

Agency-Kenney Watershed Analysis

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Bureau of Land Management
Salmon Field Office**

and

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Salmon-Challis National Forest
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Agency-Kenney Watershed Analysis

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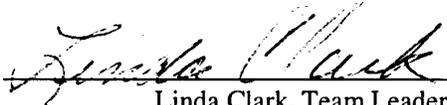
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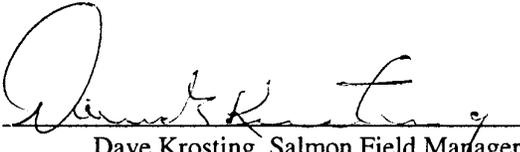
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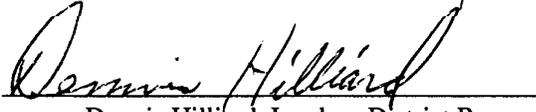

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+Agency-Kenney Watershed Analysis

Chapter 1 - Introduction

This report documents an interdisciplinary, interagency (Bureau of Land Management/Forest Service) analysis of the Kenney, Pattee, and Agency watersheds and sub-watersheds, including Kenney, Agency, Warm Springs, Pattee, Cow, Sharkey, and White creeks (hereafter referred to as the Agency-Kenney watersheds). The Lemhi River Sub-basin Review identified these watersheds as the highest priority in the sub-basin, based on ecological and economic factors (USDI-BLM and USDA-FS, 1999, p. 101).

The purpose of this analysis is to develop a science-based understanding of the processes and interactions occurring within the watersheds area and the effects of management practices on the watersheds. Although this analysis produced some management recommendations, it is not a decision-making document. Any changes in management proposed as a result of this analysis must first be analyzed site-specifically and comply with the provisions of the National Environmental Policy Act (NEPA).

The Agency-Kenney watersheds are located along the Continental Divide on the west slopes of the Bitterroot Range of the Beaverhead Mountains, between 12 and 20 miles southeast of Salmon, Idaho (see Map 1: Location Map). These watersheds have a drainage area of approximately 67,000 acres. The watersheds have mixed ownership patterns that are typical of many watersheds draining the Interior Columbia Basin and the Intermountain West. In the mid to higher elevations, public lands are managed by the Forest Service (26,314 acres, or 39%), while in the lower elevations, management is by the BLM (34,105 acres, or 51%), State of Idaho (1,124 acres, or 2%), and private landowners (5,342 acres, or 8%). The lower elevation private lands are used for the production of hay and grain crops for the local livestock industry. Public land is managed by the Salmon Field Office of the Upper Columbia-Salmon Clearwater District, Bureau of Land Management (BLM), and by the Leadore Range District of the Salmon-Challis National Forest.

Background

This analysis followed the six-step process outlined in *Ecosystem Analysis at the Watershed Scale: Federal Guide for Watershed Analysis* (RIEC/IAC, 1995). The guide explains the hierarchy used to arrive at the watershed to be analyzed. Small watersheds are nested within larger ones. Issues and concerns are different at each scale, and without proper consideration of broad-scale issues in a watershed analysis, the process may not adequately address major ecosystem concerns. The following table shows the progression of larger watersheds down to smaller ones, using the Agency Creek Watershed as an example.

<i>Region</i>	<i>River Basin</i>	<i>Sub-basin</i>	<i>Watershed</i>	<i>Sub-watershed</i>
Pacific Northwest	Upper Columbia Basin	Lemhi River	Agency Creek	Cow Creek

This watershed analysis incorporated information from broadscale and midscale analyses, as appropriate. For example, the Upper Columbia River Basin science information and the Lemhi River Sub-basin Review were both utilized as source documents to step down issues and data from the broad scale to the finer, watershed scale. Some resource values addressed in this watershed analysis can only be fully understood within a larger geographical context, such as nationally designated trails (in this case, the Lewis and Clark National Historic Trail and Continental Divide National Scenic Trail), and habitat for migratory songbirds and anadromous fish.

The following information is included in this watershed analysis document:

- the key issues identified and questions answered during the analysis (Chapter 2);
- a description of current and historical (reference) resource conditions and trends, and an assessment of the factors that produced changes from reference to current conditions (Chapter 3);
- a summary of management direction for public lands (Bureau of Land Management and Forest Service) within the analysis area (Chapter 4); and
- management recommendations (Chapter 5).

This analysis was a cooperative effort between the BLM – Salmon Field Office and the Salmon-Challis National Forest. The following staff participated on the watershed analysis team and/or provided information during the analysis.

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Gary Jackson – Soils/Geology

Richard Larson – Mapping

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Mike Steck - Wildlife

Chapter 2 - Issues, Core Topics, and Key Questions (Step 2)

The purpose of this step is to focus the watershed analysis on the key elements of the ecosystem that influence, and are in turn influenced by, the human uses, resource conditions, and management within the watershed analysis area. First, the interdisciplinary team identified the priority issues for the Agency-Kenney watersheds. These issues encompassed the core topics suggested for watershed analysis by the *Federal Guide for Watershed Analysis* (RIEC/IAC, 1995, p. 12) -- erosion processes, hydrology, vegetation, stream channel, water quality, species and habitats, and human uses -- and as well as two additional core topics that are relevant in the analysis area: cultural resources and visual resources. Then, the watershed analysis team developed key questions for each issue. Chapter 3 (Overview of Resource Condition, Trend, and Management Opportunities) and Chapter 5 (Management Recommendations) present information that seeks to answer these key questions.

Key Issues and Questions

The analysis team identified several priority issues for the analysis area:

- Noxious Weeds/Invasive Plants
- Riparian Health/Water Quality
- Forest Health
- Rangeland Health
- Human Uses
- Historic Properties and National Trails

These general issues were evaluated within two broad categories, based on the type of resource or land use being analyzed: (a) Biological Processes and (b) Human Uses and Values. Each issue is stated below along with a list of the “core topics” it addresses, a rationale statement of why the issue is relevant to this watershed analysis, and key questions to be answered during the analysis process.

Biological Processes

***Issue A:** Effects of Noxious Weeds and Non-native Invasive Plants on Wildlife Habitat, Biodiversity, Soil Erosion/Stability, Native Plant Communities and Rare Plant Species, Forage Production, and Rangeland Health.*

Core Topics Addressed: Erosion processes, vegetation, species and habitats.

Rationale: Past surface disturbance has created seedbeds for the establishment and spread of noxious weeds/invasive plant species. Infestations of eight noxious weed species and one invasive species have been documented. An integrated weed management program has been implemented on BLM and Forest Service-managed lands in the analysis area. There is a need to understand vectors of weed introduction, the effects of weeds on ecosystem processes in the watershed, and the effectiveness of current weed treatment efforts. Uncontrolled weed spread in similar habitats has had adverse effects on native vegetation, biodiversity, wildlife, and overall rangeland health.

Key Questions:

1. How have the introduction, establishment, and management of non-native species affected plant communities, wildlife habitats/populations, and other ecosystem processes within the watershed?
2. What management practices have been effective at addressing weed invasion and spread? What problems still need to be addressed?

Issue B. Riparian Health and Effects of Riparian Condition on Special Status Fish Species, Water Quality, and Wildlife

Core Topics Addressed: Erosion processes, hydrology, vegetation, stream channel, water quality, species and habitats, human uses.

Rationale: Past human uses have reduced riparian function, with subsequent effects on water quality, fisheries habitat and populations, and wildlife habitat. Management changes during the last 10 years have restored many riparian zones to proper functioning condition. Several streams in the analysis area provide habitat for fish species listed as threatened under the Endangered Species Act (ESA). Portions of Kenney Creek have been identified as failing to meet State water quality standards for temperature.

Key Questions:

1. How have human uses and activities (including livestock grazing, irrigation/diversions, minerals exploration and development, forest product removal, recreation use, transportation management, etc.) affected the structure, composition, function, and processes of riparian and aquatic ecosystems in the watershed?
2. How have riparian management practices affected terrestrial and aquatic species' habitat conditions and species distribution or numbers?
3. What management practices have been effective at improving riparian health and aquatic habitat condition? What problems still need to be addressed?

Issue C. Declining Forest Health

Core Topics Addressed: Vegetation, species and habitats.

Rationale: The watershed analysis area contains numerous indicators of declining forest health, including declining aspen populations, overstocked timber stands, mistletoe-infected Douglas-fir stands, declining whitebark pine stands, increased fuel loading, Douglas-fir encroachment into sagebrush, and overabundant regeneration in previously harvested areas. National and regional interagency strategies and initiatives emphasize the restoration of dry forest, woodland, and aspen types.

Key Questions:

1. How have silvicultural practices, or a lack thereof, affected the structure, composition, and ecosystem processes of forest vegetation in the analysis area?
2. How has fire exclusion (including suppression activities) affected the structure and composition of forest vegetation?
3. How have forest habitat management practices affected terrestrial species' habitat conditions and species distribution or numbers?
4. How can forest management practices effectively address both forest health concerns and human use concerns?

Issue D. Effects of Roads on Water Quality, Wildlife Distribution, and Weed Spread

Core Topics Addressed: Erosion processes, hydrology, vegetation, stream channel, water quality, species and habitats, human uses.

Rationale: The analysis area has the highest road density of any watershed in the Lemhi Sub-basin. Roads serve as a vector for the spread of noxious weeds. Roads located in or adjacent to stream bottoms contribute sediment to streams that are designated critical habitat. The analysis area includes substantial acreage of big game winter range; the herds which occupy this range can be directly impacted by travel management. Road use and maintenance are likely to increase because of the area's high profile designations and popularity for visitation (Lewis and Clark National Historic Trail (NHT) and Special Recreation Management Area (SRMA), Continental Divide National Scenic Trail (NST), hunting). Providing sufficient access to the area to accommodate human uses and management, while simultaneously reducing impacts to ecological processes and biological resources, will require careful thought and public involvement.

Key Questions:

1. How do road density, use, maintenance, condition, and location affect water quality, wildlife distribution, and weed spread?
2. What conditions limit road management opportunities in the watersheds?
3. What changes in road management have been effective at addressing resource concerns? What additional measures need to be implemented?

Issue E. Health of Rangeland Vegetation

Core Topics Addressed: Erosion processes, vegetation, species and habitats, human uses, and visual resources.

Rationale: Rangeland vegetation within the analysis area supports a wide variety of resources and land uses, from the scenic vistas along the Lewis and Clark NHT and Backcountry Byway/Adventure Road, to permitted livestock grazing, to upland watershed protection that limits sediment transport to streams, to wildlife habitat. In recent years, BLM has increased its focus on rangeland health. The Agency-Kenney watersheds are within the land area affected by the Great Basin Restoration Initiative, an interagency plan to restore the ecological health of the Great Basin. Shrub, sagebrush, and grassland vegetation types are emphasized for restoration. The Lewis and Clark NHT SRMA is managed to retain natural aspects of the

historic trail route, including healthy rangeland vegetation. The analysis area is also within the range of the Interior Columbia Basin Ecosystem Management Project, designed to develop a scientifically sound and ecosystem based strategy for forests and rangelands administered by the Forest Service and Bureau of Land Management in the interior Columbia River Basin and portions of the Klamath and Great Basins.

Key Questions:

1. How has historic and recent grazing management affected the structure, composition, and ecosystem processes of rangeland vegetation in the analysis area?
2. How has the spread of noxious weeds and other invasive non-native plant species affected the composition, structure, and function of rangeland ecosystems?
3. How has fire exclusion (including suppression activities) affected the structure and composition of rangeland vegetation?
4. How have rangeland management practices affected terrestrial species' habitat conditions and species distribution or numbers?
5. How has management to improve rangeland health affected other ecosystem processes and human uses in the analysis area? What management practices have been effective, and what additional measures are needed?

Human Uses and Values

Issue F. Increased Off-highway Vehicle (OHV) Use and Need for Transportation Management

Core Topics Addressed: Erosion processes, vegetation, stream channel, water quality, species and habitats, human uses, visual resources, cultural resources.

Rationale: Primary access routes within the watersheds are nationally designated (e.g., Lewis and Clark Backcountry Byway/Adventure Road) and/or access important sites (Lemhi Pass National Historic Landmark, Continental Divide National Scenic Trail). However, most travel routes in the analysis area were created by casual use and not designed for regular travel. These "vehicle ways" are often redundant, since engineered roads also provide access to most areas. Vehicle ways have recently proliferated as a result of increased visitation and vehicle capability. These numerous travel routes have a high potential for impacts to resources (see Issue D). Increased visitation and use of off-highway vehicles for transportation and recreation precipitate the need for transportation management. Recreation use conflicts (OHV use versus other uses) are becoming more and more common. Visitor safety (e.g., is a vehicle type appropriate for the route traveled) is another concern as visitor use of the area increases. Recent OHV management changes for the Salmon Field Office - BLM, approved in the Decision Record for the Lemhi RMP Amendment (USDI-BLM, 2000), are an initial attempt to address some of these issues.

Key Questions:

1. Is existing OHV management adequate to address resource (wildlife, fish, erosion, weeds, visual quality), safety (increased visitation, road maintenance, vehicle type), and multiple recreation use (foot/horse/mountain bike travel) concerns, especially during the Lewis and Clark Bicentennial? If not, what components of existing management have been effective and what changes should be pursued?

2. What transportation network and management of roads within the watershed would best provide for present and future public lands management and human uses while also addressing resource concerns?
3. What public education and enforcement measures should be implemented to prevent further proliferation of unauthorized vehicle ways and promote safe, responsible use of authorized routes?

Issue G. Tribal Treaty Rights/Traditional Uses

Core Topics Addressed: Vegetation, water quality, species and habitats, human uses, visual resources, cultural resources.

Rationale: The watersheds historically sustained a rich and diverse ecosystem that played an integral role in the subsistence, settlement, and culture of the Shoshone people. After 1907, when the Lemhi Indian Reservation was closed and the Indian people were forcibly exiled to Fort Hall, the Lemhi Shoshone lost a vital link to the resources of their homeland. In the ensuing decades, the landscape has been affected by various Euroamerican land uses and steady demographic growth and tourism. Yet, the area continues to be of great importance to the Shoshone-Bannock Tribes, both as a place of historical and traditional value, and for its many treaty rights resources.

Key Questions:

1. What resources and landscapes within the analysis area are of particular importance to the Tribes?
2. Does existing management (e.g., transportation, vegetation, fisheries, wildlife, cultural resource) adequately support the Tribes' access to and use of traditional properties and resources protected under treaty and by law?
3. What are the anticipated impacts to the Tribes' from increased visitation to the watersheds? How should these impacts be addressed?

Issue H. Increased and Changing Recreation Use

Core Topics Addressed: Human uses, visual resources.

Rationale: National trends in recreation use include increased visitation to BLM and National Forest lands. The analysis area has several recreation resources that are nationally designated: the Lewis and Clark National Historic Trail (NHT), the Lewis and Clark Backcountry Byway/Adventure Road, the Lemhi Pass National Historic Landmark (NHL) and the Continental Divide National Scenic Trail (NST). The watershed analysis area has experienced a marked increase in recreation and visitor use during the past two years. An ongoing increase in visitation is expected for at least the next four years during the Lewis and Clark Bicentennial.

Key Questions:

1. How has increased visitor use affected the recreation setting (e.g., visual, aesthetic, ecological impacts)? Which of these impacts are expected to continue over time, or to subside after the Bicentennial?
2. Are current recreation management, resources, and facilities adequate to meet public demand in the short term (Bicentennial) and long term (e.g., recreation sites, transportation/access, sanitation, outfitters/guides, signing, interpretation, accessible sites for the disabled, emergency services, law

enforcement)? If not, what components of existing management, resources, and facilities have been effective and what changes should be pursued?

3. How should the multiple high-profile (national designation) areas (Backcountry Byway/Adventure Road, Lewis and Clark NHT and Special Recreation Management Area (SRMA), Continental Divide NST, Lemhi Pass NHL) be managed to achieve a balance with commodity interests and uses (livestock grazing, minerals development, timber harvest) and to conserve or improve watershed health?

Issue I. Commodity Uses

Core Topics Addressed: Human uses.

