | 1.9 | UC | OE | Native | NA | NA |
| York Creek (Not Yet Constructed) | 1.0 | UC | | Native | | |
| | | | | | | |

OE = Open to motorized use during the snow-free season. Over snow-motorized vehicles permitted from snow season to spring.
CW= Closed to motorized use during the snow-free season. Over snow-motorized vehicles permitted from snow season to spring.
r-t= Old road maintained as a trail during snow free season.

**Forest Plan Maintenance Level 1** – Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed one year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities.

Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate". Roads receiving Level 1 Maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during the time they are open to traffic. However, while being maintained at Level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized uses (FSH 7709.58, Chapter 10).

**Forest Plan Maintenance Level 2** – Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Appropriate traffic management strategies are either to discourage or prohibit passenger cars, or; accept or discourage high clearance vehicles (FSH 7709.58, Chapter 10).

**Forest Plan Maintenance Level 3** – Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Appropriate traffic management strategies are either encouraged or accept, or; discourage or prohibit certain classes of vehicles or users (FSH 7709.58, Chapter 10).

**Traffic Service Level C** – Interrupted traffic flow, limited passing facilities, may not accommodate some vehicles. Low design speeds. Unstable surface under certain traffic or weather conditions (FSM 7712.31).

**Traffic Service Level D** – Traffic flow is slow and may be blocked by management activities. Two-way traffic is difficult, backing may be required. Rough and irregular surface. Travel with low clearance vehicles is difficult. Single purpose facility (FSM 7712.31).

## Step 3. Identifying Issues

- Summary of key road-related issues, including their origin and basis. The issues will be presented by general category (environmental, socio-cultural, and economic). *Issues were identified with forest specialists, line officers and the public during the FEIS "Open Road and Open Motorized Trail Analysis", (Motorized Road and Trail Travel Plan), page S-3. This was done on the Targhee portion of the Analysis Area.*

- Description of the status of current data, including sources, availability, and methods of obtaining information. *The forest's resource database and various specialist databases are the most current information available for the McCoy Creek Watershed Analysis Area.*

## Step 4. Assessing Benefits, Problems, and Risks.

- A synthesis of the benefits, problems, and risks of the current road system. *Each of the 71 questions were addressed in detail by the ID team and they are listed below in the document.*

- An assessment of the risks and benefits of entering any un-roaded area. *Covered in the 71 questions, listed below.*

- An assessment of the ability of the road system to meet objectives. *Again, the 71 questions address in detail the ability of the road system to meet objectives.*

***THE FOLLOWING ARE THE QUESTIONS THAT WERE ADRESSED BY THE ID TEAM AS PART OF STEP 4.***

## Ecosystem Functions and Processes (EF)

**EF (1) What ecological attributes, particularly those unique to the region, would be affected by roading of currently un-roaded areas?**

Roads in previously unroaded areas would likely accelerate access for a variety of forest management activities, including timber harvest, and minerals extraction. These management activities would change the amount, pattern, and composition of forest cover. This would lead to a change in terrestrial wildlife and ecological processes.

Newly constructed road(s) in an unroaded area(s) could contribute to the spread of invasive species.

Newly constructed road(s) in previously unroaded area(s) could disrupt big game in their summer habitat and increase accessibility to forest cover areas during hunting.

**EF (2): To what degree do the presence, type, and location of roads increase the introduction and spread of exotic plant and animal species, insects, diseases, and parasites? What are the potential effects of such introductions to plant and animal species and ecosystem function in the area?**

Roads provide access to new places. No matter what type of road (ATV, four wheel drive or passenger vehicle) or its location, roads serve as a corridor for the establishment and spread of noxious weeds.

There are no known exotic insect, diseases, or parasites in the area.

The potential effects of new introductions to plants is a reduction in quality forage for wild and domestic animals. The potential effects of new introductions to animals could lead to a decline in population numbers and/or health of the animals.

**EF (3): To what degree does the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?**

The presence of roads increases a manager's options for controlling noxious weeds, insects, diseases, and parasites. Roads allow access to the forest for many types of treatment, including, mechanical, chemical, and burning.

**EF (4): How does the road system affect ecological disturbance regimes in the area?**

The road system provides access for the removal of biomass (i.e. saw timber and firewood) from the analysis area. The removal of biomass can be a viable management strategy for reducing the risk of high severity fires that adversely impact the watersheds.

Roads provide access for fire suppression activities; however road access also increases the risk of human-caused fires. The risk of human caused fires can be reduced by administrative restrictions and closures during high and extreme fire danger periods.

**EF (5): What are the adverse effects of noise caused by developing, using, and maintaining roads?**

Traffic on roads can be an adverse disturbance both to the overall enjoyment of an area for people and as a disturbance that decrease the use of an area by wildlife. As the use of a road increases the frequency and duration of the noise increases and the disturbance can become chronic.

## Aquatic, Riparian Zone, and Water Quality (AQ)

**AQ (1): How and where does the road system modify the surface and subsurface hydrology of the area?**

Compacted surfaces of roads and dispersed campsites along roads may decrease infiltration into the ground, increasing surface runoff. However, runoff from these roads is not affecting stream flows. This is because there is ample opportunity for this runoff to infiltrate before reaching a stream course. Roads in valley bottoms, like the Barnes Creek Road #20188 can affect surface hydrology when they get rutted as ruts can act as surface streams. The lower portion of the road is the stream channel.

**AQ (2): How and where does the road system generate surface erosion?**

Most of the roads in the analysis area create erosion to some degree. Roads create the greatest amount of erosion of any management activity on the Forest. Erosion reduces the productive nature of soils and introduces sediment into streams that are within the sediment delivery area.

Barnes Creek #20188 and Brockman Creek #20086 roads are likely to directly or indirectly result in sediment input into the stream.

**AQ (3): How and where does the system affect mass wasting?**

The Elk/Jensen Road #20058 and McCoy Creek Road #20087, has had a history of mass wasting, usually during the spring run off. Several sections of road have sloughed away at different times during the season. The hill side is quite steep with many wet areas along the side of the road.

**AQ (4): How and where do road-stream crossings influence local stream channels and water quality?**

Road crossing of ephemeral streams have affected stream channels and water quality to some degree. Fords on Barnes Creek #20188, Robinson Mine #20381 and Big Elk Mtn. #20165 and roads at stream crossing (culvert) on tributaries to other streams (intermittent) may affect water quality.

**AQ (5): How and where does the road system create potential for pollutants, such as chemical spills, oils, de-icing salts, or herbicides to enter surface waters?**

The greatest potential for spills would be along Herman/McCoy Creek Road # 20087. There may be some isolated incidences where herbicides are used for control of noxious weeds, or if any mining activities started again and transporting chemicals to mining sites could be a problem.

**AQ (6): How and where is the road system hydrologically connected to the stream system? How do the connections affect water quality and quantity (such as delivery of sediments, thermal increases, elevated peak flows)?**

Anywhere the road captures water and drains it on its surface and /or ditch lines to streams, it is hydrologically connected to the stream systems. Anywhere this drainage enters streams, there is a potential for sedimentation, increases in water temperatures, and elevated peak flows. Any of the roads in the analysis could have a potential of affecting water quality but it appears not to be major problem in this analysis.

**AQ (7): What downstream beneficial uses of water exist in the area? What changes in uses and demand are expected over time? How are they affected or put at risk by road-derived pollutants?**

The main flow of water in the analysis is McCoy Creek and it flows to Palisades Reservoir with no beneficial uses down stream other than fishing are affected. There doesn't seem to be a risk from road used on the Forest.

**AQ (8): How and where does the road system affect wetlands**.

The only wetlands within the analysis area are associated with streams and adjacent riparian areas. These are generally riverine or palustrine in nature and can include low floodplains where groundwater is at or near the surface for most of the year, or beaver ponds where water is backed up and floods adjacent lands. Several roads encroach on streams and riparian areas. These include Roads #078 McCoy Creek, #188 Barnes Creek and the Brockman #086.

**AQ (9): How does the road system alter physical channel dynamics, including isolation of flood plains; constraints on channel migration; and the movement of large wood, fine organic matter, and sediment?**

Effects are greatest when roads are situated within AIZs. The presence of roads within AIZs may result in sediment delivery to streams, especially at stream crossings, drainage ditches and culverts, and where soil is sidecasted onto steep slopes above stream banks during road maintenance. Where the amount of sediment in the stream substrate increases, the food supply and reproductive success of trout is generally reduced. Sediment delivery is minimized at stream crossings if there are properly installed bridges, culverts, or hardened fords. Roads with a gravel surface deliver less sediment to streams than do unimproved roads. Roads within AIZs may also affect fish habitat by isolating floodplains; restricting lateral channel migration; and reducing riparian vegetation, shade, and the input of wood and other organic matter.

Properly functioning condition assessments indicate that roads are having, or have had, an effect on the condition of the following fish-bearing streams: Barnes, Box Canyon, City, McCoy, and Miners Delight creeks (Table 3). As indicated in Table 2, the YCT population in Barnes Creek is low in comparison to other streams. This is especially true when considering stream size; all smaller streams have more dense fish populations than Barnes Creek. Box Canyon Creek has an abundant YCT population. City Creek has a low total YCT population in comparison to other streams. McCoy Creek has an abundant YCT population, which may be a result of high productivity in some tributary streams because McCoy Creek itself appears to have a high level of stream sedimentation. Miners Delight Creek has the lowest total YCT population of any stream in the McCoy Creek Drainage.

Sediment delivery through drainage ditches and culverts appears to be highest along the mostly unimproved Brockman Road (Route 086) in the Clear Creek drainage. The portion of this road within AIZs has about 22 drainage ditches or culverts, of which 20 show signs of sediment delivery (Louis Berg, USDA Forest Service, unpublished data). Sediment delivery is noticeably absent or minimal near a crossing of Pole Creek where a short segment of the road has been graveled. The graveled McCoy Creek Road within AIZs has about 39 road drainage culverts, of which 27 show signs of sediment delivery but in generally lower amounts than occurs along the Brockman Road.

Delivery of sediment by sidecasting of soil during road maintenance is apparent along the McCoy Creek Road, particularly in the vicinity of Spring Creek. In this area, there are about 8 locations where material cleaned from drainage ditches to clear culvert openings has been routinely dumped onto steep banks above the stream (Louis Berg, USDA Forest Service, unpublished data).

Streams most likely to accumulate sediment and have fish populations impacted by it are those with a combination of low gradient and low maximum water flows. Ranking of fish-bearing streams by gradient, from lowest to highest, is as follows: McCoy Creek, Clear Creek, Keenan Creek, Miners Delight Creek, Iowa Creek, Pole Creek, Wolverine Creek, Barnes Creek, Fish Creek, Jensen Creek, City Creek, Box Canyon Creek, and Bilk Creek. Although sediment delivery may not affect fish habitat in some moderate- to

high-gradient streams, those streams may transport sediment downstream to low-gradient waters and cause problems there.

There are several improperly sized culverts which, if blocked with debris, could cause road wash-out and stream sedimentation. One of these is located where the McCoy Creek Road crosses Spring Creek. Another exists where the Brockman Road crosses an unnamed tributary of Pole Creek.

**AQ (10): How and where does the road system restrict the migration and movement of aquatic organisms? What aquatic species are affected and to what extent**

There are 37 open road crossings of perennial streams, of which 13 are fords, 21 have culverts, and 3 are bridges. Of ford crossings, two have been hardened with rock to reduce stream sedimentation. Four of the road ford crossings are located on the Barnes Creek Road (FS Road 50188). The lowest Barnes Creek crossing visually appears to be delivering the highest amount of sediment to a stream even though it is a hardened crossing. High sediment delivery occurs there because of the crossing width and amount of motorized use.