Rationale Statement: Under the authority of the Federal Land Policy and Management Act (FLPMA) and National Forest Management Act (NFMA), the BLM and Forest Service manage public lands for multiple uses, including commodity uses such as timber harvest, mining, and livestock grazing. BLM and Forest Service management direction (e.g., minerals restrictions, off-highway vehicle use designations, and visual resource management objectives) influences the nature and extent of commodity uses that can occur in some portions of the watershed analysis area. Historically, the Agency-Kenney watersheds have been used for livestock grazing, mineral development, forest product extraction, fishing, a powerline right-of-way, hunting, and irrigation. The analysis area continues to have potential for these uses, as well as recreation pursuits. In some parts of the watersheds, commodity uses may be in direct conflict with other land uses or resources. One purpose of this watershed analysis is to identify these use conflicts and recommend management solutions that improve and maintain resource values while also accommodating human uses.

Key Questions

1. What is the current and anticipated interest in commodity uses within the watersheds? How do these interests overlap with other multiple uses and the issues already identified for the watershed? In what areas should use conflicts be anticipated? How might these conflicts be resolved?
2. How does existing management constrain or guide commodity uses? What balance of management would foster commodity uses while simultaneously addressing other human uses and resource concerns within the watersheds?

Chapter 3 - Overview of Resource Condition, Trend, and Management Opportunities (Steps 1, 3, 4, and 5)

This chapter consolidates the information gleaned from completing several steps of the Ecosystem Analysis Six-Step process, namely steps 1, 3, 4, and 5. The overview focuses on the predominant physical, biological, and human processes and features that affect ecosystem functions or conditions in the watershed. Where the information was available, each resource discussion includes a description of current uses, condition, and trends, as well as a summary of historical (reference) conditions. Factors that may have produced changes between historical and current conditions are also mentioned.

Climate

Precipitation in the analysis area varies with elevation, ranging from 7 to 16 inches on the lower elevation, drier sites, to 13 to 23 inches at the higher elevation, moister sites. Average annual precipitation is 11 to 14 inches, mainly occurring as snow. Summers are hot and dry, with little precipitation from June to September.

Air Quality

Air quality within the Agency-Kenney watersheds area is good, depending on the time of year and source of particulate matter. The analysis area is located away from large metropolitan airsheds. The main source of pollutants is from prescribed fires on the Salmon-Challis National Forest during the spring and fall, and from large wildfires to the west and northwest during the summer and early fall.

Visual Resources

Visual or scenery management objectives for the analysis area tend to be mostly retention-oriented, especially in the areas near the Continental Divide, where visible impacts to the landscape are kept to a minimum (see Map 2; Glossary, pages 103-104; and Management Summary, page 83). The Salmon National Forest has identified areas of planned or potential timber harvest in the mid- to lower elevation forested areas as areas for modification of the visual resource. The BLM has designated much of the public land in the watershed analysis area as Visual Resource Management (VRM) Class II - Retention, due to the historical significance of the area, and a much smaller portion in the Kenny Creek drainage as VRM Class III - Partial Retention (USDI-BLM, 2001). The Continental Divide NST SRMA is VRM Class I - Preservation, due to its Congressional designation as a National Scenic Trail.

The historic landscape has been affected during the past 60 years by electrical transmission line construction, minerals exploration and development, timber harvest, and road construction related to each of these activities. Rural farming developments on private lands in the lower portions of the watershed have gradually changed the landscape character of some of the lower foothills and creek bottoms. The upper portions of the analysis area show the least amount of visual impact.

Geologic and Hydrologic Processes

Geology

Most of the region is underlain by Precambrian (about one billion year-old) rocks consisting of interlayered, light- to dark-gray and greenish-gray micaceous quartzite, and dark-gray argillite. These rocks are regionally folded and faulted and have been intruded locally by diorite or diabase dikes. These dikes are late Mesozoic to early Tertiary in age (approximately 100 to 50 million year-old). Eocene aged (about 50 to 35 million year-old) volcanic rocks (rhyolitic and basaltic in composition) occur as remnants on the Precambrian rocks, mostly in the eastern and northern parts of the watershed. Neogene aged (about 20 million years ago to the present) sedimentary rocks, consisting mostly of poorly sorted gravels, conglomerants, and sandstones, occur predominately in the western parts of the analysis area. Numerous landslide (mudflow and mudslide) deposits occur along Agency Creek, are very young geologically, and continue to form at the present time.

Two major structural events that occurred in the Agency-Kenney watersheds are responsible for the majority of the land forms seen in the region today. A major northwesterly trending fault zone cuts the area diagonally, southeast to northwest. This zone of fractured and broken rock is up to approximately 5.5 miles wide in the eastern part of the watershed and narrows to a less distinctive zone about 1 to 3 miles in width as it extends northwesterly from Lemhi Pass across the watershed. The fault zone trends into Idaho from Montana. Its northern boundary crosses about one half mile north of Lemhi Pass, and its southern boundary crosses about 5 miles south of the Pass. This fault zone can be traced to the Pattee Creek area, where it apparently is truncated by a north-south trending range front fault zone. This north-south fault represents the second major structural event in the area. Exact ages of these two fault events are not well defined, but the north-south faults are definitely younger and represent typical basin-and-range structures that occurred throughout much of the West beginning about 60 million years ago. The northwest trending Lemhi Pass fault zone is therefore older than 60 million years.

The relatively lower and less rugged topography of the Lemhi Pass area is directly related to the ability of the more broken and fractured rocks within the fault zone to be eroded at a more rapid rate than the surrounding, less fractured rocks. This differential erosional activity formed the natural pass through this rugged part of the Bitterroot Range used by the Native people, and later by the Lewis and Clark party. The mudslide deposits in the Agency Creek area are also a direct result of fault prepared, intensely fractured rocks being undercut by the erosive action of the creek. The susceptibility of these fractured rock formations to slide will be a continuing concern during the design and maintenance of roads and projects in the watershed.

Erosion Processes

Overall, the watershed analysis area has a low to moderate potential for surface erosion, with moderate potential occurring in previously disturbed areas. On portions of National Forest lands in the watershed, the land types formed over quartzite have low to very low potential for mass wasting. Most of the National Forest lands have a parent material derived from quartzites, but there is about a 10% presence of Challis volcanic materials. Some of these volcanic soils are adjacent to Lemhi Pass and ridgelines south, but these soils are most prevalent on BLM lands in the lower third of the Flume Creek watershed and across Agency Creek into Cow Creek. These soils types have a moderate erosion potential, whereas the quartzite soils have a low potential. A small percentage of depositional, alluvial, colluvial soils occur in the watershed in a narrow band on both sides along the middle third of Agency Creek. These areas can be susceptible to landslides and

slumping.

Strongly faulted and fractured rocks (e.g., brittle quartzites and siltites of the Precambrian Belt Series), volcanic rocks of the Challis Volcanic Group, and poorly consolidated lake bed and glacial deposits comprise a large portion of the BLM lands within the watershed. These rock types, when combined with steep terrain, result in regional instabilities that produce geomorphologic features including hummocky topography, landslides, debris flows, and hill-side creep. Slope instabilities are common along the Agency Creek fault zone (see Geology, above), and need to be considered in any planning or assessment activities related to the area (e.g. recreation, wildlife, fisheries, and grazing activities).

Sediment deposition increases progressively downstream as gradient decreases and streambanks become slightly less stable. Many stream channels are diverted as they pass through private lands, which lowers the capacity of the streams to move sediment. The primary sources of sediment appear to be from (a) streambank erosion and (b) roads surfaced with native materials that parallel streams. The seasonal blow-out of earthen irrigation diversion impoundments is also a likely source of sediment. Riparian improvement projects implemented since 1991 on both federal and private lands have reduced sedimentation from unstable banks. Riparian improvement has also resulted from activities such as enclosure fencing and off-site water developments. Road improvement projects have addressed the primary sediment sources, but travel management is a key to maintaining roads in good shape. Many roads are located in or immediately adjacent to the floodplain, increasing the drainage network in the watershed and resulting in both chronic and acute sources of sediment to the aquatic system. Increased road maintenance and improvements to several roads such as the Agency Creek Road and Cow Creek Road have resulted in improved drainage, more stable road surfaces, and improved fish passage.

Hydrology

A “high integrity” hydrologic system is defined here as a network of streams, along with their unique ground water ecosystems, within the broader landscape where the upland, floodplain, and riparian areas have resilient vegetation; where the capture, storage, and release of water limit the effects of sedimentation and erosion; and where infiltration, percolation, and nutrient cycling provide for diverse and productive aquatic and terrestrial environments. This definition is consistent with, and is driven by, the goal to maintain ecological processes within a landscape.

Measures of hydrologic integrity include such elements as the following: disturbance to water flow; bare soil and disturbances to soil structure; riparian vegetation; sensitivity of stream banks and hill slopes to disturbance; cycling of nutrients, energy, and chemicals; surface and sub-surface flows; stream-specific measurements such as gradient, stream bed substrate, full bank width, and depth; and recovery potential following disturbance. Specific proxies for forest and rangeland hydrologic integrity include hydrologic effect variables (for example, surface mining, dams, cropland conversion, and roads) and sensitivity of stream banks and stream channel function to disturbance. Ratings include potential for sediment to reach streams following road construction; potential for sediment to reach streams following fire or vegetation removal; potential to adversely affect stream hydrologic function through increased sediment or stream flow; inherent stream bank sensitivity; rating of riparian vegetation importance to stream function; and potential for a watershed to recover hydrologic functions following disturbance (USDI-BLM/FS, 1997).

The three primary streams in the analysis area (Kenney, Pattee and Agency creeks) drain a total of 100 square miles of the western slopes of the Continental Divide. The analysis area is comprised of two 5th code sub-watersheds and four 6th code sub-watersheds. There are numerous springs in the analysis area which augment surface runoff and maintain fairly constant base flows in the streams. (*Note:* Major streams in the analysis area are shown on Map 1.)

Streams in the analysis area generally begin as a series of seeps and springs near the Continental Divide. They then flow in a southwesterly direction through steep forested lands, narrow canyons, and low foothills to the convergence with the Lemhi River. Although historically Kenney, Pattee, and Agency creeks all reached the Lemhi River year round, Kenney Creek is now one of the few tributaries to the Lemhi River that do so. Kenney, Pattee, Agency, White, Sharkey, and Warm Springs creeks all have diversions that withdraw water for irrigation purposes and prevent Pattee and Agency creeks from reaching the Lemhi River for much of the year. Typically, the lower portions of the streams are classified by Rosgen (1996) as B channels, while the headwaters are classified as A channels (see Glossary, p.103).

Kenney Creek - Kenney Creek is one of the few streams in the Lemhi sub-basin that reaches the Lemhi River year-round. The creek begins as a series of seeps and springs near the rock faces of the Continental Divide. It then flows in a southwesterly direction through steep forested lands, a narrow canyon, and low foothills to the convergence with the Lemhi River. The stream is characterized by gradients between 2 and 5%, with 78% of the stream length exceeding 4% gradient. The lower portion of the stream is a B channel, while the headwaters are A channels. Kenney Creek has two main tributaries, including the East Fork, which drains the area to the southeast of upper Kenney Creek, entering just upstream of a narrow, deep, heavily vegetated canyon. Rattlesnake Draw, an intermittent stream, enters the mainstem just above the private holdings.

The mainstem base flow for Kenney Creek is 10 to 15 cubic feet per second (cfs) above the diversions. The many springs and seeps within the watershed contribute to this base flow. The Kenney Creek drainage has seven water rights (of which only one point of diversion is on BLM lands) which are permitted to withdraw a total of 6.3 cfs from March 15 to November 15.

Warm Springs Creek - Warm Springs Creek is an intermittent, spring-fed stream within the Pattee Creek drainage. The creek has less than 1 cfs base flow. Sharkey Hot Spring flows into the stream approximately ¾ mile below the stream source, rapidly increasing the temperature of the water. The stream channel follows the Warm Springs Wood Road until it reaches private property, where it flows into a series of ditches.

Pattee Creek - Pattee Creek has a before-diversion mainstem base flow of 4-5 cfs, with a mean annual flow of 6.1 cfs, and is characterized by stream gradients of 0.5 to 5⁺%. The lower section on private lands and BLM-administered public lands is a C channel, while the upper BLM/lower USFS section is a B channel. The headwaters near the Continental Divide are A channel. Several tributaries empty into Pattee Creek (High Creek and Wade Creek are the most important), as well as many other unnamed intermittent streams, springs, and seeps. There are eight claims to the water in Pattee Creek, totaling 8.35 cfs, for the period of March 15 through November 15.

Agency Creek - Agency Creek has a mainstem base flow of 5-10 cfs, and is characterized by stream gradients of 1% to 5⁺%. The lower 3 miles are C channels, while the majority of the stream is a B channel, except the uppermost reaches which are A channels. The watershed contains numerous perennial and ephemeral streams, seeps, springs and bogs, the majority of which are located on the south side of Agency Creek. The Cow Creek sub-watershed enters Agency Creek from the south, and as the southernmost tributary, it forms a rather long southern leg to the Agency Creek watershed. Cow Creek is second only to

Agency Creek proper in amount and diversity of riparian habitat. Other perennial streams entering Agency Creek from the south include Sharkey Creek, White Creek, Squaw Creek, and an unnamed stream in which the Copper Queen mine is located. As with Cow Creek, the headwaters of these streams originate as springs along the Continental Divide. Flume Creek and two unnamed streams in Rattlesnake Draw and Gould Basin enter Agency Creek from the north.

Multiple diversions dewater Agency Creek and prevent it from reaching the Lemhi River during the irrigation season. There are 20 water rights claims on Agency Creek and its tributaries, totaling 15.027 cfs for the period March 15 to November 15, and an additional claim for 2.0 cfs for the period April 1 to November 1. During peak irrigation, the lower reach of the stream is frequently reduced to less than one cfs. Since it flows through and across a ditch just upstream of the Lemhi River confluence, irrigators have the opportunity to dewater it completely at this point. There are also two diversions on tributaries to Agency Creek, Sharkey Creek, and White Creek. Both diversions are located on public land. The BLM has no discretion over these ditches or diversions. Although the diversions reduce streamflow, both Sharkey and White Creeks still reach Agency Creek year-round.

Vegetation

Fire Ecology

Fire Activity

Fire activity in the analysis area has been traced from 1939 to 2002. During this time period, approximately 3,434 acres burned within the analysis area (an average of 55 acres per year). The majority of these fires were less than 5 acres. Larger fires (1,590 acres and 640 acres) burned in the Pattee Creek drainage in 1945, and in the Warm Springs Creek drainage in 1982 (130 acres) and 1983 (720 acres). These were the four largest fires identified in Forest Service and BLM fire records. Between 1939 and 1967 no legal descriptions were available for fires; only the drainage or prominent landmark was identified. For this reason, it is not known in what type of vegetation these earlier fires burned. However, there is a good possibility the fires occurred in forested areas, since livestock grazing reduces fine fuels in rangeland communities. In addition, data from a fuels inventory completed in 2001 (North Wind Environmental, Inc.) indicated plots with charcoal debris and fire scars on trees. Since 1967, fire activity data are more complete.

Fire Ecology of the Watershed

Historically, wildfire was the dominant change agent (disturbance) in the Agency-Kenny watersheds in both forested and non-forested ecosystems. Fire controlled the structure of these communities. Due to fire management practices and policies, fire has been excluded from these ecosystems for approximately 110 years.

Map 3 depicts a coarse-scale landscape level assessment of condition class for the Salmon Field Office-BLM, based on satellite imagery data gathered by the University of Idaho in 2002. (**Note:** The satellite imagery indicates the vegetation types that are present on a landscape level; structural stages of vegetation can also be determined from the satellite imagery data.) Landscapes in the analysis area are currently categorized as within fire regime Condition Class 1, Condition Class 2, or Condition Class 3 (see Glossary, pages 99-100). Fire regimes are generalized descriptions of the role fire plays in an ecosystem. They are characterized by fire frequency, predictability, seasonality, intensity, duration, scale (patch size), as well as regularity or variability.

Detailed descriptions of the vegetation cover types found within the Salmon Field Office area and their associated fire ecology can be found on pages 15 to 25 of the Interdisciplinary Activity Plan for Fire Management (North Wind Environmental, Inc., June 2002).

Currently, 90% of vegetation communities within the Field Office are Condition Classes 2 and 3. Implementing the resource management objectives recommended in this document should move more of the area towards a better condition class (to Class I). Moving high priority, high condition class areas to a lower condition class is one of the key performance measures identified in the 10-Year Comprehensive Strategy Implementation Plan (USDI-BLM, USDA-FS, *et. al*, 2002).

Timbered stands within areas of fire exclusion have moved closer to their climax seral stages and are now densely populated. As stocking densities increase, wildlife habitat may have been altered. The increased tree density has created a thicker tree canopy and a decreased snow pack on the forest floor. This has increased competition between trees for water and nutrients. As trees are stressed for water and nutrients, overall stand health is reduced.