Culverts can be barriers due to vertical water drop, high velocity, length, and/or debris blockage. Seven culverts along the McCoy Creek Road checked for ability to pass fish in 2003 are considered partial or complete barriers (Louis Berg, USDA Forest Service, unpublished data). These barriers occur on the following perennial streams: Lake Creek, McCoy Creek, Miners Delight Creek, and three unnamed waters. Lake Creek in 2003 did not have a fish population above or below its culvert despite what appeared to be good quality habitat. Stream distance below the culvert is short, and insufficient accessible habitat is a likely reason for absence of fish. In McCoy Creek, a 2003 survey indicated that YCT had 32% higher density below a culvert than above it. Sculpin had 154% higher density, and longnose dace had six times higher density, below the culvert than above it. Fish were present in Miners Delight Creek in 2003 below its culvert but not above, although YCT used to occur upstream (Derek Hinckley, personal communication). Drought-induced low water flows are the probable reason for loss of fish in upper Miners Delight Creek. Recolonization of upper Miners Delight Creek is not possible because of the culvert. The unnamed streams with barrier culverts have not been surveyed to determine fish presence and culvert effects on fish populations.

**AQ (11): How does the road system affect shading, litter-fall, and riparian plant communities?**

Where roads have encroached upon streams, there have been impacts to stream shading, litterfall, and riparian plant communities. Those roads are listed above.

**AQ (12): How and where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species?**

At-risk aquatic species in the analysis area are primarily Yellowstone cutthroat trout. All fish-bearing streams in the analysis area have roads extending at least part way up from their mouths, often in close proximity to the stream. Their nearness to the streams provides opportunities for fishing, poaching, and habitat loss.

Roads increase the impact and risk to aquatic organisms of all human activities in the McCoy Creek Watershed by providing access for those activities. Human activities and potential activities include trail construction and use, angling and other recreation, introduction of nonnative fish species and diseases, livestock management, mining, timber harvest, and fire suppression. The portion of the road system within AIZ is of greatest concern because it is there activities facilitated by roads closely overlap the distribution of YCT.

**AQ (13): How and where does the road system facilitate the introduction of non-native aquatic species?**

Stocking of non-native fish by Idaho Department of Fish and Game has been terminated in the analysis area. However, the release of non-native species could still occur illegally by the public. This risk is greatest where roads encroach upon streams.

**AQ (14): To what extent does the road system overlap with areas of exceptionally high aquatic diversity or productivity, or areas containing rare or unique aquatic species or species of interest?**

McCoy Creek and its tributaries are Caribou-Targhee National Forest Yellowstone cutthroat trout stronghold streams. There is a total of 59 miles of open roads in the McCoy Creek analysis area. Thirty-four percent (20 miles) of the open road miles are situated within AIZs. Of the open road mileage within AIZs, approximately 11 miles are graveled and 9 miles are ungraveled. The only graveled road is the McCoy Creek Road (FS Road 087).

## Terrestrial Wildlife (TW)

**TW (1): What are the direct effects of the road system on terrestrial species habitat?**

The road prism removes local vegetative communities. The McCoy Creek Road is not wide or busy enough to cause fragmentation of terrestrial habitat for many species. The remaining roads are single lane and use is less frequent. These roads, or loss of habitat, are not built to cause a barrier to movement. (Displacement and road kill is discussed below.) This loss of usable habitat due to displacement of animals by activities on roads is a very low percentage and not impacting wildlife needs.

**TW (2): How does the road system facilitate human activities that affect habitat?**

The road system facilitates vehicle access onto the National Forest. This increases logging, livestock grazing, wildfire suppression/ignition, recreation opportunities, and developments (guard stations, corrals, and gravel sources). These activities change wildlife habitat usually by disturbance to early seral vegetation; some localized sites are not likely to revegetate with current use. The probability of introducing exotic plant and animal species also increases. Roads provide access to motorized and non-motorized trails, which in turn increases impacts along the trail to a lesser degree, specifically vegetation removal and exotic species introductions.

Wildfires are easier to control and prescribed burning may be easier to implement. Likewise, increased human activities increase the chances of human caused wildfires. To a lesser degree, firewood gathering removes standing snags and down woody debris and campers trample the vegetation in localized areas.

**TW (3): How does the road system affect legal and illegal human activities (including trapping, hunting, poaching, harassment, road kill, or illegal kill levels)? What are the effects on wildlife species?**

Roads facilitate human access and increase human interactions with wildlife. This increases big game vulnerability and displacement. This in turn, reduces the area efficiently used by some forms of wildlife. The large vehicle access is limited to the McCoy Creek road artery and four side roads: Barnes Ck, Brockman, Caribou City, and Jensen Creek. Road kills more commonly occur on well-improved roads where vehicles can drive at a higher rate of speed. Most road kills in the watershed would be limited to slow moving wildlife (amphibians, reptiles, and small mammals). Roads also provide winter snowmobile routes, which can increase disturbance and displacement of animals such as furbearers and wintering moose.

Game populations are controlled by Idaho Department of Fish and Game regulations. Hunting unit boundaries, season lengths, and tag numbers are determined is part by open roads and trails. Access increases wildlife-killing opportunities but also law enforcement capabilities. Poaching levels are unknown, but may be high due to the large unroaded areas. Restrictions on the use of ATVs when hunting were implemented in 2003. This is designed to increase hunter enjoyment.

Sage grouse populations may have been eliminated in Caribou Basin due to increased access, a large mining population, and unrestricted hunting.

**TW (4): How does the road system directly affect unique communities of special features in the area?**

Roads built to extract minerals and the associated creation of cities and a resident population in Caribou Basin that hunted the available wildlife for food, likely reduced the resident population of sage grouse. There are no other unique communities of special features in the area.

## Economics (EC)

**EC (1): How does the road system affect the agency's direct costs and revenues? What, if any, changes in the road system will increase net revenue to the agency by reducing cost, increasing revenue, or both?**

The agency derives direct revenue from grazing, timber harvest, firewood permits, Christmas tree permits and special use permits that are all accessible by the present road system.
The road system decreases cost of fire suppression by increasing access to remote areas or by not decommissioning roads.
The road system decreases the cost to administer range allotments by providing access.

**EC (2): How does the road system affect priced and non-priced consequences included in economic efficiency analysis used to assess net benefits to society?**

The economics will be addressed in the new Forest Travel Management Plan that is in the first stages of development. Its planned completion date is December 2004.

**EC (3): How does the road system affect the distribution of benefits and costs among affected people?**

The road system is open and free to everyone (benefits). The cost of the system is borne through a combination of county, state and federal taxes. Many people, who do not directly benefit from the road system, contribute to the cost of it.
Timber sales have the potential to improve roads by graveling, improving drainage and maintenance to a road system.

## Timber management (TM)

**TM (1): How does road spacing and location affect logging system feasibility?**

The present road system is not adequate to remove timber from the analysis area. If there are additional transportation system needs, new construction (system or temporary roads), re-construction, and re-location to access treatment areas, if permitted by forest plan, will be evaluated.

**TM (2): How does the road system affect managing the suitable timber base and other lands?**

Road systems provide for faster and less expensive access to national forest lands for resource inventory data collection, monitoring activities and conditions, law enforcement, fire suppression, watershed restoration, site preparation and tree planting, treating noxious weeds, tree thinning, and numerous other forest management activities.

**TM (3): How does the road system affect access to timber stands needing silvicultural treatment?**

See TM(1( and TM(2).

## Minerals management (MM)

**MM (1): How does the road system affect access to locatable, leasable, and salable minerals?**

There are no leasable minerals in the area, but there may be low potential for oil/gas development in the future. The road system provides adequate access for locatable, leasable and salable minerals. That's based on the fact that if someone submitted a Plan of Operations to extract any minerals, and there wasn't an existing road providing access, they could build one after NEPA was completed.

## Range management (RM)

**RM (1): How does the road system affect access to range allotments?**

The roads in this analysis area allow for easier administrative management of range allotments, including transportation of livestock, herding, salting, range improvements, controlling noxious weeds and a variety of range maintenance responsibilities (i.e. fencing, water developments).

## Water production (WP)

**WP (1): How does the road system affect access, constructing, maintaining, monitoring , and operating water diversions, impoundments, and distribution canals or pipes?**

The road system in the analysis area does not affect water production and is not used for the production of water.

**WP (2): How does road development and use affect the water quality in municipal watersheds?**

McCoy Creek is not a municipal watershed.

**WP (3): How does the road system affect access to hydroelectric power generation?**

The road system is not used for access to hydropower facilities.

## Special forest products (SP)

### SP (1): How does the road system affect access for collecting special forest products?

The collection of special forest products depends mainly on existing forest roads. Other than firewood gathering, which occurs extensively along roads, this analysis area does not offer many special forest products that are in demand.

## Special-Use Permits (SU)

### SU (1): How does the road system affect managing special-use permit sites (concessionaires, communications sites, utility corridors, and so on)?

The current road system is adequate for the management of any existing special use permits. No additional roads are anticipated because at this time there are no communications sites, utility corridors, or any other special –use permits, there are some near this watershed but they are outside of the analysis area.

## General Public Transportation (GT)

### GT (1): How does the road system connect to public roads and provide primary access to communities?

The road system, on both the East and West side of the analysis area connects to a public road system. On the West it ties to a county road system at Grays Lake National Wildlife Refuge and then connects to State Highway 34 at Wayan, Id. Going to the East a major portion of the road system connects to the McCoy Creek Road #087 which ends at Federal Highway US 89, near the town of Alpine, Wyo.

### GT (2): How does the road system connect large blocks of land in other ownership to public roads (ad hoc communities, subdivisions, in-holdings and so on)?

The McCoy Creek Road #087 is the main road that runs through the analysis area from East to West and all roads can in one form or another connect to the McCoy Creek Road. The McCoy Creek Road connects to a county road system on the West where a small community exists at Grays Lake and Wayan, Idaho. To the East on the McCoy Creek Road, it passes through a parcel of in-holding land and then past some subdivisions along the Palisades Res. and ending a U.S. Highway 89, in Wyoming going North on Hwy. 89 will take you to Alpine, Wyoming and to the South to Afton, Wyoming.

### GT (3) How does the road system affect managing roads with shared ownership or with limited jurisdiction? (RS 2477, cost-share, Prescriptive rights, FLPMA easements, FRTA easements, DOT easements).

Bonneville County, Idaho and Lincoln County, Wyoming maintains the McCoy Creek Road #087, which is under a USDA Easement, (Forest Development Road Agreement). Lincoln County maintains the road from Hwy. 89 to the state line and Bonneville County maintains it from the state line to Elk-Jensen Road #058. The Forest Service maintains it from Elk-Jensen to the forest boundary to the west and Bonneville County maintains it to the county road at Herman. The road system has not experienced any affects managing roads with shared ownership or jurisdiction.

**GT (4): How does the road system address the safety of road users?**

The objective of roads analysis in the Forest Service is to provide line officers with critical information to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions.

## Administrative uses (AU)

**AU (1): How does the road system affect access needed for research, inventory, and monitoring?**

Road access affects research, inventories, and field monitoring. Limited, or no road access, increases both time and costs for field observations. All roads in the analysis area are used for administrative purposes.

**AU (2): How does the road system affect investigative of enforcement activities.**

Forest Service law-enforcement agents are faced with a growing workload paralleling the growth in forest use. This workload adds to the traditional work related to investigating natural resource thefts and travel management enforcement. Expanded road access, particularly near towns, can add to problems with garbage dumping, vandalism and other criminal activities.