In non-forested communities, cattle grazing and fire suppression have altered the environment. Current grazing practices reduce fine fuel loading. However, the lack of fire disturbance has increased the amount of sagebrush present. Due to fire suppression, fire has not entered these ecosystems for approximately 100 years.

Fire Ecology Reference Conditions: The use of fire by aboriginal peoples in the western United States is quite well documented (e.g., Williams 2002). However, as yet, there is no known direct evidence of intentional fire use in the analysis area by the Lemhi Shoshone. The frequency and antiquity of intentional burning by native people is not well understood, but must certainly have played a role in local ecosystem condition and function. Human-kindled fires served to alter the floral character and cover of the landscape, enticing and fattening favored game species, encouraging denser and/or more extensive patches of certain plant foods, and increasing available pasturage for their growing horse herds. The Lewis and Clark journals (Moulton 1988) note several "smokes" wafting into the August sky as the Expedition sojourned in the study area in August 1805. These observations may be evidence of aboriginal firing. Alternately, the smokes may have been created as long-distance messages to scattered Indian families that it was time to consolidate for the fall bison hunt (a common communication technique). It is somewhat less likely that these were natural burns, given the unusually cool weather documented for that particular August.

The Role of Fire in Forested Vegetation

Prior to fire suppression practices, Douglas-fir forested areas did not have the number of trees per acre that are on the landscape today. With fewer trees, more nutrients and water were available for existing trees and other plants. This enabled the trees in these forested communities to be larger and healthier. With fewer trees, more sunlight could enter the forest floor and increase forb and grass production. As a result, Douglas-fir stands were more open and produced a greater abundance of understory plants. This increased the amount of forage available for wildlife. In addition, more species of vegetation that regenerate rapidly after low to moderate severity fires (such as forbs and grasses) were likely present.

Similar conditions existed in sub-alpine fir and whitebark pine stands. However, these communities, by nature, were not as open as Douglas-fir stands. This reduced the amount and diversity of understory species.

Recent inventories identified the following fire groups within the watershed analysis area (North Wind

**Table 1: Fire Groups Present in the Agency-Kenney Watersheds
(Forested Ecosystems = approximately 75,000 acres)**

Fire Group	Habitat Description	Mean Fire Return Interval (years)	% of Watershed Analysis Area
Fire Group 2	Warm, dry habitat types that support open forests of Douglas-fir	12 to 22	19
Fire Group 4	Cool, dry Douglas-fir habitat types	40	
Fire Group 7	Cool habitat types usually dominated by lodgepole pine	25 to 80	15
Fire Group 8	Dry, lower subalpine fir habitat types		
Fire Group 9	Wet or moist, lower subalpine fir habitat types	-	3
Fire Group 10	Cold, upper subalpine fir and timberline habitat types	100 to 300	
Grass/Sagebrush		20 to 80	63

Low intensity fires characterize Fire Group 2. These fires may occur as frequently as every 15 years. Low intensity fires with this frequency eliminate fuel build up on the forest floor and reduce stand density. With lack of ground fuel and reduced stand density, stand-replacing fires are very uncommon. For the existing trees on site, reduced competition for water and nutrients increases overall forest health.

Fire Group 4 is considered a mixed fire regime. These vegetation communities experience combinations of low to moderate intensity fires and infrequent, severe, stand-replacing fires. Fire frequency averages approximately every 40 years. The lower intensity fires do not tend to kill all the conifers but serve to reduce stand density, thereby reducing competition for water and soil nutrients. On a less frequent basis, environmental conditions may allow for seedlings to establish and grow to heights that contribute to ladder fuel conditions, which increase the potential for a stand-replacing fire.

Fire Groups 7 and 8 typically consist of lodgepole pine and dry, lower elevation subalpine fir. They experience stand-replacing fires in cooler, higher elevations and/or wetter ecosystems. Between stand replacement fires, these Fire Groups also experience low to moderate intensity fires. Fire frequency for this Fire Group is every 25-80 years.

Fire Groups 9 and 10 typically consist of wet, lower elevation subalpine fir and cooler, upper elevation subalpine fir and timberline habitat types. Fire frequency is every 100-300 years.

To gain a better understanding of the extent to which fire has been excluded from the Agency-Kenney Watersheds landscape, we will consider an average mean fire return interval (MFI) of 40 to 300 years and compare these figures with the actual area burned during the last 63 years:

- Assuming a mean fire return interval (MFI) of 40 years, approximately 105,525 acres should have burned between 1939 and 2002 (63 years/40years = 1.5 years x 67,000 acres = 105,525 acres). *This would require that the entire landscape (100%) would have experienced a low intensity ground fire approximately one and one half times since 1939.*

- Assuming a MFI of 300 years, approximately 14,070 acres should have burned between 1939 and 2002 (63 years/300 years = 0.21 years x 67,000 acres = 14,070 acres). *This would require that 21% of the landscape would have burned.* This 300 year MFI would only apply to the upper elevation subalpine fir and whitebark pine ecosystems (Fire Groups 9 and 10). Since these ecosystems represent only 18% of the Agency-Kenney landscape, it should be considered a conservative estimate of acres that should have burned during that 63-year timeframe.
- Assuming a MFI of 40 years, the 3,434 acres burned since 1939 represents approximately 5% of the area that theoretically would have burned according to fire group definitions and natural fire return intervals. The 3,434 acres burned since 1939 represent *about 24% of the area that would have burned under natural conditions with a MFI of 300 years.*

Summary: Fire has been excluded from this landscape during the past 63 years. This ecological process that controls vegetative structure no longer functions naturally on a landscape level. The historic fire frequency is no longer part of this ecosystem. Under these circumstances, fuel loading can increase to levels much higher than those that existed historically. When fire does enter this ecosystem, it will likely be at much higher intensities rarely experienced on these sites.

The Role of Fire in Non- Forested Uplands (Sagebrush/Grasslands)

Opinions vary on the historic occurrence of sagebrush. However, numerous historic journals indicate its occurrence across wide expanses of the West. Lewis and Clark made numerous references to sagebrush in their travels across Montana and Idaho in 1805. Historical photographs of Yellowstone National Park taken in the 1880's show that big sagebrush was present as a dominant overstory shrub (USDA-FS/USDI-BLM, 1998. page 4-7). Further evidence that much of the present-day sagebrush distribution existed in pre-settlement times comes from photographs taken by the Hayden Expedition in the 1870's in Wyoming, Idaho, and Utah. These photos were retaken in the 1980's and provide a picture of landscape change over a 100 year period.

Wildland Urban Interface within the Watershed Analysis Area

The term Wildland Urban Interface (WUI) has no consistent, nationally accepted definition at present. For the purposes of this analysis, Wildland Urban Interface areas within the Agency-Kenney watersheds include (a) several small ranches with buildings, and (b) unoccupied buildings that have historical value.

The majority of structures are within Fuel Model 2 and 10 areas. (A Fuel Model 2 area has the potential for fast rates of spread with high fire intensity. A Fuel Model 10 area has heavy fuel loading and lower rates of spread, but could have detrimental effects to structures in the path of a fire.) Within Fuel Model 2 areas there is the potential to “greenstrip” public lands adjoining structures. Livestock grazing management on Fuel Model 2 rangelands can also reduce fine fuels and the rate of fire spread (to make fires more manageable). Within Fuel Model 10 timbered areas there are unoccupied buildings with historical value that could fall into the WUI category. Mechanical fuels projects to reduce hazardous fuels could be focused around these areas once occupied structure projects are completed.

The Lemhi County WUI working group continues to do assessments and mitigations in the urban interface. This working group is also working towards a prevention and education program in Lemhi County which

should reduce human-caused fires in WUI areas and wildlands.

Forest Vegetation

The analysis area contains approximately 26,657 acres of forested vegetation. Forest types are interspersed with natural sagebrush/grass openings and rocky outcrops. As a result of fire exclusion, Douglas-fir (and in some cases lodgepole pine) have been encroaching into sagebrush and grassland areas. Map 4 depicts the vegetation types within the analysis area as derived from University of Idaho satellite imagery data.

Current Conditions

The forest tree species in the watershed analysis area include Douglas-fir, lodgepole pine, subalpine fir, whitebark pine, Engelmann spruce, aspen, and cottonwood. These species are typical for this portion of the Rocky Mountains and can be found in adjacent landscapes.

Douglas-fir: Douglas-fir occurs as an early succession species in subalpine fir cover types and as a climax species with lodgepole pine as the seral species.

Lodgepole pine: Lodgepole pine is present in stands with subalpine fir and Douglas-fir. Generally, pure lodgepole pine stands exist in cool drainages or cool air pockets.

Subalpine fir: Most stands of subalpine fir are already multi-layered and heavily stocked with Douglas-fir and subalpine fir.

Whitebark pine: Whitebark pine is found in both pure stands and in stands mixed with subalpine fir.

Engelmann spruce: Engelmann spruce is generally limited to areas with wetter soil conditions and may be scattered within Douglas-fir and subalpine-fir stands.

Aspen: Aspen is generally found in areas with wetter soil conditions. Aspen has almost disappeared from the Agency-Kenney Creek watersheds as a result of conifer encroachment and lack of disturbance. The satellite imagery was unable to accurately identify aspen patches.

Cottonwood: Cottonwood colonization is limited to wetter sites and riparian areas. It is found in protected valleys and canyon bottoms, along stream banks, and at edges of ponds and meadows. With the exclusion of fire or other disturbances, the trend is that cottonwood occupies slightly less of the suitable habitat than it did in the past. As a shade intolerant species, it out-competes its slower-growing competitors through initial rapid growth after establishment. However, it is not able to reproduce in the shade and has become replaced with shade tolerant species, such as spruce and subalpine fir.

Designated Old Growth: The analysis area contains 1,094 acres of “designated old growth” (see Map 5). These old growth stands are distributed in the Wade Creek/Flume Creek area (817 acres), Kenney Creek area (817 acres), and adjacent to Lemhi Pass (46 acres). Forested vegetation cover types within these stands are Douglas-fir and lodgepole pine.

Current vegetation acreages were determined from satellite imagery data gathered by the University of Idaho. This analysis was done using 30 meter satellite imagery to determine current cover types and structural stages. One must take into account the limitations of satellite imagery at this scale in differentiating both cover types and structural stages. Also, for this analysis, habitat types were combined to give the six cover types shown in the following tables of current and historical conditions. This was done to simplify the analysis for the reader. The numbers in the following tables should be used to represent general trends or shifts as opposed to concrete acreage values.

Table 2: Forest Vegetation Types by Structural Stage

Forest Type	Structure	Acres
Douglas-fir	Old Multi Strata	6,406
	Old Single Strata	628
	Stand Initiation	859
	Stem Exclusion Closed Canop	86
	Understory Reinitiation	2,293
	Young Multi-strata	4,003
	<i>Total</i>	14,275
Lodgepole Pine	Old Multi Strata	1,129
	Stem Exclusion Closed Canop	94
	Understory Reinitiation	8,191
	Young Multi-strata	1,817
	<i>Total</i>	11,231
Spruce/Subalpine Fir	Old Multi Strata	589
	Understory Reinitiation	7
	Young Multi-strata	58
	<i>Total</i>	654
Whitebark Pine	Old Multi Strata	16
	Old Single Strata	174
	Understory Reinitiation	43
	Young Multi-strata	264
	<i>Total</i>	497

Historical Conditions

By analyzing the current data for this watershed and historical data from the Hayden Creek Watershed Analysis (USDI-BLM and USDA-FS, 1998) and Salmon Interface Watershed Assessment (USDA-FS and USDI-BLM, in progress), the following trends can be concluded.

Historically, the forested landscape supported the following species: Douglas-fir, lodgepole pine, subalpine fir, whitebark pine, Engelmann spruce, aspen, and cottonwood. These species were typical for this portion of the Rocky Mountains and could be found in adjacent landscapes.

Douglas-fir Cover Type

Douglas-fir in the dry forest type had lower stocking densities than the other forest types; the stands were more open and “park-like.” The mid seral and late seral stages had less subalpine fir and Douglas-fir in the understory. Douglas-fir would not have succeeded into sagebrush/grass areas. Where it was mixed with ponderosa pine and lodgepole pine, the pines dominated the area. The habitat types were similar to current conditions. Generally, Douglas-fir stands were open-grown with large diameter boles and very little understory. Stands had basal areas likely ranging from 40 to 110 square feet per acre, with Stand Density Indexes ranging from 100 to 250 trees per acre. Some multi-layered old forest stands existed, but they were not common. With fewer trees per acre, trees grew faster, increasing their diameters and developing bark thick enough to survive periodic low or moderate severity fires. The current amount of Douglas-fir cover

types is less than what occurred historically. This trend is due to the lack of disturbance such as fire. These types have become spruce/fir cover types today.

Table 3: Percent Distribution of Douglas-fir Structural Stages (Historic and Current)

	Stand Initiation	Stem Exclusion	Understory Re-initiation	Young Forest Multi Story	Old Multi Story	Old Single Story
Historic	15-30	10-30	20-40	0	5-10	10-40
Current	6	0.6	16	28	45	4
Difference	-9 to -24	-10 to -30	-4 to -24	+28	+35	-6 to -36

Lodgepole Pine Cover Type

Historically, stands were dominated by lodgepole pine with less Douglas-fir and subalpine fir in the understory. Lodgepole pine was more of a major component in the subalpine fir habitat types than it is today. The lodgepole pine stands occupied a wide range of structural stages in the historical landscape, with stocking densities low enough to prevent stand stagnation. Lodgepole pine has decreased in extent compared to what occurred historically.

Table 4: Percent Distribution of Lodgepole Pine Structural Stages (Historic and Current)

	Stand Initiation	Stem Exclusion	Understory Re-initiation	Young Forest Multi Story	Old Multi Story	Old Single Story
Historic	10-25	30-40	20-30	0	5-20	5-10
Current	0	0.8	73		10	0
Difference	-10 to -25	-29 to -39	+43 to +53		+5 to -10	-5 to -10

Spruce/Fir Cover Type

This type was found across the watershed in moist areas and at higher elevations. There was less subalpine fir in the understories of other cover types due to more mixed severity fires. Subalpine fir was not as abundant in the landscape as it is today. Historically, it often occurred as a minor component in mixed lodgepole or whitebark pine stands. These cover types have increased from historic conditions due to the lack of disturbance. Engelmann spruce was not a major component in this landscape. Historically, it was restricted to areas exhibiting wet soil conditions or it was sparsely scattered within Douglas-fir and subalpine-fir stands. Few stands of relatively pure Engelmann spruce existed. With low to moderate fire activity, Engelmann spruce was afforded advantages for regeneration. These fires killed only portions of the overstory, resulting in small openings with increased sunlight, water, and a prepared mineral soil seedbed. Since these areas were not wide open, the spruce regeneration was not subject to frost damage, excessive heat, and competition from lodgepole pine. Englemann spruce cover types have increased in association with subalpine fir due to the lack of disturbance.

Table 5: Percent Distribution of Spruce/Fir Structural Stages (Historic and Current)

	Stand Initiation	Stem Exclusion	Understory Re-initiation	Young Forest Multi Story	Old Multi Story	Old Single Story
Historic	10-15	20-45	10-20	0	25-35	5
Current	0	0	0	8	90	0
Difference	-10 to -15	-20 to -45	-10 to -20	+8	+55 to +65	-5

Whitebark Pine Cover Type

Whitebark pine seedlings and saplings occurred in disturbed areas at high elevations. The trees were widely spaced, with less subalpine fir in the stand. Historically, whitebark pine was a major component in this landscape at the upper elevational ranges, present in stands with subalpine fir and stands of relatively pure whitebark pine. Fire often provided the competitive advantage to the species by removing subalpine fir and preparing a seed bed for the pine. Whitebark pine cover types have decreased from historic due to subalpine fir successional advance. Whitebark pine’s stocking (trees/acre) will continue to decrease in the mixed stands because of increased competition from subalpine fir.

Table 6: Percent Distribution of Whitebark Pine Structural Stages (Historic and Current)

	Stand Initiation	Stem Exclusion	Understory Re-initiation	Young Forest Multi Story	Old Multi Story	Old Single Story
Historic	10-20	20-50	30-50	0	15	15-30
Current	0	0	9	53	3	35
Difference	-10 to -20	-20 to -50	-21 to -41	+53	-12	+5 to +25

Quaking Aspen Cover Type

Historically, aspen stands would be healthy and thriving. Patch sizes would be larger than currently found in the watershed. Conifers would not be as prevalent in the stands, especially in the areas adjacent to mixed fire regimes. The understory would be more diverse. Aspen occupied a larger area of the historical landscape than it does today. It was present in areas exhibiting wetter soil conditions or in moist scattered locations where fire had removed other tree competition and prepared a seed bed. Many of the aspen communities previously occupying a site for hundreds or more years, were rejuvenated by frequent fires that encouraged re-sprouting and kept conifers from out-competing the aspen.

Table 7: Percent Distribution of Aspen Structural Stages (Historic)

	Stand Initiation	Stem Exclusion	Understory Re-initiation	Young Forest Multi Story	Old Multi Story	Old Single Story
Historic	40	20	10	0	5	25

Note: The satellite imagery did not accurately detect the current occurrence of aspen stands in the analysis area.

Black Cottonwood Cover Type

Cottonwoods would have grown along streams and in moist areas within the analysis area. Natural disturbances would have maintained a portion of the stands in the stand initiation stage. Wild ungulate populations would have reduced seedlings, but the grazing would not have been concentrated throughout the growing season. Historically, cottonwood colonized wetter sites and riparian areas, with some growing in association with aspen. Cottonwood was (and is) highly susceptible to fire damage. Its affinity for the lower elevation ranges (near or below 7,000 feet) limited it to protected valleys and canyon bottoms, along stream banks and edges of ponds and meadows, and to moist toe slopes. As a shade-intolerant species, cottonwood requires full sunlight for optimum growth. Bare, moist seedbeds are required for initial establishment, and sprouting occurs readily from stumps, with some sprouting from roots.

Forest Understory Plant Diversity

The Douglas-fir areas of the historical landscape had significantly less tree biomass per acre than exists today. With fewer trees occupying the sites, more sunlight, water, and nutrients reached the forest floor, resulting in considerably more biomass of grasses and herbs. In addition to more abundance of grasses and forbs, a greater variety of plant species occurred. Increased shade restricts the establishment and productivity of many grasses and forbs. Two-thirds of the historical Douglas-fir forests were open, encouraging increased amounts of understory plants, thereby providing more forage, more seeds for wildlife food, more habitat for insects (food for some wildlife), and more species of vegetation that re-sprouted quickly after low to moderate severity fires (protecting the soil).

Similar conditions may have also existed in the historical subalpine fir and whitebark pine habitats; however open forest conditions comprised a smaller percentage within those types.

Effects of Silvicultural Practices and Fire Exclusion

Clearcuts do not mimic historical patterns or patch sizes in lodgepole pine; rather, clearcuts can fragment the landscape. Historically, patch sizes of stand initiation created by fire were much larger than the current clearcuts. Pre-commercially thinned lodgepole pine has an “unnatural” uniform spacing; historically, a moderate or low intensity fire would have left clumps of standing dead trees and clumps of various age classes. Planted lodgepole pine stands are also uniformly spaced, unlike historical fire-generated stand initiation areas that would have had a more clumpy appearance.

Lack of fire in Douglas-fir has increased mistletoe infestations. Historically, fire (especially low to moderate severity fires) cleansed the stands of mistletoe. Commercial thinning in Douglas-fir has created uniform spacing in areas that would have naturally had a more clumpy appearance and larger trees.

Lack of fire has increased late seral species in the understory of Douglas-fir and lodgepole pine stands.

Conclusions

Due to changes in landscape patterns, the existing landscape supports a different type and level of forest vegetation diversity when compared to the historic landscape. The richness and abundance of the current diversity may be no less or no more than the historic diversity. Rather, it is different from the historic diversity. The trend for the Agency-Kenney landscape has been replacement of open canopy forests (which had open, park-like conditions) with forests of multiple structural layers, a substantial increase in tree stocking, and fuel accumulations.

Non-forest (Rangeland) Vegetation

Historic Condition

When Meriwether Lewis crossed the Continental Divide at Lemhi Pass on August 12, 1805, he found a landscape only moderately influenced by man. Native Americans had been using fire as a tool to "freshen up" forage for their horses and to improve conditions for the native buffalo, so they would be encouraged to linger close by. The large herds of horses, numbering in the hundreds and ranging unrestrained over the valleys and foothills of the area, probably affected the ecology of the watersheds. Early historic accounts verify that grazing pressure and depletion was often severe and rather rapid along the Lemhi River, necessitating frequent moves of Indian encampments. The extent to which uplands (including the study area) were affected by these herds at that time is unknown, but must have been measurable, particularly during drier years. Still, the lower sagebrush-grass slopes and higher foothills of the study area produced a diversity of flora, and abounded in edible plants such as bitterroot, kous (biscuit root), arrowleaf balsamroot, Indian ricegrass, and many other edible root and seed plants. Springs and riparian courses throughout the study area added chokecherry, currant, serviceberry, yampa, cattail, and a host of useful plants to serve the material needs of the people.

The livestock industry in the area started after gold was discovered in the mountains west of Salmon in 1866. Cattle were allowed to run at will and trailed to the mining camps for butchering. This continued until the harsh winter of 1889-1890 showed the need to put up hay to feed cattle through the winter months (Loucks, 1992). After that time the livestock industry stabilized; ranches produced hay in the valley bottoms for winter feeding and pastured livestock on BLM- and Forest Service-administered lands during the summers. Sheep were also an important component of the economy of the area, with thousands of sheep pastured in the area surrounding the Agency-Kenney watersheds. The impact of this livestock grazing on the native vegetation resulted in the current patterns of fair condition range on the lower elevation or more accessible ranges, and good range condition on the steeper or higher elevation ranges.

Current Condition

Non-forest upland vegetation accounts for approximately 55% (41,730 acres) of the analysis area (see Map 4). Upland vegetation is typical of the Western Shrub and Grassland biome defined by Kuchler (1964). The sagebrush-steppe category consists of dense to open grasslands with a dense to open sagebrush component. Dominant sagebrush species include Wyoming big sagebrush (*Artemisia tridentata* spp. *wyomingensis*) in the lower elevations, grading into three-tip sagebrush (*Artemisia tripartita*) on cooler, wetter, or higher elevation sites, and mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*) at the higher elevations (above 6,500 feet).

Different grasses and forbs are associated with each sagebrush type. In the lower elevation Wyoming big sagebrush sites, Kentucky bluegrass (*Poa pratensis*) and bluebunch wheatgrass (*Agropyron spicatum*) dominate. In the three-tip sagebrush type, bluebunch wheatgrass tends to be replaced by Idaho fescue (*Festuca idahoensis*), which extends into the mountain big sagebrush type. Some grasslands occur around the mesic fringe of riparian areas, where moisture conditions are not conducive to sagebrush survival, but it is too dry to support hydric vegetation. These grasslands are primarily transitional in nature. Grasslands also occur when a fire burns off the native sagebrush overstory. In these cases, sagebrush will reoccupy the site, usually within several years of the fire. Within about 20 to 30 years it may be difficult to see the effects of the fire. Coniferous trees species (such as Douglas-fir) may intrude into non-forest vegetation zones along

some canyons and streams.

Based on ecological site inventories completed prior to 1985, the majority of rangeland in the Kenney-Agency watershed analysis area was rated as good condition (USDI-BLM, 1985, Map 4). Range condition generally correlates with slope: the gentler hills and flats near the valley bottom tend to be in fair condition, and the steeper hills and higher elevations tend to be in good condition. (**Note:** These condition ratings are based on what kinds and proportions of native plant species *could* grow on a site, versus what is actually there. Many of the range sites should support vigorous bluebunch wheatgrass, 15 to 20 percent canopy cover of sagebrush, and a variety of forbs (broad-leafed plants, wildflowers).)

Noxious Weeds and Non-native, Invasive Plants

Overview

A noxious weed inventory of the watershed analysis area was completed during the field season of 2001. The inventory focused on the areas directly adjacent to roads and vehicle ways, and included GIS mapping of weed infestations along with a description of the type of weed and density/extent of the invasion. Eight species of designated noxious weeds and one invasive species currently infest the analysis area. By far, the most predominant species is spotted knapweed (estimated 800 acres), followed by cheatgrass (500 acres), and musk, bull, and Canada thistles (200 acres). Cheatgrass is scattered throughout the analysis area at all elevations, along roadsides, and in powerline right-of-way. Other occasional weed species include rush skeletonweed, black henbane, and hound-s tongue. The general distribution of weeds in the analysis area is shown on Map 6.

Spotted knapweed appears to have invaded the analysis area from Montana during about the 1950's. The history of invasion of other noxious weed species is unknown. Roads and vehicle ways are the primary vectors of weed spread in the analysis area. The watershed area is heavily roaded due to mining and logging access roads built from before 1900 to as recently as the 1980s. In recent years, all-terrain vehicles have created many small "two-track roads" (vehicle ways). The disturbed areas adjacent to these roads and vehicle ways provide a niche for invaders to occupy. Rush skeletonweed relies on wind-borne seed dispersal. It is a prolific seeder, producing up to 20,000 seeds per plant, but seldom invades healthy native vegetation (Sheley and Petroff, 1999). Burned-over areas with even a small amount of skeletonweed present before the burn are very susceptible to increased invasion.

Species Distribution and Treatment

Spotted Knapweed (*Centaurea maculosa*) - Spotted knapweed populations are concentrated in a few areas that receive heavy recreation use and in scattered patches at other locations. The largest infestations occur on the northern end of the analysis area, with infestations becoming smaller and more wide-spread in the southern portion of the watershed. Most infestations occur along roads, two-track primitive roads, disturbed unshaded creek bottoms, and riparian areas. In the Pattee and Kenney Creek drainages, the spotted knapweed populations lie just below the Forest Service boundary. In the Agency Creek drainage, spotted knapweed populations occur below Flume Creek. The roads that leave the Agency Creek drainage from Cow Creek to Flume Creek have abundant spotted knapweed (approximately three miles of road are infested, when all five roads are taken into account). An isolated spotted knapweed infestation exists at Sharkey Hot Springs. The Alkali Flat Road, Pattee Creek Road, and roads leaving Gould Basin toward the north have moderate densities of spotted knapweed distributed

along their entire length (a total of 8.5 miles).

Inventory of spotted knapweed is incomplete. Known infestations are being treated. Treatment consists of spraying scattered or spotty infestations with Tordon® and using biological control insects in the riparian zone of Pattee Creek. Biological control agents currently include a root moth (*Agapeta zoegana*), a root weevil (*Cyphocleonus achates*), and two seedhead-feeding weevils (*Larinus minutus* and *Larinus obtusus*). These biological control agents tend to establish slowly, and it may be several years before significant results can be noted.

Cheatgrass (*Bromus tectorum*) - Cheatgrass competes with spotted knapweed for population size, with an estimated population of 500 acres. It appears to be scattered in patches at all elevations and along the majority of roads/vehicle ways in the analysis area. Cheatgrass occurs in higher densities on roads used by Idaho Power to install power lines. On rangelands, cheatgrass is found covering south-facing slopes in moderate density, with some higher concentration patches.

Thistles - Most musk, bull and Canada thistle are found along roadways that lie adjacent to riparian areas and spring seep areas. Some large patches also occur in unshaded riparian flats (such as Pattee creek bottoms) and below water troughs (scattered throughout the entire analysis area). The thistle head weevil (*Rhinocyllus conicus*) has been used as a biological control agent in the watershed. It has established so successfully that herbicide or other treatment methods have been unnecessary except in isolated cases.

Musk Thistle (*Cardus nutans*) - The highest concentration of musk thistle is found in the Cow Creek drainage. Musk thistle is also scattered along the Warm Springs Wood Road and Agency Creek Road in moderate quantities. Musk thistle occurs in isolated patches on roads in the Copper Queen Mine area.

Bull Thistle (*Cirsium vulgare*) - Small and isolated infestations of bull thistle occur throughout the watershed analysis area, often intermixed with musk thistle. Bull thistle seems to tolerate and thrive on slightly drier sites than musk thistle. The thistle head weevil does not appear to attack bull thistle as much as musk thistle.

Canada Thistle (*Cirsium arvense*) - Canada thistle is mostly found in areas where water is available, including the Cow Creek and Pattee Creek drainages. The Cow Creek drainage has a consistent distribution with moderate density. Canada thistle can also be found around many troughs; however, the density varies from location to location depending on ground disturbance.

Black Henbane (*Hyoscyamus niger*) - Black henbane occurs infrequently throughout the analysis area along roads and at old mining sites. This weed has been treated along roads and vehicle ways in recent years and is estimated to infest less than 50 acres total. It does not invade undisturbed rangeland and appears to be on a slow decline within the analysis area. The largest patch of black henbane is found at the Sharkey Hot Springs developed recreation area. It is also scattered along the Warm Springs Wood Road. Future treatment will probably concentrate on the Sharkey Hot Springs area and as needed elsewhere.

Hound's Tongue (*Cynoglossum officinale*) – Hound's tongue is a recent invader to the analysis area and to date has been located only within the Pattee Creek drainage. It is located in the riparian areas

from the Clark camp location, inside the habitat improvement enclosure and west of the enclosure toward the ranch at the bottom of the drainage. Most of the known infestation has been treated, but will need additional treatment for several years.

Rush Skeletonweed (*Chondrila juncea*) - A small (less than 5 feet in circumference) patch of rush skeletonweed was discovered in 2001 during a watershed tour. The patch and area around it were treated with Tordon and 2-4-D. To date this is the only known infestation found within the watershed analysis area.

Riparian Vegetation

Riparian vegetation condition within the Kenney to Agency Creek watersheds varies considerably depending upon location. For example, in the upper end of Kenney Creek, riparian vegetation is in almost pristine condition. In contrast, the riparian areas in Kenney Creek's lower elevations have been heavily impacted by past livestock grazing management. Noxious weeds have crept into some riparian areas within the analysis area.

Kenney Creek - The upper end of Kenney Creek occurs within a deep, narrow, rocky canyon where riparian vegetation is dense, heavy, and in almost pristine condition. Riparian vegetation within this stretch consists of red-osier dogwood, willow, sedges, and rushes. In the Kenney Creek Research Natural Area (RNA), riparian areas are dominated by an overstory of Douglas-fir, lodgepole pine, and Englemann spruce. The understory consists of woody shrub species and pinegrass, and is often covered with downed trees. This reach of stream is in pristine condition with no impacts from human uses and little evidence of livestock grazing. The East Fork of Kenney Creek is thickly vegetated with willow, changing to a conifer overstory higher in the watershed. Below the canyon in Kenney Creek the topography opens up, and the riparian zone has been heavily impacted by past livestock grazing practices. The overstory consists of decadent cottonwood with an understory of bluegrasses and rose.

Warm Springs Creek - Warm Springs Creek is deeply incised into soft sediments, but well vegetated with bulrushes, sedges, rushes, and cattails, with a few cottonwood and willows along the lower stretch.

Pattee Creek - Pattee Creek begins near the Continental Divide in a sedge meadow. Willows and conifers occur along the streambanks as the stream begins its descent toward the valley floor. As it enters a steep, confined canyon the riparian vegetation is dominated by an overstory of willows and conifers, and an understory of sedges and mixed annual and perennial forbs. Vegetation along lower Pattee Creek reflects its history of mining and livestock grazing, prior to about half of the creek being excluded from livestock grazing in 1992. The riparian community is wide, mature, and in good condition, with an overstory of aspen, cottonwood, and willow predominating an understory of rose, bluegrass, and sedges. Although the shrub component is in good to excellent condition, spotted knapweed has increased rapidly in the meadows during the past 5 to 10 years.

Agency Creek - Agency Creek's riparian vegetation is predominantly a mature to over-mature woody component of cottonwood and aspen, with highly variable rates of reproduction. The understory consists of sedges and rushes, bluegrass, and willows. Tributaries of Agency Creek consist of bluegrass and decadent willows, with some willow and sedge recovery occurring along Cow Creek.

Rare Plant Species and Communities

Four Forest Service and BLM plant species designated as Sensitive have known populations in the area: Lemhi penstemon (*Penstemon lemhiensis*), Salmon twin bladderpod (*Physaria didymocarpa* var. *lyrata*), Idaho range lichen (*Xanthoparmelia idahoensis*), and Lemhi milkvetch (*Astragalus aquilonius*) (see Map 7). These species have distinct habitats and are known to occur at only a few locations. Lemhi penstemon is found in one location near the Warm Springs Wood Road in Wyoming sagebrush/bluebunch wheatgrass rangelands, in early seral microsites with little ground cover. Salmon twin bladderpod is found in two locations on gravel slopes and gravelly uplands adjacent to the Agency Creek and Pattee Creek roads. The Idaho range lichen is known to occur at only one location (along the Alkali Flat Road). Lemhi milkvetch is found in the lower foothills between Pattee and Agency creeks.