## Protection (PT)

### PT (1) How does the road system affect fuels management?

The road system does provide access for prescribed burns for decreasing fuels and access for wildfire. Also the roads provide an access for gathering firewood which reduces fuel loading in areas with down and dead standing trees.

### PT (2) How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?

Good access is critical to fire fighters; the road system does provide access for fire suppression, thus facilitating fire suppression efforts. The analysis area has numerous roads that need to be maintained on a regular basis to accommodate fire suppression if needed. Also some road improvements would help the majority of the roads in the analysis area if a need for fire equipment were to be used on the roads.

### PT (3) How does the road system affect risk to firefighters and to public safety?

Increases chance of fire by increased accessibility.

The location of narrow roads in canyons can endanger fire fighters because of poor sight distance, dust, smoke, and non-fire fighting personal on the roads and an increase of traffic on the roads.

The Barnes Creek Area, in its present condition, would not allow motorized traffic to move quickly over the road.

### PT (4) How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?

Most of the roads in this analysis area are constructed with native material, which when dried out causes a fair amount of dust from vehicles using the road, and for a short period of time dust will remain in the air making visibility difficult and those with respiratory problems may be bothered for several minutes until the air clears again.

In the analysis area there is limited dust abatement used on the roads if any.

With the low volume of traffic using these roads, we feel that there is an extremely low risk to users, with the exception of the McCoy Creek Road (#20087), where some travelers drive it at speeds faster than recommended.

## Un-roaded Recreation (UR)

**UR (1) Is there now or will there be in the future excess supply or excess demand for un-roaded recreation opportunities?**

Currently there is no shortage of un-roaded recreational opportunities within the analysis area. Much of the analysis area falls within the Boulder Creek Closure area and the Caribou Roadless area. Prescription emphasis within these areas are on deer/elk winter range, non-motorized recreation and wildlife security, semi-primitive recreation (including a proposed wilderness), range management, and special use recreation.

**UR (2) Is developing new roads into un-roaded areas, decommissioning of existing roads, or changing the maintenance of existing roads causing substantial changes in the quantity, quality, or type of un-roaded recreation opportunities?**

There are encroachment trends upon un-roaded areas by un-authorized two-track All-Terrain Vehicles (ATV's). There is no management emphasis toward increasing the number or mileage of motorized system roads or trails within the analysis area.

**UR (3) What are the effects of noise and other disturbances caused by developing, using, and maintaining roads on the quantity, quality, and type of un-roaded recreation opportunities?**

Some minor disturbance and annoyance may occur through these activities but they are short in duration and do not cause long-term impacts to affected recreational users.

**UR (4) Who participates' in un-roaded recreation in the area affected by construction, maintaining and decommissioning roads?**

Equestrians, dirt bike users, ATV users, hikers, mine claim permittees and hunters participate in un-roaded recreation. Those that participate would feel some affect.

**UR (5) What are these participants' attachments to the area, how strong is their feelings, and is alternative opportunities and locations available?**

This depends entirely upon the user group. For example, hikers like a more serene, peaceful, solitary recreational experience than the equestrian user. Within the motorized community there is a wide range. Dirt bike users tend to be more solitary while the snowmobile user tends to be more social/group oriented. The ATV user is a little of both.

**Road- related recreation (RR)**

**RR (1) Is there now or will there be in the future excess supply or excess demand for roaded recreation opportunities?**

Most of the area is un-roaded and little or no new road or motorized trail construction is expected.

**RR (2) Is developing new roads into un-roaded areas, decommissioning existing roads, or changing maintenance of existing roads causing significant changes in the quantity, quality, or type of roaded recreation opportunities?**

No major changes to the existing motorized transportation system are planned.

**RR (3) What are the adverse effects of noise and other disturbances caused by constructing, using, and maintaining roads on the quantity, quality, or type of roaded recreation opportunities?**

There may be some minor annoyance to the non-motorized recreation user but this annoyance will be of short duration with no long-term effects.

**RR (4) Who participates in roaded recreation in the areas affected by road constructing, maintaining, or decommissioning?**

Hunters, ATV and dirt bike users, campers, mountain bike users, and four-wheel drive enthusiasts participate in roaded recreation.

**RR 5) What are these participants' attachments to the area, how strong is their feelings, and is alternative opportunities and locations available?**

Forest users have feelings of strong historical and traditional use for specific areas. Some users have strong feelings for cross-country motorized travel and others want areas closed to motorized travel-two conflicting uses. There is a reluctance to use alternative opportunities and locations because of these feelings.

## Passive-Use Value (PV)

**PV (1) Do areas planned for road entry, closure, or decommissioning have unique physical or biological characteristics, such as unique natural features and threatened or endangered species?**

Areas in the analysis planned for road entry, closure, or decommissioning is in big game summer use areas. Part of the project area is in Lynx Analysis Unit (LAU) 25 and 26 the remaining project is outside of the (LAU). See Lynx Analysis Unit Map.

**PV (2) Do areas planned for road construction, closure, or decommissioning have unique cultural, traditional, symbolic, spiritual, or religious significance?**

Forest consultation procedures and inter-government agreements with the tribes to guide future cooperative efforts will comply with the protocols set forth in the National Resource Book on American Indian and Alaska Native relations Working Draft 1995 or its successor. For this analysis area there are no unique cultural sites known at this time.

**PV (3) What , if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, sacred, traditional, for religious values for un-roaded areas planned for road entry or road closure?**

A tribe's legal status is also derived through agreement with the U.S. Government, congressional and executive branch recognition of tribes and federal court interpretation of Indian Law and legal documents, e.g. treaties. The Federal agencies have trust obligations to address effects to tribal interests, rights and property on reservations, public lands and are required to disclose know effects through the NEPA process. There may be natural resources that exist here which are utilized by the tribe for religious, cultural and traditional purposes but are unidentified for this analysis.

**PV (4) Will road construction, closure, or decommissioning significantly affect passive-use value?**

Yes, to some extent it will affect passive use values no matter what is done. To change from the present condition it will have some affect to the land and to the forest users. Existence value is value or benefit people receive from the existence of a specific place, condition, or thing independent form others. Each person will have there own value of the land independent from one another and how they would like to see it managed.

## Social issues (SI)

**SI (1) What are people's perceived needs and values for roads? How does road management affect people's dependence on, need for, and desire for roads?**

Roads in general for this area have a great value, people depend on them for recreation, livestock management, as well management of the National Forest Lands. Many local residents depend on the road system for commodity use such as firewood gathering, hunting of big game animals to supplement family food supplies, livestock management operations, and providing saw timber to industry and for personal use. At one time some of the road system was used for mining activities as well as serving several mining towns and other businesses in the area.

**SI (2) What are people perceived needs and values for access? How does road management affect people's dependence on, need for, and desire for access?**

Access is the permission or ability to enter an area or reach a destination. The road trail system in the analysis area provides access to the entire area for all type of users. Some people perceive roads to be the means to access forest resources, on which they may be economically and culturally dependent. Some perceive roads to be a deterrent to healthy wildlife habitat, or unacceptable contribution to stream sedimentation. Others want to see roads maintained to a high standard. Each has a different view of how they would like to see a road system managed to match their individual lifestyle.

**SI (3) How does the road system affect access to paleontological, archaeological, and historical sites?**

There are no paleontological sites identified for this analysis area although the United States Government has a unique relationship with federally recognized American Indian tribes and any activities that may affect a tribe's treaty rights, needs and concerns will be considered in road planning. Part of the Caribou Basin Guard Station and the Bald Mountain Guard Stations as well as the old mining claims in this area is considered historical sites that are accessible by roads and is identified as a Special Emphasis Area ( 2.1.4(b)) in the Revised Forest Plan for the Caribou National Forest.

**SI (4) How does the road system affect cultural and traditional uses (such as plant gathering, and access to traditional and cultural sites) and American Indian treaty rights.**

The present road system has not changed for some time and it does not affect cultural and traditional guises or have there been any problems in the past brought to the attention of the Forest Service. Also see PV (2).

**SI (5) How are roads that are historic sites affected by road management?**

The roads in and around the Old Caribou City site were mostly left in place and receive some general maintenance to the main roads. Some of these roads may constitute historic sites under the National Historic Preservation Act (1966). So any management opportunities that might be developed for these roads must address and be in compliance with this act.

Roads in this area have had assertions made on them by Bonneville County as RS 2477 (Revised Statute), the Forest will not make any road management decisions to decommission roads that have an RS 2477 assertion until the claim has been resolved in court at which time the roads will be turned over to the public road agency or the forest will make a management decision on the states of the roads.

**SI (6) How is community social and economic health affected by road management (for example, lifestyles, businesses, tourism industry, infrastructure maintenance)?**

Current access needs to be maintained for range management and fire protection. Tourism in this area is primarily hunting/fishing and recreational/visitation along forest roads.

**SI (7) What is the perceived social and economic dependency of a community on an un-roaded area versus the value of that un-roaded area for its intrinsic existence and symbolic values?**

The road system is used by all groups of people with different values of life. constructing additional roads/motorized trails within the analysis area would affect different user groups.

**SI (8) How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?**

The opportunity for primitive recreation will remain the same. Any additional roads would conflict with the wilderness attributes in the Caribou Roadless Area.

**SI (9) What are the traditional uses of animal and plants species within the area of analysis?**

The entire analysis area provides year round habitat for a variety of species ranging from sagebrush valleys to high mountain peaks. Livestock have traditionally grazed the analysis area. Big game, small game and other animals have traditionally utilized the plants in the area for food and shelter. Tree species in the area are used by wildlife. Local residents have used trees as saw timber, firewood and other products.

Animals: big game, sage grouse, etc have been traditionally used as food. Hunting and trapping have a long history from uses by Native Americans, fur trappers, and miners.

Plants: livestock grazing, berry picking, Christmas Trees, saw log timber, other forest products, and firewood gathering.

**SI (10) How does road management affect people's sense of place?**

Some people have been using this analysis area for decades and consider it a special place. These people are ranchers, outfitters, hunters, and private forest users. Each person, or group of people, views the forest in their own way. To some it may be a place to make a living, a place to relax and escape, a religious experience, or a place to pursue hobbies. Changes in road management can affect access to special places and change the biophysical setting, all of which will affect the experience people have, either for the positive or the negative.

## Civil Rights and Environmental Justice (CR)

**CR (1) How does the road system, or its management, affect certain groups of people (minority, ethnic, cultural, racial, disabled, and low-income groups)?**

The road system provides an opportunity for all groups to have access onto public lands. It provides an opportunity for people site see, explore other outdoor activities, to supplement their food and fuel bills by gathering firewood and hunting big game and fishing. The roads and trails in the analysis area provide a variety of access for all visitors that use the National Forest.

People are affected by changes in road management and the access afforded by roads. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Population and Low-Income Populations, order Federal agencies to identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…" Department of Agriculture agencies are required, per the Secretary of Agriculture's 1978 decision, to identify and address the civil right implications of proposed agency actions in their management decisions.

## Step 5. Describing Opportunities and Setting Priorities

- Descriptive ranking of the problems and risks posed by the current road system.

- Assessment of the potential problems and opportunities of building roads in currently un-roaded area.

- List of opportunities, by priority, for addressing important problems and risks.

*Priority 1:* The top priority is to improve the present road system in the analysis area. To accomplish this, the existing road system will need to be improved. The road system, although relatively stable, suffers from a lack of routine maintenance on all roads. Many of the specified roads are rutted, lacking drainage structures and a gravel surface material. Numerous roads need to be re-located in some areas to make it a more stable road system. The Herman-McCoy Creek Road is the most stable of all the roads in the analysis area.