At least one other rare plant species occurs in the analysis area: Bitterroot milkvetch (*Astragalus scaphoides*), known only from east-central Idaho and adjacent western Montana. It occurs in several locations, most notably in Agency Creek. This species is not currently considered to be at risk from livestock grazing, because it has been shown to withstand livestock grazing without adverse effects. However, potential weed invasion of known populations and habitat could become a risk in the future.

Threats to Rare Plant Species and Communities

The greatest threats to rare plant species and communities in the Agency-Kenney area are noxious weed invasion and subsequent degradation of native plant communities. Sagebrush/grasslands and high elevation grasslands are highly susceptible to noxious weed invasion. Trampling from humans, vehicles, and livestock are also a serious threat to Idaho range lichen. In turn, removal of this species, which functions as a microbiotic soil crust, could contribute to increased soil erosion.

Monitoring

Over the years, monitoring of rare plant species in the Agency-Kenney watersheds has been sporadic. Since 1991, Salmon twin bladderpod has shown a slightly downward trend where its habitats are "human caused" (e.g. road cuts), as opposed to naturally occurring gravelly slopes. No other monitoring to assess rare plant populations or habitat integrity has occurred.

Special Designations

Kenney Creek Research Natural Area

An excellent example of undisturbed high elevation forests and glacial basin wetlands and streams is protected in the 1,580-acre Kenney Creek Research Natural Area (RNA) in upper Kenney Creek (see Map 8). The RNA contains four habitat types of whitebark pine, an Engelmann spruce type, at least four Douglas-fir types, and at least two subalpine fir types. The RNA also contains wet meadows, seeps, springs, and gentle to steep gradient streams. The RNA was created in 1990 because of its outstanding variety of forest habitat types, numerous aquatic features, and notable lack of disturbance by humans. The RNA contains a rare plant community, the Engelmann spruce/soft-leaved sedge (*Picea engelmannii*/*Carex disperma*) habitat type, which is considered to be imperiled both statewide in Idaho and globally, because of its rarity (Jones, 1999).

The objective of the RNA is to maintain and preserve the terrestrial and aquatic features of the RNA in as near an undisturbed (by humans) condition as possible. The RNA provides an area for the study of natural processes, a baseline area for determining long-term ecological changes, and a monitoring comparison area for assessing effects of resource techniques and practices applied to similar ecosystems.

The Kenney Creek RNA lies within the West Big Hole Roadless Area (#13943) (see Map 8). The most predominant human use occurring within the RNA is hunting. However, it has been observed that firewood cutting on the Continental Divide at the end of Forest Road 184 and along Forest Road 186 has encroached into the RNA. This has resulted in a network of user-created vehicle ways and vegetation disturbance. The Forest Service has put up signs along the southern edge of the RNA to prevent additional woodcutting in the RNA (Riebe, 2003).

According to the Establishment Record for the Kenney Creek RNA (USDA-FS, 1989), no Threatened, Endangered, or Forest Service Intermountain Region Sensitive Species (TES) of flora or fauna were known to occur within the RNA. Searches of historical records and re-investigation of the RNA original faunal and floral inventory lists in 2003 conclude that no TES species are known to occur within Kenney Creek RNA at this time. There has been no monitoring of rare plants in the Kenney Creek RNA. However, lichen populations in the RNA have been studied in order to assess air quality impacts; the results of these studies are not yet available.

Forest Service Roadless Areas

The watershed analysis area contains two inventoried roadless areas (see Map 8). The 6,388-acre Agency Creek Roadless Area (#13512) is entirely within the analysis area boundary. Approximately 18% (6,226 acres) of the 35,488-acre West Big Hole Roadless Area (#13943) lies within the analysis area.

The majority of the Agency Creek Roadless Area is natural-appearing, with some evidence of past human uses including a vehicle way and constructed roads. Approximately 1.5 miles of a two-track road (vehicle way) has been developed by users accessing the area to hunt, cut firewood, maintain fences, and harvest poles. Past road construction into the interior of the area reduces its suitability for designation as wilderness, and the area is not recommended for wilderness designation in the Forest Plan. Forest products were harvested from within the Agency Creek Roadless Area from 1988 to 2001 under guidance contained in the Forest Plan (the area is within Management Area 5B, which emphasizes moderate production of timber) (see Table 8).

Table 8: Forest Products Harvested within Agency Creek Roadless Area

Sale Name	Forest Product	Sale Date	Acres Harvested in Roadless Area	Comments
Flume Creek II	timber	1991	198 acres	4.28 miles of road constructed
South Pattee	posts and poles	1993	24 acres	
County Line	posts and poles	1998	17 acres	
Wade Creek	personal use posts and poles	1990	15 acres	
Horseshoe Bend	posts and poles	---	---	40 acres harvest planned, but deferred pending outcome of "roadless rule."

The West Big Hole Roadless Area is also essentially natural-appearing. To the east it is contiguous with

another roadless area (#01943) managed by the Beaverhead National Forest. The area contains significant amounts of outstanding scenery, and the Continental Divide National Scenic Trail corridor passes through. The portion of the West Big Hole Roadless Area that lies within the Agency-Kenney watersheds boundary is essentially closed to vehicle travel, since no routes in the area are designated for travel in the current travel plan. This has reduced human disturbance within the area, although there has been some proliferation of “woodcutter” vehicle ways adjacent to constructed roads along the Continental Divide. Recreation use of the area is primarily related to hunting and backpacking. The West Big Hole Roadless Area is not recommended for wilderness designation in the Forest Plan.

Species and Habitats

Terrestrial Species and Habitats

Historic Occurrence

Historic documents suggest that during the first half of the 19th century, big game animals such as deer, elk, and antelope were few in number, often scattered, and generally challenging to procure in the Salmon River country. The cause of this condition is hotly debated among biologists, but may in part be attributed to over-hunting by a more efficiently mounted and armed Native people, perhaps exacerbated by the growing horse herds tended by the Lemhi Shoshone and other visiting tribes in the region, and by a climatic cooling during those early 19th century decades. Winter hunting in the shaded canyons and draws of the watershed analysis area may indeed have been more successful than during other seasons, the Indian people making use of dogs and deep snow drifts to confuse and slow or entrap moose or deer. Though large bison herds were often described in fur trade journals as occurring on the Lemhi Valley floor and into the mouths of its principle tributary canyons, the dependability of such sights was, at best, unpredictable. By the 1840s, bison in the interior Rocky Mountains were but a memory. A number of bighorn sheep skulls and horn sheaths have been found over the years in the White Creek to Cow Creek area. This would indicate that the upper country was likely much more open, due to fires, than it is now.

Present Condition

The watershed has a wide variety of wildlife habitats, ranging from sagebrush/ bunchgrass communities at the lower elevations to whitebark pine and subalpine fir communities at the upper elevations. Riparian areas provide an important niche for many species.

Riparian Habitat: Human uses during the last century, including livestock grazing and mining, reduced the habitat quality of many riparian areas. However, recent (approximately 1993 to present) management changes have vastly improved habitat condition, especially on public lands (see Riparian Habitat Condition discussion on pages 39-43).

Aspen stands throughout the watershed analysis area provide important habitat and/or habitat diversity for many species of large and small mammals and birds, including neotropical migratory songbirds.

Mule deer and white-tail deer utilize riparian areas within the watersheds to a limited extent yearlong. The white-tail deer tend to be found in the lower elevations. As riparian habitat condition improves, an increasing amount of moose are reported in the watershed. Black bear can be found throughout the higher elevations of

the drainages, often in association with riparian areas or forested habitats. In 1993 beaver were re-introduced in Pattee Creek on National Forest lands. They have since moved downstream and taken up residence on BLM lands within and below the riparian enclosure near the mouth of the canyon. Cottontail rabbits are often seen among riparian vegetation throughout the watershed. The spotted frog, Western toad, tailed frog, and long-toed salamander have been recorded within the watershed analysis area.

Broods of sage grouse have been seen near a number of the riparian areas. Hungarian partridge and chukar are occasionally found along the riparian areas and draws lower in the drainages, especially along Pattee and Agency creeks.

Riparian areas in the Agency-Kenney watersheds support a wide variety of neo-tropical and other bird species. Bird species recorded along riparian areas since 1994 include the following:

Table 9: Birds Known to Occur in the Watershed Analysis Area

Wading Birds	Great blue heron
Ducks	Mallard
Raptors	Northern harrier, Cooper’s hawk, red-tailed hawk, golden eagle, American kestrel, sharp-shinned hawk
Upland Game Birds	blue grouse, chukar
Shorebirds	common snipe
Pigeons and Doves	mourning dove
Owls	long-eared owl, boreal owl
Swifts	Nighthawk
Hummingbirds	broad tailed hummingbird, black-chinned hummingbird, calliope hummingbird, rufous hummingbird
Kingfishers	belted kingfisher
Woodpeckers	hairy woodpecker, downy woodpecker, red-naped sapsucker, Northern flicker, Lewis’ woodpecker, pileated woodpecker
Flycatchers	Western wood peewee, dusky flycatcher, Cordilleran flycatcher, Hammond’s flycatcher, Wilson’s flycatcher
Shrikes and Vireos	warbling vireo
Jays and Crows	black-billed magpie, Stellar’s jay, Clark’s nutcracker
Swallows	violet-green swallow, rough-winged swallow, tree swallow
Chickadees	black-capped chickadee, Mountain chickadee
Wrens	house wren, rock wren
Warblers and Thrushes	dipper, Townsend’s solitaire, mountain bluebird, American robin, veery, Swanson’s thrush, ruby-crowned kinglet,
Starlings	European starling
Waxwings	cedar waxwing
Wood Warblers	Audubon’s warbler, orange-crowned warbler, yellow warbler, MacGillivray’s warbler, yellow-rumped warbler, Wilson’s warbler
Tanagers and Cardinals	Western tanager, black-headed grosbeak, lazuli bunting
Sparrows	rufous-sided towhee, spotted towhee, Brewer’s sparrow, chipping sparrow, vesper sparrow, song sparrow, dark-eyed junco
Icterids	Western meadowlark, brown-headed cowbird, Northern oriole, Brewer’s blackbird
Finches and Old World Sparrows	Cassin’s finch, American goldfinch, pine siskin

While this list contains species that were associated with riparian areas at the time of recording, many of the species also use the higher elevation forested habitats and/or the rangelands. As riparian conditions have improved since the early 1990's, the diversity and density of birds have also increased.

Forest Habitat: Relatively large expanses of continuous forested communities, primarily Douglas-fir, lodgepole pine, and subalpine fir, occur throughout the upper portions of the entire watershed analysis area. Unique or specialized habitats such as old growth timber and big game security cover, although abundant in the upper portions of the watershed, are lacking in the lower elevations. Lower timberline, and thus the lower extent of forested habitats, occurs at approximately 7,000 feet. Forested habitats above this elevation are fairly intact. However, some fragmentation from past timber harvest and road construction is evident, especially in the Copper Queen and Agency Creek drainages. Forest habitats are used by various species, including forest carnivores, ungulates, small mammals, and birds.

The upper portions of the Pattee Creek and Kenney Creek watersheds are part of the Northern Beaverhead Lynx Analysis Unit (LAU). Primary vegetation that provides lynx habitat in the analysis area includes subalpine fir forest associations, mixed species composition stands (subalpine fir, lodgepole pine, and Douglas-fir), and pure lodgepole pine stands. Moist Douglas-fir habitat types, where they are mixed with subalpine fir habitat types, constitute secondary vegetation that provide habitat for lynx. Aspen/tall forb community types, especially those that include snowberry, serviceberry, and chokecherry shrub understories, are very important in terms of lynx prey. High elevation shrub-steppe habitats (especially high elevation sagebrush) provide important connectivity between large patches of lynx habitat along the Continental Divide and between the Beaverhead and Lemhi Mountain Ranges. While Canada lynx have not been documented in the area in the recent past, there is habitat available, and lynx may move through the area between more suitable habitats. During snow surveys, both snowshoe hares and red squirrels, important prey for Canada lynx, have been found in the upper elevations of the watershed.

Pine martin, wolverine, mountain lions, fisher, and bobcats are other forest predators that have been located in the upper portions of the analysis area.

Summer deer use occurs throughout the watershed analysis area. Elk primarily use the higher elevation, forested portion of the watershed for summer range. The portion of the Kenney-Agency analysis area managed by the Forest Service is either "Acceptable" elk summer habitat (1 elk/mile) or "Optimal" elk summer habitat (5 elk/mile) (approx. 2,560 acres). Road densities can limit elk use of acceptable habitats; one mile of road/square mile of area reduces elk use by about 40% (Lyon, 1983).

Forest grouse (blue and spruce) are relatively common throughout the watershed. Great gray owls and northern goshawk have also been recorded in the forested portions of the watersheds. Woodpeckers, such as the three-toed woodpecker, have also been documented in the area.

Non-forested (Rangeland) Habitat: Non-forested habitats consist primarily of sagebrush/bunchgrass communities. Bluebunch wheatgrass dominates south aspects, while Idaho fescue is found on north aspects and at higher elevations. These habitats have been variously impacted by human uses, such as livestock grazing, road construction, and off-highway vehicle (OHV) use. As a result, rangelands suffer from noxious weed and invasive, non-native plant invasion, especially spotted knapweed and cheatgrass on south slopes and along roads.

A ferruginous hawk was reported along the Warm Springs Road in 1988; this BLM State Sensitive species has only been recorded a few times within the Salmon Field Office area. Coyotes are often seen in the non-

forested portion of the drainages.

Fairly substantial winter use is made by both mule deer and elk in the lower portions of the watersheds. During light snow winters, deer may be found virtually anywhere below the timberline. Elk utilize the Pattee/Agency ridge heavily during winter. Antelope may be found anywhere below the timber line during the summer, especially in the Pattee Creek watershed (fewer antelope are present toward Kenney Creek). A small, antelope-wintering area is located on the lower portion of the ridge between Kenney and Sandy creeks, and there is also a wintering area on the low, flatter country between Warms Springs and Agency creeks.

Sage grouse summer throughout the watershed. A few wintering areas have been identified low on the toe of the ridge between Kenney Creek and Sandy Creek. There are also records of sage grouse wintering on the windswept ridges in the vicinity of the Flag Unfurling Monument. Sage grouse are also known to winter along small areas associated with Alkali Flats. A strutting ground was historically located near the monument, but no use has been documented in the last few years. There are also historic leks recorded in the Pattee Creek watershed; these leks have not been used in the last few years.

Summary of Terrestrial Wildlife Species: The watersheds provide important habitat for many bird species, including sage grouse and neo-tropical migrating birds. The watersheds are a wintering area for deer and elk herds, with some use also occurring during the warmer months. A few antelope may be found in the watershed. The number of moose in the area is increasing as riparian habitat conditions improve. There is habitat to support forest carnivores, such as Canada lynx. Wolf sightings have been reported in the area, although a pack has not established in the watersheds. In addition to the previous listed species, there are numerous small mammals, birds, amphibians, and reptiles that have not been mentioned. Appendix A lists the special status terrestrial wildlife species that are presently known to occur on public lands managed by the Salmon Field Office, BLM, and/or the Salmon-Challis National Forest, Leadore Ranger District.

Summary of Impacts to Terrestrial Wildlife Species and Habitats: In summary, wildlife diversity within the watershed area is relatively high. However, as a result of altered habitats, some species are present in lower numbers than they were historically, and some species are present in higher numbers.

Fire suppression, livestock grazing, and human disturbance have had the greatest long-term effects on wildlife species and/or habitats. Past predator control activities may have altered predator/prey relationships. Beaver trapping has affected stream and riparian habitat and associated species. As a result of long-term fire suppression and livestock grazing, vegetation composition and seral stages have been altered. In forest environments, the density of small-diameter trees has increased, causing a decrease in forbs, grasses, and shrubs. An increased stocking density within forest communities also causes disease and moisture stress, increasing susceptibility to catastrophic fire. Long-term grazing and lack of fire have likewise caused structural changes in sagebrush systems and are believed to have caused an increase in sagebrush density and a decrease in grass/forb quantity and quality. This may be affecting habitat quality for large ungulates, while benefiting some species that require greater sagebrush canopy cover (e.g., sage grouse). The total extent of these structural changes and how they may affect different species is still being assessed.

Structural changes within riparian systems have been more evident and are affecting habitat connectivity for amphibians, small mammals, and songbirds. This fragmentation of habitat is most often caused by the loss of appropriate shrub (willow) and tree components within the riparian areas. Fragmentation or loss of connectivity in habitat corridors limits the ability of riparian-dependent species to travel safely from habitat patch to habitat patch. This increases stress on animals and increases their exposure to predators or the weather. Habitat fragmentation also decreases a species' ability to find mates, which may affect the genetic

interchange between wildlife populations. Changes in grazing management in recent years have improved the connectivity of riparian habitats in many areas.

Aspen systems, on the other hand, are naturally fragmented within the analysis area. However, surveys have shown that this habitat component has been declining in quantity and quality for many decades. This has reduced habitat suitability for red-naped sapsuckers, grouse, and other species of birds. Reduced habitat suitability in aspen and riparian corridors, coupled with the presence of cowbirds, may be having significant effects on songbird production within the watershed. More study is needed to verify this.

In addition to structural habitat changes, increasing levels of human disturbance may be affecting many wildlife species, including breeding or wintering sage grouse, wintering and calving big game species, and forest carnivores. Livestock trampling along streams, ponds, and wet meadows is reducing habitat suitability for spotted frogs and other riparian dependent species throughout the watershed.

In the recent past, off-highway vehicles have been allowed to travel on BLM-managed lands wherever they were physically able to go. This led to a proliferation of two tracks and vehicle ways throughout the lower elevations of the watersheds. Unauthorized vehicle travel off of designated routes on FS-managed lands also created numerous vehicle ways along the Continental Divide. The density of roads can limit habitat suitability for elk and forest carnivores. The BLM has recently changed management on lands they administer within the analysis area to allow vehicle travel only on designated routes. This should eliminate new route establishment and decrease the density of currently used roads.

Spotted knapweed has affected habitat in riparian zones and along roads as it displaces the native vegetation. Cheatgrass can be found in the watersheds along roads and in some of the uplands. As weeds spread they alter habitats, decrease diversity, and change natural processes. Currently, infestations are not large enough to influence wildlife populations; however, if noxious weeds and invasive species are allowed to continue to spread, habitat conditions will decrease as the natural processes change.

Aquatic Species and Habitat

Salmonid habitat within the analysis area, like that of much of the rest of the upper Salmon River basin, has been degraded by a variety of activities, including water diversion, grazing, mining, agricultural practices, logging, and road building. These human uses have altered the floodplain, resulting in a loss of willows and herbaceous vegetation. This is especially true for Pattee and Agency Creeks where the riparian zones have a long history of disturbance from road construction, channelization (to "protect" the roads up the bottom), mining exploration work, and livestock grazing. Generally, the most severe degradation of salmonid habitat has occurred on private lands, which are located primarily along the mainstem Lemhi River and tributary streams. Environmental conditions on Federal lands within the analysis area have generally been on an improving trend since approximately 1990, mostly due to improved grazing practices; however, this has yet to have a measurable effect on anadromous salmonid numbers in the analysis area.

In the Lemhi River Subbasin Review (USDI – BLM and USDA Forest Service, 1999), the Kenney Creek watershed rated as high status/low risk/high opportunity for aquatic species and habitats for several reasons, but the primary reason was the year-round connectivity to the Lemhi River. It has few unscreened diversions, generally healthy riparian communities, and functional hydrologic processes that provide good habitat for all life stages. Although somewhat impacted by agriculture and irrigation practices along the lowermost private lands, when compared with the rest of the sub-basin, this watershed stood out as having some of the best overall conditions. With relatively little effort, a few additional improvements will result in a

system with exceptional habitat and little human impact. The Screening and Habitat Improvement Prioritization for the Upper Salmon Sub-basin (SHIPUSS) identified Kenney Creek as the highest priority stream, and Pattee Creek as the third highest priority stream, for restoration activities on or adjacent to irrigated agricultural and livestock ranching lands in the Lemhi Sub-basin (USBWP, 2003). SHIPUSS is a prioritized list of streams within watersheds to guide fish screening and habitat improvement efforts on privately owned lands throughout the Upper Salmon River Basin (USRB). SHIPUSS was developed by the Upper Salmon Basin Watershed Project (USBWP) Technical Team, which is comprised of numerous professional technical experts and fisheries biologists from regional state, federal, and tribal agencies, and other biologists familiar with fisheries populations in the USRB.

In the Lemhi River Sub-basin review the Agency Creek and Pattee Creek watersheds were rated medium status/medium risk with a high opportunity for improvement for aquatic species and habitats, given the vast majority of federal lands in the watersheds, existing conditions, and good relations with private landowners. Efforts are already underway to restore at least seasonal connectivity between the Lemhi River and both creeks. Riparian conditions and hydrologic processes are improving with changes in grazing management on federal lands. None of the systems have been influenced by exotic fish species.

In the Lemhi River Sub-basin review the Kenney Creek watershed rated as high status for riparian habitat, because most stream miles are at or near their functional potential. The remainder of the watersheds in the review all rated medium status. Riparian habitat conditions along Kenney Creek are generally good, with further improvements occurring in many areas. The Agency Creek watershed was rated as having higher opportunities for riparian habitat improvement than the rest of the watersheds in the “medium” status category.

Riparian functionality is improving within the watershed analysis area, but there is room for improvement on Agency Creek and its tributaries, including Copper Queen, Flume, White, Sharkey, and Cow creeks, as well as portions of Pattee Creek, especially in the Forest Service (FS) riparian pasture. The federally-managed portions of Kenney Creek are in an upward trend, with proper management in place. Although there has been significant improvement to much of Pattee Creek, portions of the stream still need improvement; management efforts are underway to address the remaining impacts. The opportunities for improving/maintaining these upward trends are very high due to management strategies and current working relationships with livestock grazing permittees. The risk of losing these gains is higher in Agency/Pattee creeks than in Kenney Creek due to the accessibility of the streams by livestock and the proximity of roads to the streams. There are also threatened and endangered fish species issues in these three watersheds which generally require an increased rate of recovery, when compared to areas without listed fish species.

Water Quality

None of the streams in the analysis area are on the State of Idaho’s list of water quality impaired streams as designated under Section 303(d) of the Clean Water Act for sediment or nutrients. Kenney Creek is on the list for temperature, although monitoring on federal lands shows that the stream meets all temperature criteria. Beneficial uses identified as existing within the Agency-Kenney watersheds include Secondary Contact Recreation, Cold Water Biota, Salmonid Spawning, Agricultural Water Supply, Wildlife Habitat, and Aesthetics and Human Health. Domestic water supply has been identified as an Unknown use. BLM and USFS actions meet State Best Management Practices (BMPs) for Forestry, Roads, Range/Agriculture, and Mining (IDHW-DEQ, 1999). No beneficial uses have been identified for the Warm Springs portion of the watershed. Sediment analysis, macroinvertebrate samples, and Habitat Index evaluations conducted by the Idaho Division of Environmental Quality all reflect non-impaired conditions. Table 10 presents historic temperature data for

select streams within the watershed analysis area.

Kenney Creek – Kenney Creek is on the 1998 Section 303(d) list from the headwaters to the mouth for temperature. Temperatures recorded on private land in 1997 exceeded the State temperature standards, but monitoring on federal land shows that the creek meets standards. The primary private land uses along the listed section are grazing and irrigated agriculture. Most of the federal land is either excluded from livestock grazing, inaccessible to livestock, or within the ungrazed and unroaded Kenney Creek Research Natural Area. The temperature regime of Kenney Creek is among the best to be found among Lemhi River tributaries and is within seasonally acceptable ranges of values for respective species of salmonids. Daily and 7-day maximum averages are also within standards prescribed by State water quality standards. Continued improvements in the portion of BLM lands excluded from livestock grazing will result in increased vegetative cover and thus reduced water temperatures.

Nutrient loading is within suggested EPA standards based on instantaneous depth integrated samples; however, increased loading from heavy seasonal livestock use could occur. Nuisance levels of aquatic plants were not documented.

According to Idaho Department of Environmental Quality (IDEQ) sampling in 1997/1998, surface and sub-surface fine sediments likely reduce fry production along the lower two miles of Kenney Creek. Irrigation diversions are fish passage barriers in the upper area of private land and at one site on BLM. All diversions are unscreened and are a likely source of fish mortality. Above the uppermost diversion, however, fish have access to higher quality spawning and rearing substrate that provides adequate production to sustain the resident population of fish. The potential for genetic exchange is high, and the risk to fish from catastrophic events is low due to the connection of Kenney Creek to the Lemhi River.

Designated beneficial uses for the listed reach include Primary Contact Recreation, Industrial Water Supply, Wildlife Habitat, and Aesthetics. Existing beneficial uses include Coldwater Biota, Salmonid Spawning, and Agricultural Water Supply. Kenney Creek has been determined to fully support beneficial uses.

Recent Management Changes and Improvement: In 1995 the BLM fenced the lower one mile of Kenney Creek below the canyon to exclude livestock. Several springs in the Rattlesnake side of the watershed have been fenced to exclude livestock, and a drift fence was built to prevent cattle from using the riparian area. In 1996 the Sandy Creek allotment water gap was built to exclude livestock from a quarter mile of Kenney Creek, upstream of the Kenney Creek enclosure. These efforts will allow riparian vegetation (in particular, cottonwood galleries) to reestablish and provide the necessary shading, cover, and woody debris to the stream channel.

Additional Opportunities for Improvement: In the Lemhi River sub-basin review (USDI-BLM 1999), Kenney Creek was one of two watersheds which ranked high in status for water quality. It ranked medium for improvement opportunities, with private lands being the major factor. Kenney Creek was considered a low risk for future degradation because of existing management and the fact that most of the watershed is federally managed.

Table 10: Agency Creek, Kenney Creek, and Pattee Creek Stream Temperatures 1993 - 2001

Stream Name	1993		1994		1995		1996		1997		1998		1999		2000		2001	
	Max.	7-day Max.	Max.	7-day Max.	Max.	7-day Max.												
Agency Creek																		
Lower		68.2	67.1	64.2	62.5	65.2	63.9	66.1	64.4	67.3	66.6	67.0	65.6	69.9	68.6	70.2	68.0	
Upper		65.3	64.5	55.1	54.2	54.5	53.9	56.8	55.7	59.0	58.4	57.9	56.6	Malfunction	Malfunction	Malfunction		
Cow @ BLM/private																		
Flume @ mouth																	62.1	60.3
Kenney Creek																		
Lower		60.1	58.6	53.4	49.5	56.5	55.2	57.8	56.4	54.2	53.6			Malfunction		Lost		
Upper				52.0	48.4			52.3	51.6					Malfunction		55.2	54.4	
Pattee Creek																		
Lower		65.3	64.1	61.5	60.4	63.2	62.6	63.8	62.2	64.7	64.1	64.4	63.5	65.8	64.8	64.7	63.3	
Upper	60.1			63.0		63.0		60.4	58.9	60.4	59.6							

Kenney Creek is in the upper spectrum of Lemhi River tributaries, with regard to its potential fish habitat and water quality above the BLM/private boundary. Below the boundary the riparian zone continues to provide some shading; however, species and age class diversity decrease progressively downstream to the confluence with the Lemhi River. In-stream habitat conditions remain adequate from where the canyon opens down to IDEQ's lower Beneficial Use Reconnaissance Program (BURP) site. Sediment deposition increases progressively downstream as gradient decreases and stream banks become slightly less stable. The seasonal blow-out of a small earthen irrigation diversion impoundment is also a likely source of sediment. This could be reduced by installing an alternative structure, but this is cost-prohibitive to the land owner. Reduced water flows from the stream channel through the private reach increase water temperature and lower the capacity of the stream to move sediment. Improving irrigation efficiency and establishing livestock exclusion through the private reach of Kenney Creek would likely quickly improve and extend the range of adequate riparian and instream habitat conditions to the confluence with the Lemhi River.

Evaluations of sediment deposition characteristics within Kenney Creek and of erosion characteristics of its streambanks show in-stream sediment above target threshold levels below the BLM/private boundary and streambank erosion below the average just above the BLM/private boundary. Above the USFS/BLM boundary, instream sediment characteristics are below target threshold levels. The primary source of sediment appears to be from streambank erosion, with some potential contribution from vehicle ways that parallel Kenney Creek, with at least one crossing noted (IDEQ, 1997).

Warm Springs Creek - No beneficial uses have been identified for the Warm Springs portion of the Pattee Creek watershed. Warm Springs Creek is improving rapidly, with established vegetation trapping sediment and causing the streambed to rise within the incised channel. Intermittent flows affect the rate of recovery. Warm Springs Creek occasionally carries some sediment, as it flows through bentonitic soils, but current vegetation filters it significantly. Due to its thermal regime (>140° F. at the source), Warm Springs Creek is not occupied by any fish species.

Pattee Creek - Water quality in the Pattee Creek watershed meets State standards, but unstable streambanks and soil types result in elevated sediment loads. The headwaters arise along the Continental Divide and are not impacted by human activities other than minimal livestock grazing and vehicle travel on unpaved roads.

Existing beneficial uses identified within the Pattee Creek watershed include Secondary Contact Recreation, Cold Water Biota, Salmonid Spawning, Agricultural Water Supply, Wildlife Habitat, and Aesthetics and Human Health. BLM and Forest Service activities follow Best Management Practices (BMPs) for Forestry, Roads, Range/Agriculture, and Mining.

Recent Management Changes and Improvement: The Pattee Creek Habitat Improvement Project (HIP) fence, a cooperative project among the BLM, Idaho Department of Fish and Game (IDFG), and permittee, was constructed in 1991 to exclude livestock from two miles of Pattee Creek. Exclusion of this extremely impacted area has allowed two miles of Pattee Creek to improve to Proper Functioning Condition. The BLM has expanded the enclosure twice and connected it to the Forest Service riparian pasture, thus protecting a cultural site and the most historically impacted areas on Pattee Creek.

The Warm Springs/Pattee Coordinated Resource Management Plan (CRMP) was initiated in 1991 between the BLM, USFS and permittee to manage livestock grazing in a manner appropriate to resource conditions. This plan includes a voluntary 20% reduction in livestock numbers. Overall riparian and upland ecological conditions have improved as a result of this management system. In 1994, further changes in grazing management included reductions in livestock numbers, construction of off-site water developments and

exclosure fences, and changes in grazing management, with a focus on improving riparian vegetation. These changes will allow woody and herbaceous vegetation to recover and bank stability to increase, resulting in reduced sediment input to the Lemhi River. In 1996-1997, three projects on the private lands of the Muleshoe Ranch were constructed to improve habitat conditions/fish passage. Through the Lemhi County Conservation Agreement, one-fourth mile of the Lemhi River and one-half mile of Pattee Creek were fenced to exclude livestock. The IDFG, BLM, USFS and landowner worked together to construct several drop structures in Pattee Creek to improve fish passage at an irrigation diversion dam. These projects will allow cottonwoods and willows to re-establish along the Lemhi River and Pattee Creek, improving stability and reducing erosion on Pattee Creek, as well as improving fish passage over an irrigation diversion on Pattee Creek.

Impacts from livestock grazing are still occurring in an unfenced portion of Pattee Creek in the BLM-managed Lower Warm Springs pasture, where the stream has moved away from its historic channel due to deposition from mass wasting. The BLM is proposing to fence this area, except for a water gap. Livestock grazing impacts can also still occur along FS-managed sections of Pattee Creek where livestock are trailed down the canyon. However, with much of the riparian area fenced to exclude livestock use and the uplands under prescribed grazing management, upward trends in riparian and upland habitat condition will continue to be realized. Improved ecological condition will result in reduced erosion and potential sediment flows. Only small amounts of sediment, if any, are expected to reach Pattee Creek or the Lemhi River.

The aquatic habitat in Pattee Creek is in good condition overall and should improve dramatically with the extension of the exclosure and restrictions on vehicle travel within this area. However, the channel in the upper stretch of the exclosure, which was so heavily impacted by mining exploration and road construction/obliteration, is extremely cobbly and lacks much woody vegetation, and will react very slowly to these changes. For this reason, an overall improvement in aquatic habitat parameters such as the number of pools per mile and bank angle will be slow to be realized. Water temperature is highly affected in this stretch since woody vegetation is limited in some parts of the hot canyon. Shrubs are on the increase and hopefully within a relatively short time, a better grasp of the thermal potential of this system can be realized, as many areas are now unshaded. Overhead cover should also increase. Cobble embeddedness was affected by the failure of several beaver dams and by vehicular traffic within the upper section of the exclosure. The beavers have moved into a more stable area and vehicle traffic has been restricted to one heavily armored wet crossing within the exclosure.