- A prioritized list of specific actions, problems, or forest plan adjustments requiring NEPA analysis.

*OPPORTUNITIES BY PRIORITIES*

- The Barnes Creek road needs drainage structures and the road needs to be built up and moved out of the creek (#20188). Also there are other areas of this road that could use some drainage structures and erosion preventions on the road.
- Brockman Creek road needs to be surfaced and in places relocated or surface raised with borrow material to prevent erosion problems and putting sediment in to stream channels (#20086).
- Install turnouts and drainage structures as well as gravel surfacing on the Bear Creek-Elk Jensen road (#20058).
- Control drainage with structures off small side roads along the McCoy Creek road that floods across the road and causes erosion problems to the road (#20087).
- Place gravel/install and clean drainage structures and add new drainage structures, needs to be maintained Robinson Mine (#20381).
- Road needs to be improved if it is to remain open to public traffic Willow Creek (#20118.)
- Many small roads that lead to dispersed campsites off the McCoy Creek where approaches on and off the road could be modified (#20087).
- If the York Creek gravel pit is developed this would be an open road (new) and enter on to the McCoy Creek east of the existing York Creek road.
- Incorporate BMP's to prevent further spread and establishment of noxious weeds through out the analysis area.

- **Table A - 2** identifies roads that could be directly affected if activities were to begin in the McCoy Creek Watershed Analysis area and summarizes the need and activity associated with each road. Appendix A of this document discloses Road Management Objectives for individual roads scheduled to remain on the transportation system.

**Table A - 2: Project related Need/Activity**

| Road Number | Need for the Road Relative to McCoy Creek Watershed Analysis | Road Activity Relative to McCoy Creek Watershed Analysis |
|---|---|---|
| 20087 | Haul Route, Main Route to Herman Id. to Alpine, Wyo. | Specified Road Maintenance |
| 20086 | Log Haul Route, Forest user Route | Specified Road Maintenance |
| 20159 | Recreation High Clearance | Specified Road Maintenance |
| 20162 | Recreation High Clearance | Specified Road Maintenance |
| 20164 | Recreation High Clearance | Specified Road Maintenance |
| 20165 | Restricted Road Access | Specified Road Maintenance |
| 20058C | Restricted Road Access | Specified Road Maintenance |
| 20188 | Restricted Road Access, Mining | Specified Road Maintenance |
| 20284 | Recreation High Clearance | Specified Road Maintenance |
| 20285 | Recreation High Clearance | Specified Road Maintenance |
| 20380 | Recreation High Clearance | Specified Road Maintenance |
| 20381 | Restricted Road Access, Mining | Specified Road Maintenance |
| 20058T | Recreation High Clearance | Specified Road Maintenance |
| 20056 | Restricted Road Access | Specified Road Maintenance |
| 21277 | Recreation Road/Trail | Maintenance |
| 21278 | Restricted Road | Maintenance |
| 21282 | Restricted Road/Trail | Maintenance |
| 21284 | Restricted Road/Trail | Maintenance |
| 21286 | Restricted Road/Trail | Maintenance |

## Step 6. Reporting

- Reports including maps, analysis, and text documentation of the roads analysis. *See the project folder documentation for the Caribou and Targhee National Forest Roads Analysis for this Analysis Area.*

- Maps that show the data and information used in the analysis, and the opportunities identified during the analysis. *See the project folder documentation for the Roads Analysis for this Analysis Area.*

## Road Management Objectives

**FSM 7712.31**

| **RMO** | **Date Prepared = 5/20/04** |
|---|---|
| **Herman/McCoy #20087 Total Length = 23.5Miles** | |
| **Miles by Surface Type: Native: 0 Miles, Aggregate: 23.5 Miles, Pavement: 0 Miles** | |
| **Roadway Termini is Jct. US 89 Alpine Wyo. to County Road at Herman** | |
| **This road is within the State of Idaho and Wyoming, County of Bonneville and Lincoln County Wyoming** | |
| **Existing roadway status Exists at Maint. Level 4 (Open), Objective Maint. Level is 4.** | |

Functional class is Arterial, (Provides service to large land areas. Connects with other arterials or public highways). Service Life is Intermittent, Traffic Service Level is 'B', (Congested during heavy traffic, slower speeds and periodic dust; accommodates any legal-size load or vehicle). Low design speeds. Passenger vehicles-gravel surface not smooth, may be problems under certain traffic or weather conditions).

Primary use of this road is for recreation but will provide access timber or mining hauling and other resource uses and activities. Other uses include forest administration, hunting and fire prevention traffic. Design and critical vehicle for this road is a standard logging truck that is 8.5 feet in width.

This Forest roadway is under Bonneville and Lincoln County Jurisdiction on the Targhee portion and Forest Service Crew maintains this road from Elk Jensen intersection to the Forest Boundary on the Caribou portion of the Forest and Bonneville County maintains the rest to Herman.

This road falls within the Caribou Range Mountains Subsection (M331Di) – Watershed #036, 037 and 040 on the Targhee. The Watersheds for the Caribou are 6$^{th}$ Code Hydrologic Units 041102, 041103, 041104, 041105 and 041106. Management direction is based on Management Prescription 5.4 (c) Elk Security Range (Big Game Security Emphasis), 6.1 (b) Range Management, 3.1.1 (a) Non-Motorized, in the Revised Targhee Forest Plan. In the Caribou Revised Forest Plan Management direction is based on Management Prescription 3.3 (b) Semi-Primitive- restoration, 6.2 (b) Rangeland Vegetation Management, 3.1 (a) Non-Motorized Recreation and Wildlife Security, 3.2 (b) Semi-Primitive Recreation, 1.3 (e) Recommended Wilderness and 4.2 (b) Special Use Recreation Sites. Big game security, other compatible commodity outputs and consideration for long-term forest health. Management actions and resource conditions provide increased security for big game species, and hunting opportunities with limited access. Maximum open road density is 2.0 miles per square mile.

No special concerns have been identified for this area.

Special traffic requirement includes signing during logging or mining activities to provide for public safety, turn around for vehicle with trailer, and turnouts for passing.

**Existing Travel Management:**

Motorized and mechanized travel is encouraged on designated roads and acceptable on designated trails. Summer cross-country travel is acceptable for mountain bike traffic but restricted for all motorized vehicles. Winter cross-country travel is acceptable.

| RMO | Date Prepared 5/20/04 |
|---|---|
| **Brockman #20086 Total Length = 12.8 Miles** | |
| **Miles by Surface Type = Native: 12.8 Miles, Aggregate: 0 Miles, Pavement: 0 Miles** | |
| **Roadway Termini is Jct. County Road, Sec. 26 Hot Springs and Sec. 17, Herman/McCoy Road #20087** | |
| **This road is within the State of Idaho, County of Bonneville.** | |
| **Existing roadway status is Exist at Maintenance Level 3 (Open), Objective Maintenance Level 3.** | |

Functional class is Collector, (provides service to smaller land areas than an arterial road and usually connects forest arterial roads to local forest roads or terminal facilities). Service Life is Intermittent, Traffic Service Level is 'C', (interrupted traffic flow, limited passing facilities, may not accommodate some vehicles. Low design speeds. Unstable surface under certain traffic or weather conditions).

Primary use of this road is for timber hauling, recreation and range or livestock allotments but will provide access for a mix of resource uses and activities. Other uses include forest administration, hunting and fire prevention traffic. Design and critical vehicle for this road is a standard logging truck that is 8.5 feet in width.

This major portion of roadway is under Forest Service Jurisdiction, is not a Cost Share road with State of Idaho, and is not subject to the Highway Safety Act. The first part of this road (Approx. 2 miles) is under Bonneville County Jurisdiction and the road crossed two areas of private land. This road falls within the Caribou Range Mountain Subsection Watershed (M331Di) – Watershed #040 on the Targhee and 041105, 6$^{th}$ Code Hydrologic Unit on the Caribou portion of the Forest. Management direction is based on Management Prescription 5.1.4 (b) Timber Management (Big Game Security Emphasis) as described on pages III-139 thru III-142 of the 1997 Revised Forest Plan for the Targhee National Forest and 3.3 (b) as described in the Caribou Revised Forest Plan. Emphasizing wood-fiber production and use, big game security, other compatible commodity outputs and consideration for long-term forest health. Management actions and resource conditions provide increased security for big game species, and hunting opportunities with limited access. Maximum open road density is 1.5 miles per square mile. Special concerns have been identified, a min. of 18’ culverts should be installed in all draws and live streams. Ditches cut ½ foot to 1 foot in depth. Ditch slope 3:1, Rolling dips and out-slope travel ways where appropriate.

Special traffic requirement includes signing during logging activities to provide for public safety, and turnouts for passing. A gravel surface is recommended for the entire route with some road modifications or relocation in some places and drainage problems corrected. Curves on the road should be a minimum of 50 foot radius.

**Existing Travel Management:**

Motorized and mechanized travel is encouraged on designated roads and acceptable on designated trails. Winter cross-country travel is acceptable

| RMO | Date Prepared = 5/20/04 |
|---|---|
| **Elk Jensen #20058 Total Length 9.7 Miles** | |
| **Miles by Surface Type = Native: 9.7 Miles, Aggregate: 0 Miles, Pavement: 0 Miles** | |
| **Roadway Termini is Bear Creek Sec. 6 and Herman/McCoy Road #20087** | |
| **This road is within the State of Idaho, County of Bonneville.** | |
| **Existing roadway status is Existing at Maintenance Level 2 (Open), Objective Maintenance Level is 2.** | |

Functional class is Local, (connects terminal facilities with forest collector, arterial roads, or public highways, and are usually single purpose transportation facilities). Service Life is Intermittent, Traffic Service Level is 'D',(traffic flow is slow and may be blocked by management activities. Two-way traffic is difficult, backing may be required. Rough and irregular surface. Travel with low clearance vehicles is difficult. Single purpose facility.)

Primary use of this road is for recreation access but will provide access for a mix of resource uses and activities. Other uses include forest administration, hunting and fire prevention traffic. Design and critical vehicle for this road is a standard high-clearance vehicle.

This portion of roadway is under Forest Service Jurisdiction, is not a Cost Share road with State of Idaho, and is not subject to the Highway Safety Act.

This road falls within the Caribou Range Mountain Subsection Watershed (M331Di) – Targhee Principal Watershed #037. Management direction is based on Management Prescription 6.1 (b) Range Management, as described on pages III-155 thru III-156 of the 1997 Revised Forest Plan for the Targhee National Forest, emphasizing forage is provided on a sustained-yield basis that protects rangeland values, including domestic livestock grazing and wildlife habitat. Important seasonal ranges for big game animals exist in much of this area. Vegetation manipulation (with the use of fire, mechanical means, or herbicides) may occur to achieve or maintain healthy rangeland conditions. A variety of rangeland vegetation successional stages can be observed. Herders, range riders, camps, and transport vehicles may be seen at various times and places. Dispersed recreation activity generally occurs throughout these areas. Management action is to achieve and maintain healthy non-forested rangelands for livestock forage production and good watershed condition. Maximum open road density is 2.0 miles per square mile.

Special concerns have been identified for this area a min. of 18” culverts installed in all draws and live streams. Ditches cut ½ foot to 1 foot in depth. Ditch slope 3:1, rolling dips and out-sloped travel ways where appropriate. A good sub-base would need to be added to the road prism, drainage would need to be corrected in some portions as well as widening the road in some places and adding turnouts every 1000 feet or using natural openings when possible. Slump areas will need some special attention when improving portions of this road. Placement of a gravel surface on the road of approx. 6 inches the full length of the road if not gravel then borrow material should be placed on the road and spot gravel where needed.

Special traffic requirement includes signing in accordance with standards and guidance contained in the Manual on Uniform Traffic Control Devices (MUTCD) will be used. Public safety is a major concern on forest roads.

**Existing Travel Management:**

Motorized and mechanized travel is encouraged on designated roads and acceptable on designated trails. Winter cross-country travel is acceptable. All motorized access is acceptable under the guide lines of the Caribou – Targhee National Forest Travel Map.

| | |
|---|---|
| **RMO** | **Date Prepared = 5/20/04** |
| **Barns Creek #20188 Total Length = 5.2 Miles** | |
| **Miles by Surface Type = Native: 5.2 Miles, Aggregate: 0 Miles, Pavement: 0 Miles** | |
| **Roadway Termini is Jct. Herman-McCoy #20087 to Willow Creek #20118** | |
| **This road is within the State of Idaho, County of Bonneville** | |
| **Roadway status is Existing at Maintenance Level 2 (Open), Objective Maintenance Level is 2.** | |

Functional class is Local, (connects terminal facilities with forest collector, arterial roads, or public highways, and is usually single purpose transportation facilities). Service Life is Intermittent, Traffic Service Level is 'C' (Interrupted traffic flow, limited passing facilities, may not accommodate some vehicles. Low design speeds. Unstable surface under certain traffic of weather conditions. Rough and irregular surface. Travel with low clearance vehicles is difficult. Single purpose facility.)

Primary use of this road is for mining activities but will provide access for a mix of resource uses and activities. Other uses include forest administration, hunting and fire prevention traffic.

Design and critical vehicle for this road is a standard exploration drill rig approx. 8.5 feet in width.

This road is under Forest Service Jurisdiction, is not a Cost Share road with State of Idaho, and is not subject to the Highway Safety Act.

This road falls within the McCoy Watershed (1704010411) of the 5$^{th}$ Hydrologic Unit Code – Watershed #041105 of the 6$^{th}$ Hydrologic Unit Code. Management direction is based on Management Prescription 4.2 (b) Special Use Recreation Sites as described on pages RFP 4-65 thru RFP 4-67 of the 2003 Revised Forest Plan for the Caribou National Forest, emphasis is on providing privately operated types of recreation on National Forest land for large concentrated groups of people. The area around the special use facility will generally exhibit a variety of visual conditions, depending on mining activities, past insect, disease, and fire activity and management's response to these disturbances. Wildlife may be seen. Generally visitors will find a variety of vegetation conditions from sagebrush to forest land within these areas. Management actions and resource conditions provide increased security for big game species, and hunting opportunities with limited access. Maximum open road density is 1.5 miles per square mile.

Special concerns have been identified for this area. The road needs to correct the stream crossings and provide culverts or bridge at the beginning of the road. Three stream crossings are fords and if more use is to be generated on this road the stream crossings should be culverts at a minimum. The road is narrow but will accommodate a moderate amount of traffic.

Special traffic requirement includes signing if mining activities were to resume for public safety, and turnouts for passing.

**Existing Travel Management:**

Motorized and mechanized travel is encouraged on designated roads and acceptable on designated trails. Winter cross-country travel is acceptable.

# Appendix B

## Soil & Hydrology Disturbance Information

*Roads & Trail Disturbances*

- Assumptions:

  - To determine the acreage for roads and trails within the analysis area, varying widths were used. The coverage, ***cnf_trav06a*** was used as the roads and trail coverage for the analysis. The coverage was produced and used for the Caribou Travel Plan Revision DEIS and FEIS which was conducted on the Caribou-Targhee National Forest from 2003-2005. Refer to Table B- 1 and Table B- 2.

  - To determine the difference between open/closed roads and trails the field TRAV06 was used.

  - Within the TRAV06 field, the label "access", "tnf", and "to" had to be defined further in order to determine the appropriate width. The field "admin" and "juris_surf", along with the Palisades Travel Plan Map was then used along with local knowledge to determine a road or trail and appropriate width.

  - To determine detrimental soil disturbance, all non-system roads and trails were used. To determine if a road/trail was system or not, the fields "Road_No" and "Trail_NO" was used. If either field was populated with a road or trail number then it was considered to be system, and didn't count for detrimental disturbance. Refer to Table B- 3

  - To determine the miles/acres of roads and trails within AIZs, each perennial and intermittent stream, pond, lake and wetland was buffered following direction in section 2.8.3 of the 2003 Revised Forest Plan using USGS GIS data. 300 foot buffers were used for fish bearing streams. Because data is insufficient on which streams or reaches are fish-bearing, all perennial stream reaches were assumed to be fish-bearing. Wetlands greater than 1 acre were buffered 100'. Intermittent streams and wetlands less than 1 acre were buffered 50'. Refer to Table B- 6 and Table B- 7.

  - To calculate the number of times a road or trail crosses a perennial or intermittent stream, a intersect function within arcmap was used. Once intersection points were known, then local knowledge was used to populate the crossing type field. Refer to Table B- 8.

**Table B- 1: Width Assumptions**

| TRAV06 | Width Criteria | Width |
|---|---|---|
| access | fs_native | 16 |
| | county | 20 |
| | county_agg | 20 |
| | fs_native | 16 |
| | trail | 3 |
| | road | 16 |
| bike | n/a | 3 |
| foot | n/a | 3 |
| nfs | n/a | 16 |
| ob | n/a | 12 |
| rc | n/a | 12 |
| ro_hc | n/a | 16 |
| ro_pass | n/a | 20 |
| tc | n/a | 6 |
| tnf_bike | Width Criteria was developed using the Palisades Travel Management Map | 3 |
| tnf_nfs | | 16 |
| tnf_rc | | 12 |
| tnf_ro_hc | | 16 |
| tnf_tc | | 6 |
| tnf_to | | 8 |
| tnf_tom | | 6 |
| to | imp_sys of trail | 8 |
| | imp_sys of trail and road | 12 |
| tom | n/a | 3 |

**Table B- 2: Miles and Acres of Roads and Trails**

| TRAV06 | Total Miles | Total Acres |
|---|---|---|
| access | 4.4 | 10.5 |
| bike | 38.6 | 14.0 |
| foot | 0.1 | 0.0 |
| nfs | 0.2 | 0.3 |
| ob | 9.9 | 14.4 |
| rc | 28.0 | 40.8 |
| ro_hc | 33.0 | 64.1 |
| ro_pass | 14.2 | 34.4 |
| tc | 8.2 | 5.9 |
| tnf_bike | 11.1 | 4.0 |
| tnf_nfs | 0.2 | 0.5 |
| tnf_rc | 1.1 | 1.5 |
| tnf_ro_hc | 7.2 | 13.9 |
| tnf_tc | 0.4 | 0.3 |
| tnf_to | 0.2 | 0.2 |
| tnf_tom | 3.9 | 2.8 |
| to | 7.7 | 9.7 |
| tom | 0.9 | 0.3 |
| **Total** | **169** | **218** |

Total Open Road Miles (access + nfs + ro_hc + ro_pass + tnf_nfs + tnf_ro_hc) = **59 miles**

Total miles of motorized trails (tnf_to + tnf_tom + to+ tom) = **13 miles**

Total miles of closed and obliterated roads (ob + rc + tnf_rc) = **39 miles**

Total miles of closed trails (tc + tnf_tc) = **9 miles**

Total miles of non-motorized trails (bike + foot + tnf_bike) = **50 miles**

**Table B- 3: Miles and Acres of System/Non system roads and trails**

| TRAV06 | System | | Total Miles | | System | | Total Acres |
|---|---|---|---|---|---|---|---|
| | no | yes | | | no | yes | |
| access | 0.0 | 4.4 | 4.4 | | 0.0 | 10.5 | 10.5 |
| bike | 0.0 | 38.6 | 38.6 | | 0.0 | 14.0 | 14.0 |
| foot | 0.0 | 0.1 | 0.1 | | 0.0 | 0.0 | 0.0 |
| nfs | 0.2 | 0.0 | 0.2 | | 0.3 | 0.0 | 0.3 |
| ob | 9.9 | 0.0 | 9.9 | | 14.4 | 0.0 | 14.4 |
| rc | 24.8 | 3.2 | 28.0 | | 36.1 | 4.7 | 40.8 |
| ro_hc | 0.4 | 32.6 | 33.0 | | 0.8 | 63.3 | 64.1 |
| ro_pass | 0.0 | 14.2 | 14.2 | | 0.0 | 34.4 | 34.4 |
| tc | 8.2 | 0.0 | 8.2 | | 5.9 | 0.0 | 5.9 |
| tnf_bike | 0.0 | 11.1 | 11.1 | | 0.0 | 4.0 | 4.0 |
| tnf_nfs | 0.0 | 0.2 | 0.2 | | 0.0 | 0.5 | 0.5 |
| tnf_rc | 1.1 | 0.0 | 1.1 | | 1.5 | 0.0 | 1.5 |
| tnf_ro_hc | 0.0 | 7.2 | 7.2 | | 0.0 | 13.9 | 13.9 |
| tnf_tc | 0.4 | 0.0 | 0.4 | | 0.3 | 0.0 | 0.3 |
| tnf_to | 0.0 | 0.2 | 0.2 | | 0.0 | 0.2 | 0.2 |
| tnf_tom | 0.2 | 3.7 | 3.9 | | 0.1 | 2.7 | 2.8 |
| to | 0.0 | 7.7 | 7.7 | | 0.0 | 9.7 | 9.7 |
| tom | 0.0 | 0.9 | 0.9 | | 0.0 | 0.3 | 0.3 |
| **Total** | **45** | **124** | **169** | | **59** | **158** | **218** |

**Table B- 4: Total Miles of Roads and Trails per Huc 6th**

| | Huc 6th # | | | | | | |
|---|---|---|---|---|---|---|---|
| **TRAV06** | 170401041101 | 170401041102 | 170401041103 | 170401041104 | 170401041105 | 170401041106 | Total |
| access | 3.9 | 0.0 | 0.0 | 0.3 | 0.2 | 0.0 | 4.4 |
| bike | 0.0 | 10.2 | 13.1 | 8.0 | 7.1 | 0.2 | 38.6 |
| foot | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| nfs | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 |
| ob | 0.0 | 0.5 | 4.1 | 1.8 | 0.0 | 3.6 | 9.9 |
| rc | 1.5 | 0.9 | 4.4 | 7.2 | 9.0 | 5.0 | 28.0 |
| ro_hc | 0.3 | 0.6 | 5.3 | 3.5 | 13.5 | 9.9 | 33.0 |
| ro_pass | 1.0 | 1.9 | 3.4 | 2.1 | | 5.8 | 14.2 |
| tc | 0.0 | 0.1 | 2.1 | 3.2 | 1.5 | 1.2 | 8.2 |
| tnf_bike | 9.4 | 1.6 | 0.0 | 0.1 | 0.0 | 0.0 | 11.1 |
| tnf_nfs | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 |
| tnf_rc | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 |
| tnf_ro_hc | 7.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 7.2 |
| tnf_tc | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 |
| tnf_to | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.2 |
| tnf_tom | 3.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.9 |
| to | 0.0 | 0.0 | 0.7 | 0.0 | 3.1 | 3.9 | 7.7 |
| tom | 0.0 | 0.0 | 0.0 | 0.5 | 0.3 | 0.0 | 0.9 |
| **Total** | **29** | **16** | **33** | **27** | **35** | **30** | **169** |