Bull trout have only been documented in the Pattee Creek riparian pasture of the USFS Pattee Creek Allotment. Summer water temperatures below this point in the canyon on BLM lands are likely too warm to support rearing or staging fish. This reach of stream was historically impacted by a road that ran up the bottom with multiple wet crossings, as well as being directly in the channel in several places. With the channel destabilized by this road, a high runoff event in 1997, and to a lesser degree in 1998, moved considerable amounts of bedload material, altering the channel and further reducing suitable habitat. Unauthorized use by livestock in the riparian pasture has further degraded habitat conditions by not allowing the vegetation to recover and reestablish itself along the modified channel. Unfortunately, this issue was not identified and fully understood until 2002 when BLM personnel walked the entire length of Pattee Creek from its headwaters to the BLM/USFS boundary.

Additional Opportunities for Improvement: Prior to the 2003 grazing season, discussions with the permittee focused on how to address the issue of livestock use in the FS riparian pasture. Modifications to existing fences will likely be required, since the upper pasture boundary fences tend to trap livestock in the upper canyon instead of grading them away from the stream. In 2003, the BLM plans to construct a fence along

lower Pattee Creek immediately upstream of the private lands, to reduce livestock use and allow this portion of the stream to establish vegetation that was lost when the stream channel moved after a mass wasting event.

Agency Creek - Water quality is the only factor potentially limiting fish habitat quality/fish productivity within the Agency Creek watershed. Sedimentation and temperature are the primary concerns, and the degree to which they affect the aquatic populations is related to riparian vegetation condition and roads throughout the watershed. Improvements in both upland and riparian vegetation since 1993 have resulted in more stable streambanks and reduced sediment input. Temperature regimes have not improved during this period, however. The BLM's recent acquisition of several miles of mainstem Agency Creek, a portion of Flume Creek, and most of the unnamed tributary which flows through Ghoul Basin should result in improved management and subsequent improvements to riparian vegetation.

Existing beneficial uses identified within the Agency Creek watershed include Secondary Contact Recreation, Cold Water Biota, Salmonid Spawning, Agricultural Water Supply, Wildlife Habitat, and Aesthetics and Human Health. Domestic water supply has been identified as an Unknown use. Best Management Practices met on federal lands with regard to these beneficial uses are Forestry, Roads, Range/Agriculture, and Mining.

Recent Management Changes and Improvement: In 1993, sediment transport across the uplands was identified as a water quality concern only in the Sharkey Creek sub-watershed. This area was fenced to exclude livestock use in 1995 and straw bales were placed in several gullies to stabilize headcuts and trap sediment. These efforts have stopped nearly all sediment from reaching Sharkey Creek.

In 1993, through an agreement with the permittee, the BLM combined two allotments into the Agency Creek Allotment, reduced livestock numbers by 50%, instituted a riparian condition-oriented grazing management system, constructed a fence to manage grazing on Cow Creek, and installed four culverts on Cow Creek to improve fish passage and reduce erosion. Habitat improvement structures and fencing were installed on two miles of private land in 1997. The BLM also worked with the Idaho Department of Lands (IDL) and a private landowner to fence three miles of Agency Creek to create a riparian pasture. The BLM just purchased the private land in this pasture, which will guarantee management of this area. Livestock have been excluded from upper Agency Creek on the Salmon-Challis National Forest since 1994. Both the main County road up Agency Creek and the Cow Creek Road have been improved with additional surfacing, better drainage, and increased maintenance to reduce road impacts to the streams.

Additional Opportunities for Improvement: Although most streams in the Agency Creek watershed are in an upward trend, some of the smaller tributaries have stayed in a static trend while the focus on improvement has been on other streams. As the primary streams stabilize in a functional condition, the focus can shift to the smaller tributaries to identify ways to improve vegetative condition and bank stability. Stream reaches flowing across private lands are still the area of most concern. Efforts will have to be increased in this area to fully realize improvements to the overall system.

The recent acquisition of private in-holdings along Agency, Ghoul Basin and Flume Creeks will result in improved riparian habitat conditions and water quality through management prescriptions. The BLM will continue to improve road conditions as time and money allow to reduce erosion potential and subsequent impacts to adjacent streams.

Riparian Habitat Condition

Kenney Creek - The riparian vegetation in Kenney Creek varies considerably between what is in the canyon and what is below the canyon. The vegetation on federally managed lands downstream of the canyon has been severely impacted by livestock grazing, resulting in a near total loss of herbaceous vegetation. The cottonwoods are completely lacking any age structure, with only old, decadent cottonwoods remaining. Streambanks are mostly barren; where grass does grow, it is generally bluegrass and an occasional forb. However, immediately upon entering the canyon, the vegetation changes dramatically to a lush, pristine, almost impenetrable jungle. It is impossible to walk anywhere but in the stream channel itself, and even that is difficult. The vegetation consists of red-osier dogwood, cottonwood, willow, and herbaceous vegetation. The upper watershed lies within the Kenney Creek RNA; there the riparian vegetation has not been impacted by human uses. Vegetation in this area is dominated by a conifer overstory with a mix of willow and herbaceous understory.

In 1987, a Pilot Riparian Project was instituted in the Rattlesnake Draw area, an intermittent tributary to Kenney Creek. This project consisted of four exclosures of one to three acres each, along a ¾-mile stretch. The purpose of the project was to provide a control area to compare the effects of grazing management on the vegetation outside the exclosures with the effects of total exclusion. The draw contains a series of small seeps and springs along the sagebrush slopes, in which the riparian areas are degraded and contain only decadent willows, rose, and bluegrasses. The area was heavily grazed by sheep prior to the 1960's and by cattle since that time. The stream channel had become completely incised. After construction of the exclosures, there was a marked visual change within two years.

Table 11 displays current riparian habitat condition for all land ownerships in the Kenney Creek drainage.

Table 11: Riparian Habitat Condition Classes for Streams within the Kenney Creek Watershed

Stream	Length (miles)	Condition												
		Proper Functioning Condition				Functional At Risk/Trend				Non-Functional				Dewatered
		BL M	FS	State	Pvt.	BL M	FS	State	Pvt.	BL M	FS	State	Pvt.	
Kenney	10.0	1.9	5.3	0.0	1.0	0.5↑	0.0	0.0	0.8→	0.5	0.0	0.0	0.0	0.0
Rattlesnake	2.1	0.0	0.0	0.0	0.0	2.1↑	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
East Fork	4.5	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL:	16.6	1.9	9.8	0.0	1.0	2.6	0.0	0.0	0.8	0.5	0.0	0.0	0.0	0.0

→ indicates a static trend
 ↑ indicates an upward trend

Pattee Creek – Riparian vegetation in Pattee Creek varies considerably depending on its location on the stream. The upper portion, which begins in a wet meadow, flows down through a steep, brushy, canyon and

is almost pristine in condition. Vegetation consisting of red-osier dogwood, willows, and conifers lines this reach of the stream.

The riparian zone along the BLM and lower FS portions of Pattee Creek has a long history of human impacts from roading, channelization (to "protect" the road up the bottom), mining exploration work, and livestock grazing. As a result, the watershed has a record of major flooding and "blowouts," especially during spring runoff. In the spring of 1992, almost all the Pattee Creek riparian zone in the canyon section on BLM-managed lands was fenced to exclude livestock. This project was a cooperative venture with the grazing permittee, IDFG, and the BLM. Riparian response was immediate and profound, with woody and herbaceous vegetation growth rendering some sections of the road nearly impassable by the fall of 1992. The remainder of the old road was blocked to vehicle traffic in 1994 when the BLM removed a large water gap on the upper end. The cessation of grazing and vehicle travel has speeded the recovery of this area.

Due to road and livestock grazing impacts, the riparian habitat along Pattee Creek was becoming dominated by an understory of bluegrasses, cheatgrass, and weeds in many parts. An overstory of aspen and willows occurred throughout, but many shrubs were declining. Given changes in management and relocation of the road, shrubs are on a steady increase and bluegrasses, weeds, and cheatgrass are being replaced by *Carex/Juncus* communities. Young cottonwoods are increasing throughout the enclosure. The area within the FS riparian pasture has been impacted by historic and recent grazing and high flow events which drastically altered the floodplain community, burying much of it under bedload. Above the riparian pasture, the stream enters a deep, narrow canyon with limited access. Riparian vegetation is dominated by spruce and aspen overstory with a mix of willow and herbaceous understory. The riparian vegetation is very narrow here, but in the higher reaches where the canyon opens, willow and wide sedge meadows dominate.

The vast majority of the middle section of Pattee Creek is now either excluded from livestock grazing or in an early-season riparian pasture. The Pattee Creek Habitat Improvement Project (HIP) enclosure was constructed in 1991 and extended in 1994 and again in 1998. Roads have been closed or moved out of the stream bottom. The lowest reach of stream is dominated by willows and cottonwoods. Where livestock historically had access, herbaceous and woody species were heavily impacted. With changes in grazing management beginning in 1991, recovery in these areas has been dramatic.

Although the health of the Pattee Creek riparian areas is improving through use of an enclosure and a grazing management plan instituted in 1992 and revised in 1994 (when the permit was leased), the riparian areas must be carefully monitored to allow this improvement to continue at the desired rate. Due to the topography of the area and the general lack of concern moose show for fences, cattle occasionally end up in the creek bottom.

Warm Springs Creek, which parallels the Warm Springs Wood Road but is not significantly impacted by it, is predominately vegetated by bulrushes (*Scirpus spp.*), sedges (*Carex spp.*), and rushes (*Juncus spp.*), although some cottonwoods and willows are found along the lower stretch. No riparian management objectives are currently defined for Warm Springs Creek. The channel's incisement and heavily vegetated and intermittent nature preclude readily identifiable objectives, other than the need to continue its apparent upward trend.

There are numerous developed springs within the Warm Springs/Pattee Allotment, several undeveloped springs, and several pipelines. The headbox areas of most developed springs are fenced to exclude livestock from the spring areas. There are several undeveloped springs in the allotment, including three which were fenced in 1987 as part of a Pilot Riparian Project, and numerous springs included in the Pattee Creek enclosure. The remainder of the undeveloped springs are currently unfenced, which does allow livestock

access.

Table 12 displays the riparian habitat condition of streams in the Pattee Creek watershed.

Table 12: Riparian Habitat Condition Classes for Streams within the Pattee Creek Watershed

Stream	Length (miles)	Condition												
		Proper Functioning Condition				Functional At Risk/Trend				Non-Functional				Dewatered
		BLM	FS	State	Pvt.	BLM	FS	State	Pvt.	BLM	FS	State	Pvt.	
Pattee	16.1	2.5	3.0	0.0	0.0	3.0↑	3.0→	0.0	2.4→	0.0	2.0	0.0	0.0	0.0
High	2.2	0.0	1.2	0.0	0.0	0.2→	1.0→	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wade	4.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Warm Springs	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	2.4→	0.0	0.0	0.0	0.0	0.0
TOTAL:	22.3	4.7	8.2	0.0	0.0	3.2	4.0	0.0	4.8	0.0	2.0	0.0	0.0	0.0

→ indicates a static trend
 ↑ indicates an upward trend

Agency Creek – Until recently, riparian conditions were generally characterized as having a mature to over-mature woody component with little reproduction, a depauperate *Carex/Juncus* community, considerable bare ground in some reaches, dominance of upland species (e.g., bluegrasses, cheatgrass, thistle) on immediate streambanks in many areas, and frequent sloughing, raw banks. This trend is reversing with changes in livestock grazing management, with young aspen coming up everywhere, increased *Carex/Juncus*, and decreased bare ground.

Agency Creek proper is dominated by a *Carex/Juncus* understory and willow overstory. Aspen are common, but in many areas regeneration is limited. Riparian condition along most of the tributaries is improving, but some areas still have unstable banks, high erosion, and undesirable species. The grasses along the tributaries are generally dominated by *Poa*'s and annuals non-typical of riparian areas. Some willows remain, but are often mushroomed and decadent. Weeds are common and have invaded riparian areas. Cow Creek is recovering dramatically from the effects of grazing, with a recovery rate much faster than any of the other tributaries. Changes in grazing management in 1994 appear to have reversed the downward trend, and have resulted in improvements throughout most of the watershed. Recovery on FS managed lands is equally high, due to a grazing exclosure constructed in 1994.

Approximately half of the riparian area on Agency Creek proper is in private ownership, and it is in these areas that riparian habitat is in the worst condition. Overall, the riparian zone through private lands is thought to be in fair condition. In some sections landowners have removed riparian vegetation (though it is re-establishing in some places). In some riparian areas on private lands livestock use has been excessive, at least within the context of riparian management for aquatic health. There is minimal recruitment of riparian woody vegetation, *Carex/Juncus* communities are small and fragmented, and much of the immediately adjacent "wet meadow" type habitat has been dominated by various upland grasses (e.g., bluegrass) and annuals (e.g., thistle). In

several reaches, the stream is downcut sufficiently to lower the water table.

Table 13 depicts the current riparian condition classes of streams in the Agency Creek watershed.

Table 13: Riparian Habitat Condition Classes for Streams within the Agency Creek Watershed

Stream	Length (miles)	Condition												
		Proper Functioning Condition				Functional At Risk/Trend				Non-Functional				Dewatered
		BLM	FS	State	Pvt.	BLM	FS	State	Pvt.	BLM	FS	State	Pvt.	
Agency	11.0	1.2	1.7	0.0	1.6	2.0↑	0.5↑	0.8↑	3.2→	0.0	0.0	0.0	0.0	0.0
Cow	8.8	4.7	0.0	0.0	0.4	1.5↑	0.0	0.0	2.2↑	0.0	0.0	0.0	0.0	0.0
Copper Queen	1.5	0.0	0.4	0.0	0.1	1.0↑	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flume	7.7	0.6	6.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gould Basin	1.6	0.0	0.0	0.0	0.0	1.6→	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Horseshoe Bend	2.8	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sharkey	3.9	2.1	0.0	0.0	0.0	1.4→	0.0	0.0	0.4→	0.0	0.0	0.0	0.0	0.0
Squaw	1.3	0.0	0.0	0.0	0.0	0.7→	0.0	0.6→	0.0	0.0	0.0	0.0	0.0	0.0
White	2.3	0.0	0.0	0.0	0.0	2.0→	0.0	0.0	0.3→	0.0	0.0	0.0	0.0	0.0
TOTAL:	40.9	8.6	11.6	0.4	2.1	10.2	0.5	1.4	6.1	0.0	0.0	0.0	0.0	0.0

→ indicates a static trend

↑ indicates an upward trend

Historic Riparian Condition: Although little documentation exists for historic vegetative condition in the analysis area, it is expected the species of riparian vegetation would be similar to those seen today. The riparian areas were probably more extensive, similar to the beaver complexes that currently exist below Flume Creek. The fact that the documented Indian “roads” Lewis and Clark followed veered away from the stream bottom supports this concept. Hydric species such as sedges and rushes were likely the dominant herbaceous species, and willows and aspen were likely more widespread and thicker than they are today. Lower in the watersheds, cottonwood galleries, like the remnant still found in Kenney Creek, probably dominated the riparian areas. With heavy grazing documented as early as the 1890’s (Merriam, 1890), the removal of beaver, and the advent of roads and clearing of the river bottoms for agricultural purposes, the riparian landscape has been changing dramatically during the last 120 years or so. Even more recent historical grazing activities resulted in generally unsatisfactory riparian conditions on public lands, due to a lack of any management scheme combined with a history of season-long use. Riparian areas along the upper private lands were often in worse shape. These conditions contributed an obvious sediment load into all streams within the watershed, which in turn affected water quality in Agency Creek.

Changes in Management and Opportunities for Improvement: Changes in livestock grazing practices and

season of use began in 1994 on public lands and are still continuing, with the focus now being on private and State lands. These changes should allow the riparian areas to improve in ecological condition and result in improved water quality throughout the watershed.

It is unclear what sediment source was the worst or that correcting any one individual source would equate to measurable water quality improvement. It is believed, however, that correcting grazing problems on both public and private lands, bringing the Cow Creek road up to BMP specifications, and achieving a decrease in upland sediment transport by excluding the poor condition uplands in Sharkey Creek from livestock grazing, will result in measurable improvement.