**Table B- 5: Total Acres of Roads and Trails per Huc 6th**

| | Huc 6th # | | | | | | |
|---|---|---|---|---|---|---|---|
| **TRAV06** | 170401041101 | 170401041102 | 170401041103 | 170401041104 | 170401041105 | 170401041106 | Total |
| access | 9.5 | 0.0 | 0.1 | 0.6 | 0.3 | 0.0 | 10.5 |
| bike | 0.0 | 3.7 | 4.8 | 2.9 | 2.6 | 0.1 | 14.0 |
| foot | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| nfs | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 |
| ob | 0.0 | 0.7 | 6.0 | 2.6 | 0.0 | 5.2 | 14.4 |
| rc | 2.1 | 1.4 | 6.5 | 10.4 | 13.1 | 7.3 | 40.8 |
| ro_hc | 0.6 | 1.2 | 10.3 | 6.7 | 26.1 | 19.1 | 64.1 |
| ro_pass | 2.4 | 4.6 | 8.2 | 5.1 | 0.0 | 14.1 | 34.4 |
| tc | 0.0 | 0.0 | 1.6 | 2.3 | 1.1 | 0.9 | 5.9 |
| tnf_bike | 3.4 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 4.0 |
| tnf_nfs | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 |
| tnf_rc | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 |
| tnf_ro_hc | 13.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 13.9 |
| tnf_tc | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 |
| tnf_to | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.2 |
| tnf_tom | 2.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 |
| to | 0.0 | 0.0 | 1.0 | 0.0 | 3.4 | 5.3 | 9.7 |
| tom | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0.0 | 0.3 |
| **Total** | **37** | **12** | **38** | **31** | **47** | **52** | **218** |

**Table B- 6: Total Miles Within AIZ per Huc 6th**

| | Huc 6th # | | | | | | |
|---|---|---|---|---|---|---|---|
| **TRAV06** | 170401041101 | 170401041102 | 170401041103 | 170401041104 | 170401041105 | 170401041106 | Total |
| access | 2.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 |
| bike | 0.0 | 6.8 | 3.3 | 0.2 | 2.5 | 0.0 | 12.9 |
| foot | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| nfs | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| ob | 0.0 | 0.3 | 0.8 | 0.4 | 0.0 | 0.9 | 2.5 |
| rc | 0.7 | 0.3 | 1.5 | 2.1 | 1.8 | 0.8 | 7.1 |
| ro_hc | 0.3 | 0.4 | 1.2 | 0.1 | 1.9 | 2.6 | 6.3 |
| ro_pass | 1.0 | 1.3 | 1.3 | 0.5 | 0.0 | 4.0 | 8.1 |
| tc | 0.0 | 0.1 | 0.4 | 0.6 | 0.5 | 1.0 | 2.6 |
| tnf_bike | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 |
| tnf_nfs | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 |
| tnf_rc | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 |
| tnf_ro_hc | 2.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.3 |
| tnf_tc | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 |
| tnf_tom | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 |
| to | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 | 1.8 | 2.2 |
| **Total** | **11** | **9** | **9** | **4** | **7** | **11** | **50** |

**Table B- 7: Total Acres Within AIZ per Huc 6th**

| | Huc 6th # | | | | | | |
|---|---|---|---|---|---|---|---|
| **TRAV06** | 170401041101 | 170401041102 | 170401041103 | 170401041104 | 170401041105 | 170401041106 | Total |
| access | 6.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.8 |
| bike | 0.0 | 2.5 | 1.2 | 0.1 | 0.9 | 0.0 | 4.7 |
| foot | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| nfs | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| ob | 0.0 | 0.4 | 1.1 | 0.7 | 0.0 | 1.4 | 3.6 |
| rc | 1.0 | 0.4 | 2.2 | 3.0 | 2.6 | 1.1 | 10.3 |
| ro_hc | 0.6 | 0.7 | 2.2 | 0.1 | 3.7 | 5.0 | 12.3 |
| ro_pass | 2.3 | 3.2 | 3.2 | 1.2 | 0.0 | 9.6 | 19.5 |
| tc | 0.0 | 0.0 | 0.3 | 0.5 | 0.4 | 0.7 | 1.9 |
| tnf_bike | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 |
| tnf_nfs | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 |
| tnf_rc | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.9 |
| tnf_ro_hc | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.5 |
| tnf_tc | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| tnf_tom | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 |
| to | 0.0 | 0.0 | 0.2 | 0.0 | 0.2 | 2.7 | 3.1 |
| **Total** | **18** | **7** | **10** | **6** | **8** | **20** | **69** |

**Table B- 8: Number and Type of Open Road & Trail Stream Crossings per Huc 6th**

| | | | Number Of Crossings | | |
|---|---|---|---|---|---|
| **HUC6_** | **TRAV06** | **Crossing Type** | **Intermittent Stream** | **Perennial Stream** | **Total** |
| 170401041101 | access | bridge | | 1 | 1 |
| | | pipe | 3 | 2 | 5 |
| | foot | fjord | | 1 | 1 |
| | rc | fjord | 9 | | 9 |
| | ro_pass | pipe | 1 | | 1 |
| | tnf_bike | fjord | 4 | 2 | 6 |
| | tnf_rc | fjord | 1 | | 1 |
| | tnf_ro_hc | pipe | 4 | 1 | 5 |
| | tnf_tc | fjord | 2 | | 2 |
| | tnf_tom | fjord | | 2 | 2 |
| | **Total** | | **24** | **9** | **33** |
| 170401041102 | bike | fjord | 4 | 35 | 39 |
| | ob | fjord | | 1 | 1 |
| | rc | fjord | 2 | | 2 |
| | ro_hc | bridge | | 1 | 1 |
| | | fjord | 3 | | 3 |
| | ro_pass | bridge | | 1 | 1 |
| | | fjord | 1 | | 1 |
| | | pipe | | 2 | 2 |
| | **Total** | | **10** | **40** | **50** |
| 170401041103 | bike | fjord | 1 | 12 | 13 |
| | ob | fjord | 2 | 1 | 3 |
| | rc | fjord | | 1 | 1 |
| | ro_hc | fjord | 1 | 3 | 4 |
| | | pipe | | 1 | 1 |
| | ro_pass | pipe | | 5 | 5 |
| | tc | fjord | | 2 | 2 |
| | to | fjord | 3 | | 3 |
| | **Total** | | **7** | **25** | **32** |
| 170401041104 | bike | fjord | 3 | 1 | 4 |
| | ob | fjord | | 3 | 3 |
| | rc | fjord | 2 | 7 | 9 |
| | ro_hc | fjord | 3 | | 3 |
| | ro_pass | pipe | 1 | 3 | 4 |
| | tc | fjord | 2 | 7 | 9 |
| | **Total** | | **11** | **21** | **32** |
| 170401041105 | bike | fjord | | 13 | 13 |
| | rc | fjord | 2 | 7 | 9 |
| | ro_hc | fjord | | 2 | 2 |
| | | pipe | 3 | 5 | 8 |
| | tc | fjord | | 2 | 2 |
| | to | fjord | 1 | 1 | 2 |
| | **Total** | | **6** | **30** | **36** |
| 170401041106 | ob | fjord | 2 | 4 | 6 |
| | rc | fjord | 2 | 2 | 4 |
| | ro_hc | fjord | | 8 | 8 |
| | | pipe | 4 | | 4 |
| | ro_pass | pipe | 4 | 2 | 6 |
| | tc | fjord | | 5 | 5 |
| | to | fjord | 8 | | 8 |
| | **Total** | | **20** | **21** | **41** |
| **Grand Total** | | | **78** | **146** | **224** |

*Past Harvest (1971-1991)*

- Assumptions:
  - That all of the past harvest acres are still hydrological disturbed – 997 acres.
  - Only 7% of the past harvest acreage has detrimental disturbed soil properties – 70 acres total.

*Past wildfires (1974-2003)*

- Assumptions:
  - That all of the past wildfire acres are still hydrological disturbed – 272 acre.
  - Only 10% of the past wildfire acreage has detrimental disturbed soil properties – 27 acres total.

*Range Improvements*

- Assumption:
  - Six corrals within the project area were given 1 acre for disturbances each.
  - Forty-four ponds within the project area were given 1 acre for disturbances each.
  - Six troughs within the project area were given 0.5 acre for disturbances each.
  - Total acreage of range improvements within the project area - 53 acres.

*Sheep Driveway*

No GIS coverage was available for the sheep driveway that is near Della Basin. A coverage was developed using GIS and the 2004 color naips. It was assumed that the width of disturbance was 100 feet.

- Assumptions:
  - Sheep Driveway disturbance was assigned to one huc6th
  - Total disturbance acres is 4

*Tarweed/Wyethia Monocultures*

Areas that are dominated by tarweed/wyethia are indicators of past historic disturbances (i.e. sheep bed grounds). To determine disturbance the GIS coverage weeds_tarwy located in /fsfiles/ref/library/gis/cnf/wed was used.

- Assumptions:
  - Total disturbance is 199 acres
  - Disturbed acres was assigned per huc 6th

*Past Placer and Dredging Mining*

No GIS coverage is available for the gold mining activities within the MCW. A coverage was developed using local knowledge and District records. The coverage probably under estimates that amount of placer mining that occurred within the MCW.

- Assumptions:
  - Records used to develop coverage:
    - Mineral Resource Investigation of the Caribou City-Stump Creek Study area, Bonneville and Caribou Counties, Idaho 1993.
    - The EA for Small Placer Mining Operations, Caribou Basin Area 1994.
  - Total acres of disturbance is 1,258

- The placer mining areas are still hydrological disturbed, 1,258 of the acres have detrimental soil properties.
- Mining activities are excluded from detrimental disturbance (John Lott, personnel communication)

*Past Hard Rock Mining*
GIS coverage used to determine disturbed acres was developed by Darrel VandeWeg, District Geologist. Historic plat maps were used to construct the coverage.

- Assumptions:
  - Total number of sites = 19, and it was assumed each site represents 2 acres of disturbance.
  - Mine site acres are hydrological disturbed.
  - Mining activities are excluded from detrimental disturbance (John Lott, personnel communication).

*Exploration Drill Pads*
Exploration drilling occurred near Bald Mountain between the years of 1982-1987. Reclamation activities occurred in 1987 which included; ripping pads and access roads, removing culverts, and seeding (Steve Robison, personnel communication). No GIS coverage exists for the pad sites, however the access roads are included with the roads and trail coverage. A coverage was developed using the new colored orthoquads.

- Assumptions:
  - Total number of pad sites is 2
  - Total acres of disturbance is 17. The acreage is probably underestimated due to seeding efforts.
  - The same rational for determining detrimental soil disturbance for past harvest areas was applied to the pad sites. 7% of the acres (2 acres) have detrimental disturbed soil properties.
  - All acres are hydrological disturbed.

*Recreation Disturbances*

- Assumptions:
  - Dispersed camp sites, guard stations, and McCoy Campground were included to determine total disturbance from recreation activities
  - There are a total of 36 dispersed camp sites with a disturbed acreage of 19, two guard stations for 2 acres, and McCoy campground for 2 acres.
  - Hydrologic disturbance includes all acres (23), however soil disturbance only includes the dispersed camp sites

**Table B- 9: Existing Detrimental Disturbances with the MCW**

| Disturbance Type | Acres |
|---|---|
| Non-System Roads & Trails | 59 |
| Past Harvest 1971-91 | 70 |
| Past Wildfires 1974-2003 | 27 |
| Range Improvements | 51 |
| Sheep Driveway | 4 |
| Wyethia & Tarweed Monocultures | 199 |
| Exploration Pad Sites | 2 |
| Recreation | 19 |
| **Total Acres of Disturbance** | **431** |
| **% of Watershed (69,519 acres)** | **1%** |

**Table B- 10: Percent Hydrological Disturbance for Huc 6th**

| | Huc 6th # | | | | | | |
|---|---|---|---|---|---|---|---|
| **Disturbance Type** | **170401041101** | **170401041102** | **170401041103** | **170401041104** | **170401041105** | **170401041106** | **Total Acres** |
| Roads & Trails | 37 | 12 | 38 | 31 | 47 | 52 | 218 |
| Past Harvest | 0 | 0 | 159 | 2 | 734 | 102 | 997 |
| Past Fires | 29 | 13 | 76 | 1 | 138 | 15 | 272 |
| Range Improvments | 1 | 5 | 10 | 16 | 10 | 11 | 53 |
| Sheep Driveway | 0 | 0 | 0 | 0 | 0 | 4 | 4 |
| Wyethi_Tarweed | 0 | 0 | 83 | 0 | 116 | 0 | 199 |
| Hardrock Mines | 0 | 0 | 22 | 4 | 0 | 12 | 38 |
| Past Placer & Dreding | 0 | 0 | 737 | 101 | 20 | 400 | 1,258 |
| Exploration Drilling Pads | 0 | 8 | 9 | 0 | 0 | 0 | 17 |
| Recreation Disturbances | 9 | 3 | 2 | 0 | 0 | 9 | 23 |
| **Total Disturbance** | **76** | **41** | **1,136** | **155** | **1,065** | **605** | **3,079** |
| Total Acres per HUC | 13,456 | 11,952 | 13,529 | 10,919 | 10,950 | 8,713 | 69,519 |
| **Total Hydrological Disturbance** | **1%** | **0%** | **8%** | **1%** | **10%** | **7%** | **4%** |

Prepared By: Dylan Johnson
Date: 2-14-2007

# Appendix C

## Vegetation Analysis

***Analysis Method***

In order to classify the vegetation and other ground cover, the District delineate polygons on aerial photos from 2001 based on identifiable changes in vegetation characteristics as seen on 1:15,840 scale natural color aerial photos. The vegetation characteristics used for delineation criteria are stand structure, species composition, percent crown cover, and size class. Polygons of homogeneous conditions are determined using changes in topographic setting, color, texture, and pattern on the aerial photo around which a line is drawn. Then the aerial photo polygons were converted into an electronic spatial data layer and associated attribute table (mccoy_veg_final). The attribute table was populated using the information in the Species Codes, Size Class Codes, and Crown Cover Percent PI Estimation Guide tables provided below. Each polygon could have up to six species and associated size class and crown cover percent (refer to Figure C - 1). Once this step was completed, a cover type and structural stage was assigned to each polygon. Refer to the cover type and structural stage sections listed below for further details.

**Table C - 1: Species Codes**

| | |
|---|---|
| **Trees:** | |
| PSME | Douglas-fir |
| ABLA | Subalpine fir |
| PICO | Lodgepole pine |
| PIEN | Engelmann spruce |
| POTR5 | Quaking Aspen |
| **Shrubs:** | |
| ACGR3 | Bigtooth maple |
| CELE3 | Curlleaf mountain mahogany |
| ARTEM | Sagebrush spp. |
| PUTR | Bitterbrush |
| CEVE | Snowbrush |
| MTNBR | Mountain Brush (generally a comb. Of *Amerlanchier. Prunus, Symphoricarpus, Rosa* spp.) |
| SHRBO | Shrub other |
| **GRASSESS/FORB TYPES:** | |
| GRASS | Grass (predominantly grass or grasslike species) |
| FORBG | Forb/grass mix (predominantly forbs) |
| **RIPARIAN (wetlands):** | |
| SALIX | Willow spp |
| SHRBR | Riparian shrub mix (willow, birch, alder, etc.) |
| GRASR | Riparian non-shrub (grasses, forbs, sedges, reeds) |
| **NON-VEGETATED TYPES:** | |
| RUWA | Water – flowing |
| STWA | Water – standing |
| BEDR | Bedrock |
| BOUL | Boulders, rock >3” |
| TALUS | Talus, rock 3/4” -3” |
| DIRT | Exposed dirt, soil |
| GRAVU | Gravel <3/4”, dirt, soil – undisturbed sites |
| GRAVD | Gravel <3/4”, dirt, soil – disturbed sites (gravel pits) |

**Table C - 2: Size Class Codes**

| Tree Size Class | Description |
|---|---|
| E | Established seedlings. Mostly comprised of individuals **0.0 – 0.9 inches** in diameter at ground level or root collar |
| S | Small. Individuals **1.0 – 4.9 inches** in diameter measured at dbh. Woodland species are measured at the root collar |
| M | Medium. Individuals **5.0 – 8.9 inches** in diameter measured at dbh. Woodland species are measured at the root collar |
| L | Large. Individuals **9.0 – 15.9 inches** in diameter measured at dbh. Woodland species are measured at the root collar |
| V | Very Large. Individuals **16.0 inches and larger** in diameter measured at dbh. Woodland species are measured at the root collar |
| **Shrub Size Class** | **Description** |
| S | Small. Shrubs are less than 2.5 feet tall |
| M | Medium. Shrubs are 2.5-6.4 feet tall |
| L | Large. Shrubs are greater than 6.4 feet tall |

**Table C - 3: Crown Cover Percent PI Estimation Guide**

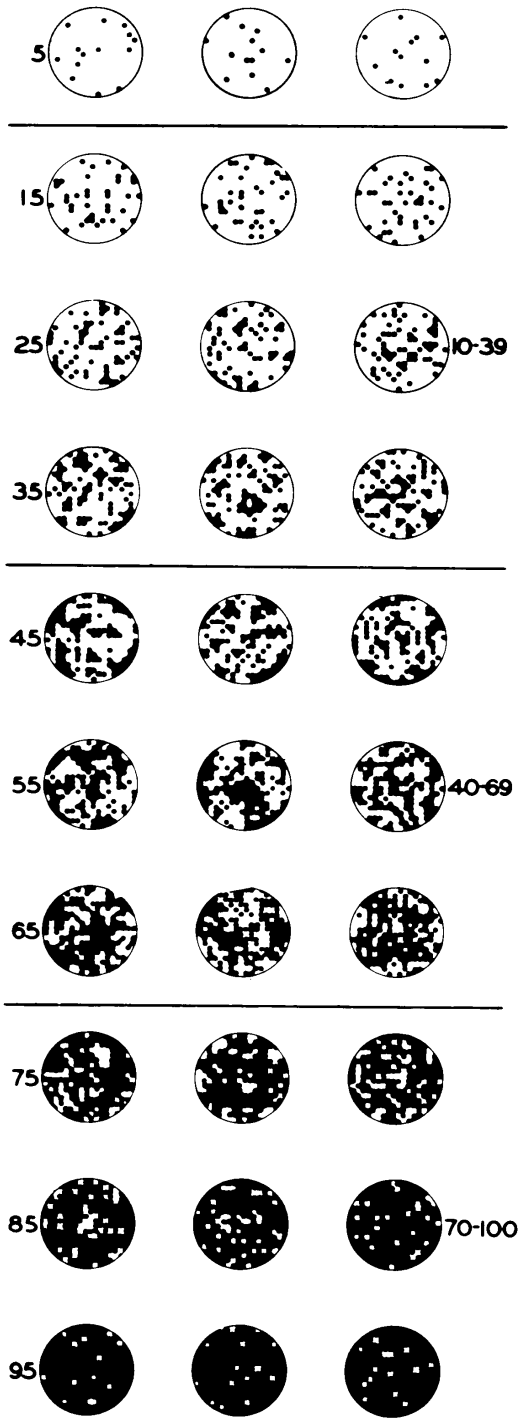
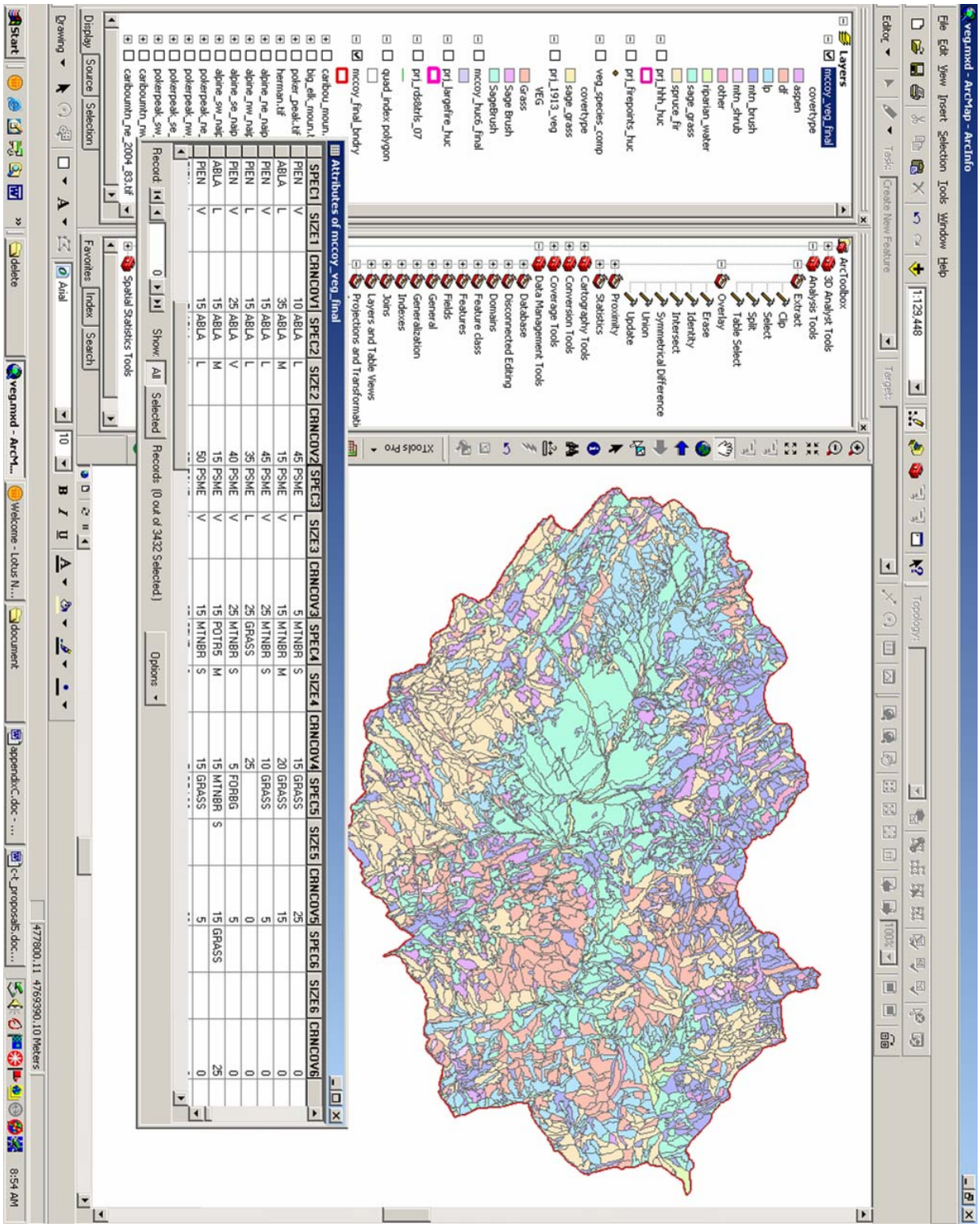
| | |
|---|---|
| 5 - 0 through 9 percent |  |
| 15 - 10 through 19 percent | |
| 25 - 20 through 29 percent | |
| 35 - 30 through 39 percent | |
| 45 - 40 through 49 percent | |
| 55 - 50 through 59 percent | |
| 65 - 60 through 69 percent | |
| 75 - 70 through 79 percent | |
| 85 - 80 through 89 percent | |
| 95 - 90 through 100 percent | |

**Figure C - 1: Display of the McCoy Creek Vegetation Attribute Table**



***Cover Type Interpretation***

In order to characterize the vegetation within the McCoy Creek Watershed the data was first divided into six cover types. Theses cover types are: Spruce/Fir, Lodgepole, Douglas-fir, Aspen, Non-forested, and Treelt25 (trees < 25% cover). This determination was based on the percent of crown cover for each species and Table C - 4 displays the matrix used. The non-forested and treelt25 were further divided into the following cover types: Sagebrush/Grass, Mountain Brush, Riparian/Water, Grass/Forb, Other, and Mountain Shrub. This determination was also based on species percent cover and the matrixes used are provided below. In order to reduce the number of cover types it was deemed necessary to further divide the Grass/Forb group into the other cover types. The matrix used for this classification is also provided below.

**Table C - 4: Cover Type Matrix**

| Cover Types | Relative Species Composition | Associates – Timber | Data Query | SAF/SRM Code |
|---|---|---|---|---|
| Engelmann Spruce/ Subalpine Fir | ES + AF are plurality of timber components | DF, LP, ASP | ES + AF = **A**<br>ES+AF+DF+LP+ASP=**B**<br>If **B**>=25% and if **A**> (DF or LP or ASP), then | SAF206 |
| Interior Douglas- Fir | DF is majority plurality of timber components | ES, AF, LP, ASP | DF = **A**<br>DF+ES+AF+DF+LP+ASP=**B**<br>If **B**>=25% and if **A**> (ES or AF or LP or ASP), then | SAF210 |
| Aspen | ASP is pure (or majority or plurality of timber components) | ES, AF, LP, DF | ASP = **A**<br>ASP+ES+AF+DF+LP=**B**<br>If **B**>=25% and if **A**> (DF or LP or ES or AF), then | SAF17 |
| Lodgepole Pine | LP is pure (or majority or plurality of timber components) | ES, AF,DF | LP = **A**<br>LP+ES+AF+DF=**B**<br>If **B**>=25% and if **A**> (DF or ES or AF), then | SAF218 |
| Non-Forested * | Timber associates do not occur | | | nonfor |
| Treelt25 * | Timber associates are less than 25% cover | | | Treelt25 |

* The non-forested and Treelt25 was broken down into Sagebrush/Grass, Mountain Brush, Riparian/Water, Other, and Mountain Shrub cover types.

The following matrix was used to further classify the **Non-Forested** cover type:

- Riparian species + water (standing or flowing) ≥55% = **Riparian/Water**
- Species type of : STWA, BEDR, BOUL, TALUS, DIRT, GRAVU, & GRAVD ≥55% = **Other**
- GRASS & FORBG species ≥55% = **Grass/Forb**
- Species of ACGR3 ≥50% = **Mtn. Shrub**
- Species of ARTEM ≥55% = **Sagebrush/Grass**
- Species of MTNBR ≥55% = **Mtn. Brush**
- Species of ARTEM ≥40% & GRASS ≥30% = **Sagebrush/Grass**
- Species of MTNBR ≥40% & GRASS ≥30% = **Mtn. Brush**
- Species of ARTEM ≥40% & FORBG ≥30% = **Sagebrush/Grass**
- Species of MTNBR ≥40% & FORBG ≥30% = **Mtn. Brush**
- Species of ARTEM ≥25% & MTNBR ≤25% = **Sagebrush/Grass**
- Species of ARTEM ≥25% & MTNBR 0% = **Sagebrush/Grass**
- Species of MTNBR ≥26% = **Mtn. Brush**
- ARTEM & MTNBR ties go to = **Sagebrush/Grass**
- Estimated the rest of polygons = the species with most % won

The following matrix was used to further classify the **Treelt25** cover type:

- Riparian species + water (standing or flowing) ≥55% = **Riparian/Water**
- Species type of : STWA, BEDR, BOUL, TALUS, DIRT, GRAVU, & GRAVD ≥55% = **Other**
- GRASS & FORBG species ≥55% = **Grass/Forb**
- Species of ACGR3 ≥50% = **Mtn. Shrub**
- Species of ARTEM ≥55% = **Sagebrush/Grass**
- Species of MTNBR ≥55% = **Mtn. Brush**
- Species of CEVE ≥55% = **Mtn. Brush**
- Species of ARTEM ≥40% & GRASS ≥20% = **Sagebrush/Grass**
- Species of MTNBR ≥40% & GRASS ≥20% = **Mtn. Brush**
- Species of ARTEM ≥40% & FORBG ≥20% = **Sagebrush/Grass**
- Species of MTNBR ≥40% & FORBG ≥20% = **Mtn. Brush**
- Species of MTNBR ≥40% & CEVE ≥20% = **Mtn. Brush**
- Species of ARTEM ≥25% with no MTNBR% = **Sagebrush/Grass**
- Species of MTNBR ≥25% with no ARTEM% = **Mtn. Brush**
- Species of ARTEM ≥25% & MTNBR ≤25% = **Sagebrush/Grass**
- Species of MTNBR ≥25% & ARTEM ≤25% = **Mtn. Brush**
- Species of MTNBR+GRASS+FORBG+SHRBO ≤25% & no ARTEM% = **Mtn. Brush**
- Species of CEVE ≥26% = **Mtn. Brush**
- ARTEM & MTNBR ties go to = **Mtn. Brush**
- Estimated the rest of polygons = the species with most % won

The following matrix was used to further classify the **Grass/Forb** type for both the non-forested and treelt25 type:

- Species of ARTEM with any % & no Mtn. Brush or Mtn. Shrub species% = **Sagebrush/Grass**
- Species of Mtn. Brush with any % & no Sagebrush or Mtn. Shrub species % = **Mtn. Brush**
- Species of Mtn. Shrub with any % & no Sagebrush or Mtn. Brush species % = **Mtn. Shrub**
- Species of Riparian with any % & no Sagebrush, Mtn. Brush or Mtn Shrub species % = **Riparian/Water**
- ARTEM ties with Mtn. Brush or Mtn. Shrub species= **Sagebrush/Grass**
- Mtn. Brush species ties with Mtn. Shrub species = **Mtn. Brush**
- ARTEM with greater cover % than Mtn. Brush, Mtn. Shrub, or Riparian species = **Sagebrush/Grass**
- Mtn. Brush species with greater cover % than Mtn. Shrub, ARTEM, or Salix species = **Mtn. Brush**
- GRASS and FORBG is 100% cover = **Sagebrush/Grass**
- GRASS and FORBG only vegetation types = **Sagebrush/Grass**
- Conifer species with any % & the conifer species with greatest % cover = **that conifer species**
- Aspen ties with conifer = **Aspen**

### *Structural Stages Interpretation*

The Forested cover types (Spruce/Fir, Lodgepole, Douglas-fir, and Aspen) were assigned structural stages based on past disturbance and size class. Polygons that have been disturbed from past harvest, wildfires or etc. were assigned the structural stage of grass/seedling/sapling. Polygons with no sign of disturbance were assigned a structural stage depending on size class. Size class was used as a surrogate for age and further information can be found in the table below.

**Table C - 5: Forested Vegetation Structural Stage Information.**

| Size Class | Structural Stages | Cover Type | Age (years) |
|---|---|---|---|
| E | Grass/Seedling/Sapling - gss | Lodgepole | 0-35 |
| | | Spruce/Fir | 0-40 |
| | | Douglas-fir | 0-40 |
| | | Aspen | 0-30 |
| S | Young/Mid – y/m | Lodgepole | 30-100 |
| | | Spruce/Fir | 30-110 |
| | | Douglas-fir | 30-140 |
| | | Aspen | 20-60 |
| M, L, & V | Mature/Old - m | Lodgepole | 100+ |
| | | Spruce/Fir | 110+ |
| | | Douglas-fir | 140+ |
| | | Aspen | 60+ |

*Structural stages and age was based on the Forest Stand Structure White Paper Montpelier R.D., 2004.

The Non-forested cover types (Sagebrush/Grass, Mountain Brush, and Mountain Shrub) were assigned structural stages based on past disturbance and cover percent. Polygons that have been disturbed from past harvest, wildfires or etc. were assigned the structural stage of early. Polygons with no sign of disturbance were assigned a structural stage depending on cover percent. Cover percent was used as a surrogate for density and age. The late seral age class is dense and has a cover percent greater than 70%, mid seral age class is moderately dense with 40-70% cover, and the early seral age class has a cover percent less than 40%. Additional information can be found in the below. Structural stages are defined as early = 0-5% crown cover, mid seral = 6-15% crown cover, and late seral = >16% crown cover.

**Table C - 6: Non-forested Vegetation Structural Stage Information**

| Cover Percent | Cover Type | Structural Stage |
|---|---|---|
| ≤ 40% | Sagebrush/Grass | Early Seral = 0-5% Crown Cover |
| | Mtn. Brush | |
| | Mtn. Shrub | |
| 40 – 70% | Sagebrush/Grass | Mid Seral = 6-15% Crown Cover |
| | Mtn. Brush | |
| | Mtn. Shrub | |
| > 70% | Sagebrush/Grass | Late Seral = >16% Crown Cover |
| | Mtn. Brush | |
| | Mtn. Shrub | |

***Species Composition Interpretation***

Cover percent was used to determine species composition for aspen, lodgepole, Douglas-fir, and spruce/fir cover types. This cover percent was then compared to the reference/desired condition for species composition. The following is the process for determining the current condition for species composition.

- Aspen - Total Acres = 4,776
  - Total acres were conifer cover % is ≥ 15% = 2,072 or 43%
  - Total acres were conifer cover % is <15% = 2,704 or 57%

- Lodgepole – Total Acres = 10,814
  - Other conifer = total cover % of ABLA+PSME+PIEN
  - Other conifer % ≤ 20% = 6,855 acres or 63% is dominated by lodgepole
  - Other conifer % >20% = 3,959 acres or 37% is still lodgepole but mixed with ABLA, PSME, or PIEN.

- Douglas-fir – Total Acres = 9,249
  - Other conifer = total cover % of ABLA & PIEN
  - Other conifer % ≤ 25% = 8,452 acres or 91% is dominated by Douglas-fir
  - Other conifer % > 25% = 797 acres or 9% is still Douglas-fir but mixed with ABLA and PIEN

- Spruce/Fir – Total Acres = 17,462
  - Other conifer = total cover % of PSME + PICO + POTR5
  - Other conifer % $\leq$ 40% = 14,360 acres or 82% is dominated by Spruce/Fir
  - Other conifer % > 25% = 3,102 acres or 18% is still Spruce/Fir but mixed with PSME, PICO, & POTR5

To determine if the Sagebrush/Grass cover type occupies 95-100% of the historical habitat a comparison to the 1913 data was done. Exact location of change is not known, only a change in acres is provided below.

- Sagebrush/Grass currently occupies 16,253 acres
- Sagebrush from the 1913 data occupied 26,040 acres
  - Approximately 9,787 acres or 38% is other cover types, and 62% is still dominated by Sagebrush.