Water temperature in Agency Creek often exceeds standards. It increases dramatically between the BLM/FS boundary and the lowermost BLM/private boundary. While very little of the mainstem is influenced by federally authorized activities, it is currently unknown how the tributaries which are affected by grazing on public land affect the mainstem. It is felt that activities on private lands (such as irrigation diversions/impoundments, intensive grazing which has reduced/removed woody vegetation, and impacts from livestock handling facilities), when combined with the extensive, active beaver complexes, are the most significant contributors to the rise in temperature.

As all the foregoing pollutant inputs are additive, there is reason to believe that the loads carried by Agency Creek may impact the habitat of aquatic species in the Lemhi River. Data are not available to quantify the amount of erosion or sediment flow taking place, but visual evidence indicates that sediment loads are high. Beaver dams within Agency Creek presently appear adequate to collect most sediment caused by the above actions. The natural scenario of interrelationships between beavers, beaver dams and riparian areas suggest, however, that at some point in the future these dams will fill with sediment and lose their filtering effectiveness. Sediment filtration will then depend largely on the health, vigor, and species composition of the riparian vegetation.

Aquatic Species and Habitat Condition

Historic Condition: The Lemhi River teemed with anadromous salmon runs that were exploited by the Shoshonean residents of the area. The lower reaches and mouths of its tributary streams (including those of the Kenney-Agency watersheds) also provided this food source, though the intensity of harvest in these waters was undoubtedly a fraction of that taken from the Lemhi River itself. The elevated terraces hugging the mouths of Kenney Creek and Agency Creek in particular, served well for the establishment of base fishing camps and winter camps, from which organized fish hunting by use of weirs, gigging, and other techniques took place.

Current Condition: Streams in the analysis area contain rainbow trout, Westslope cutthroat trout, and bull trout. These watersheds are considered critical Snake River spring/summer chinook salmon habitat by the National Marine Fisheries Service, with all primary streams possibly used historically by chinook as spawning/rearing streams. However, no federally-listed Snake River spring/summer chinook salmon (*Oncorhynchus tshawytscha*) are currently known to occupy or utilize habitat in any stream in the analysis area. It is also likely that steelhead used these streams for spawning and rearing. At present, the Lemhi River is the closest known occupied spawning/rearing habitat for anadromous fish. Bull trout (*Salvelinus confluentus*), federally listed as “threatened” under the Endangered Species Act, are only present in Kenney and Pattee creeks. There is a small sport fishery on the streams for resident rainbow and cutthroat trout. Table 14 and Map 9 summarize the current fish presence within perennial streams in the watershed analysis area.

Table 14: Fish Species Presence by Perennial Stream

Stream Name	Brook Trout	Bull Trout	Chinook	Cutthroat	Rainbow	Steelhead
Kenney	NO	YES	NO	YES	YES	NO
East Fork	NO	unknown	NO	unknown	unknown	NO
Rattlesnake	NO	NO	NO	NO	NO	NO
Pattee Creek	NO	YES	NO	YES	YES	NO
High	NO	NO	NO	YES	YES	NO
Wade	NO	NO	NO	YES	YES	NO
Warm Springs	NO	NO	NO	NO	NO	NO
Agency	NO	NO	NO	YES	YES	NO
Cow	NO	NO	NO	YES	YES	NO
Copper Queen	NO	NO	NO	YES	YES	NO
Flume	NO	NO	NO	YES	YES	NO
Gould Basin	NO	NO	NO	unknown	unknown	NO
Horseshoe Bend	NO	unknown	NO	unknown	unknown	NO
Sharkey	NO	NO	NO	YES	YES	NO
Squaw	NO	unknown	NO	unknown	unknown	NO
White	NO	unknown	NO	unknown	unknown	NO

Kenney Creek - Fish species identified as occurring within the Kenney Creek watershed include mountain whitefish, Westslope cutthroat trout, rainbow trout, and bull trout. The creek is historical spawning and rearing habitat for chinook, but not in the past 30 years. The Lemhi River is the closest occupied chinook habitat. Because Kenney Creek reaches the Lemhi River year-round, steelhead may utilize the system for spawning and rearing.

Aquatic habitat along the lower one mile of BLM-managed lands is generally in poor shape, but improving. The conditions below this area, on the private land, are better, resulting in fragmented habitat suitable for rearing or spawning. The one diversion on BLM lands, located just below the canyon, is unscreened and poses both a migration barrier and an area of potential loss of fish. This habitat fragmentation and loss of migration access to the stream have resulted in a constrained genetic pool for the resident fish. Although the remaining resident fish can maintain a viable population, catastrophic events have the potential to significantly harm the population.

Pattee Creek - Pattee Creek and its tributaries contain rainbow trout, Westslope cutthroat trout, and bull trout. The watershed is considered critical chinook salmon habitat by the National Marine Fisheries Service. This stream was possibly used historically by chinook as a spawning/rearing stream. At present, the Lemhi River is the closest occupied spawning/rearing habitat, due to seasonal dewatering. There is a small sport fishery on the stream for resident rainbow and cutthroat trout.

The seasonal dewatering of lower Pattee Creek for approximately the past 100 years prevented use of this area for rearing or spawning by mainstem Lemhi River fish. This reduced the ability of the stream to recover from any natural or man-induced event which could negatively affect the fish populations, particularly the bull trout, within Pattee Creek or its tributaries. The landowner on Pattee Creek has agreed to allow water to remain instream as much as possible, especially in the spring and fall. The Pattee Creek ditch is currently unscreened and has not been identified for screening during the next 10 years. This leads to a loss of resident fish out into diversion ditches and potentially onto irrigated fields.

Agency Creek – The only aquatic species listed or proposed for listing known to occur within the watershed area is the spotted frog (*Rana pretiosa*). This amphibian has been found in many of the ponds and wetter marshes within the watershed. Although this area has been designated critical habitat for the Snake River spring/summer chinook salmon and Snake River steelhead, the nearest occupied habitat is in the Lemhi River. No steelhead spawners were present in Agency Creek during a survey conducted by the IDFG in the spring of 1994. Fish surveys have identified the presence of two resident fish species: Westslope cutthroat, a species petitioned for proposal for listing, and rainbow trout. Historic records indicate Agency Creek was stocked with 4,000 cutthroat trout fry in 1978 by the IDFG (IDFG, unpublished data).

Fish migration along Agency Creek is currently blocked by a dam created by a lateral ditch carrying Lemhi River water. This dam prevents access to migrating fish and contributes to the lack of adult and/or juvenile chinook salmon occupancy in Agency Creek. No steelhead use the stream either, even though the lower section has water during migration/spawning times. The IDFG is working with irrigators to resolve this issue, at least seasonally, when the resident fish would migrate to/from these tributary streams.

Lower Agency Creek has a high potential to be utilized by chinook salmon, but fish have not been found in the stream in recent years, possibly due to restricted access and seasonal dewatering for irrigation purposes. Agency Creek flows into and out of several unscreened diversion ditches on its way to the Lemhi River; as a result, resident fish are being lost into the ditches and may eventually end up on irrigated fields.

In 1989, the IDFG sampled fish populations in Agency Creek. This sampling indicated rainbow trout densities of 33.7 fish/100m². In 1997, the BLM and IDFG sampled fish densities in lower Flume Creek. Densities of rainbow trout at this site were estimated at 8.3 fish/100m². The BLM also conducted a presence/absence survey of upper Flume Creek, capturing only Westslope cutthroat trout. Densities appeared to be relatively high in this area that is not impacted by human uses.

Effects of Roads on Aquatic Habitat

Existing vehicle routes (roads and vehicle ways) and route distance from streams in the watersheds analysis area are depicted on Map 15. At a sub-basin scale, the effects of existing road locations and road maintenance activities have accumulated during an environmental baseline period of the past 50 to 100 years. In many areas these accumulated effects have gradually increased stream sediment and bedload over natural levels. With the alteration of flow regimes, increase in drainage density networks, modification of riparian and upland vegetation, and loss of beaver during this period of time, the natural hydrology of streams has been

altered in many areas.

Most streams have compensated by adjusting their geomorphic and hydraulic characteristics to accommodate for these reductions, typically, by developing shorter channels, steeper gradients, greater stream power, and higher capacities for erosion and transport. Generally speaking, these changes have occurred at the expense of historic instream habitat diversity, quality, and productivity. Compared to reference watersheds within wilderness areas, the following stream habitat changes have typically occurred in managed (roaded) watersheds (USDI-BLM, 2002; USDA-FS, June 2000):

1. *Increased stream width-to-depth ratios*, resulting in less average depth, greater solar exposure and warming in the summer, and increased formation of anchor ice in the winter. These factors contribute to lower habitat suitability (less juvenile rearing capability) in summer and lower survival rates in winter.
2. *Reduced average pool depths and quality of cover*, resulting in less rearing habitat volume, and lower growth rates, carrying capacities, and overall production potential per unit of habitat.
3. *Reduced riparian thermal envelope characteristics*, resulting from the reduction or loss of extensive vegetative canopies in many streamside locations. This has reduced summer shading and cooling, as well as winter “insulation.” These factors contribute to reduced survival of fish eggs, sac-fry, and juveniles incubating in stream bottom gravels. These impacts occur especially during December and January, when exposed stream reaches freeze from the bottom-up as a result of super-cooling on clear, sub-zero nights (due to long-wave back-radiation to deep space).
4. *Reduced floodplain dynamics* and subsequently reduced creation of side-channels, wetlands, and juvenile rearing areas.
5. *A gradual reduction in the volume, distribution, and availability of spawning size gravels*. These gravels are now more likely to be transported downstream, leaving more armored stream-bottom conditions. Armored stream bottoms have reduced suitability for food (plankton and insect) production and spawning.
6. *Reduced numbers of debris jams*, with less retention of smaller spawning gravels (previously trapped in diverse locations throughout all sizes of streams) and less availability of nursery and rearing habitat associated with the structural cover provided by debris jams.
7. While roads increase the nutrient delivery to streams by removing vegetation, rerouting water flow paths, and increasing sediment delivery (USDA-FS, June 2000), they can also *reduce on-site nutrient retention and trophic development*. This will result in increased nutrient export rates, plus a less diverse and productive (multi-year) food base over the typical 12 to 24 month juvenile (fish) rearing and insect (instar) production timeframes. Nutrient retention is most affected in low gradient areas presently lacking historic beaver activity and floodplain-wide wetlands, which historically served as nutrient sinks and focal areas for juvenile production, growth, and winter survival.

Historical and Cultural Overview

Human uses within the analysis area have generated the settlement patterns, resource conditions, and interests in multiple uses that are present in the analysis area today. Sites of particular cultural and/or historic importance are depicted on Map 10 and discussed further below.

Historic Overview

Native Americans before A.D. 1800

Available diagnostic data from recorded archaeological sites within the Agency-Kenney Creek watersheds area indicates a chronological span from Middle Prehistoric to Early Historic periods (from ca. 3000 BP - 150 BP).

The last 500 years is most commonly represented in the record. This time frame will undoubtedly deepen with future field work and analysis. Evidence from surrounding East-central Idaho sites (e.g., Holmer and Ross 1985; Swanson 1972; Butler 1986) supports the likelihood that the analysis area was probably visited by human populations over most or all of the Holocene, and very possibly earlier.

For at least the last 2,000 to 3,000 years evidence of a persistent adaptive pattern in this region is highlighted by a very flexible three-pronged subsistence strategy characterized by (1) dependence upon anadromous fish runs and other aquatic resources (e.g., fresh-water mussel); (2) extensive root, berry, and seed harvesting and processing; and (3) hunting of large game (sheep, deer, elk, bison) as solitary prey or rare multiple kills using traps, jumps, deadfalls, or surrounds. Smaller prey was equally important in the total faunal take of each season (Liljeblad 1957; Walker 1978).

The course of life during these millennia appears to have been markedly "scheduled." During the warm growing seasons, single families scattered and traveled a subsistence round that could be quite complex, seeking to exploit resources as they became, or were anticipated to become, available. Subsistence was heavily focused upon dependable abundances at more or less predictable times in the season: the salmon runs, bitterroot and other floral crop harvests, including bi-annual or less frequent but prized boom crops of whitebark or limber pine seeds. Though "scheduling" played a dominant role in the lifeway of these early people, opportunism and flexibility were hallmarks of these ancient cultures. An unexpected herd of mountain bison, or a nearby toolstone outcrop, would not likely be passed up. Temporary brush shelters for individual families were probably the norm while migrating during the spring and summer seasons. Domesticated dogs were probably present and would have aided in hauling baggage and supplies.

Winter encampments, composed of a few semi-subterranean pole-and-thatch conical lodges, were located in sheltered valley settings near larger streams with abundant firewood. These camps may have been occupied by several related families, and were visited and maintained for generations. As in historic times (Steward 1938, 1943; Lowie 1909), winter camps were central bases from which to range into the snowy canyons to hunt, probably with dogs and snowshoes. In winter, nourishment depended heavily upon the labors of the previous summer and fall. High-energy storable foods probably included dried root and seed resources, jerked meat, and dried fish. Fresh meat supplemented the diet. Even when preparations went well, the waning weeks of winter were often hungry times (Walker 1978).

Upper Salmon River and Middle Fork sites typically yield volcanic glass (obsidian) toolstone used to make

flaked implements. Trace-element analysis of selected samples from these sites traces the material *hundreds of kilometers* to the southwest at quarries near the confluence of the North and South Forks of the Payette River near Timber Butte (Gallagher 1975; Torgler 1993; Wright 1969). Other quarry locations evident in the Salmon area were derived from sources across the Eastern Snake River Plain and as far as Yellowstone National Park. Exotic items encountered in central Idaho prehistoric assemblages include Northwest Coast marine shell ornaments for clothing or personal adornment, and steatite from sources in the mountains of western Wyoming (Frison 1991). Non-local raw material in the central Idaho region implies prehistoric travel and trade networks long before the horse. Perhaps these occasional foot journeys out of the sheltering mountains led to accustomed rendezvous points at Big Camas Prairie or to the more distant plains of the Lower Snake River near present-day Emmett, Idaho. These treks may have pioneered a diverging network of foot trails, some of which are documented near and over the analysis area, paths much later utilized by mounted Indian descendants and Euroamerican explorers.

Native Americans after A.D. 1800

Two hundred years intercepts a period of stunning change in Shoshonean culture in the study area and wider region. Between A.D. 1680 and 1700, a very rapid socio-cultural transformation occurred as Spanish horses and attendant equestrian technology infiltrated the Intermountain West from the east and south. The main thrust of this new adaptation happened within just a few decades, quite probably within one person's lifetime. Uniquely, these essentially mountain/valley people never abandoned their former selves as takers of salmon and eaters of bitterroot. Enduring traditional elements of ancient subsistence and culture were retained, peeking through the new flourish of beads and buckskins, tipis and horse travois, and consolidation of small family units into a more complex band level society.

On the other hand, the changes that settled over much of the study region largely by-passed small nuclear family groups occupying the rugged interior mountains of central Idaho and eastward into the Yellowstone country. These were the reclusive "Sheepeater" Shoshone, mountaineers and superlative hunters and furriers whose ways were regarded by their horseback kin as "old fashioned," and whose Shoshonean dialect was chided as "sing-song" and peculiar (Liljeblad 1957). These people largely rejected the horse and the trappings that attended it more or less as an unnecessary nuisance, preferring to live as their people had "always" lived.

In 1805, many hundreds of horses often ranged unrestrained in the Lemhi Valley, and bison hide tipis and salmon drying racks were a common sight. Firearms were still very rare, but were known of, as were various metal utilitarian items, trade beads, tobacco, and other Contact-period artifacts (Moulton 1988). Early fur trade accounts in the ensuing three decades verify that grazing pressure from these Indian herds was often severe, necessitating frequent camp moves after brief stays (e.g., Todd 1986; Hafen 1983). The sources also describe occasional large herds of bison roaming the Lemhi Valley and adjacent canyons. But these occurrences were, at best, unpredictable. By the close of the 1830s, bison in the Rockies had been over-hunted and stressed by competing horse herds, their problems compounded by several severe winters in the early 1830s (Janetski 2002).

The Lewis and Clark journals in 1805 also allude to the apparent rarity of other big game such as deer, antelope, and elk. As the Corps of Discovery crossed the Continental Divide into the study area, Expedition hunters often returned to camp empty-handed. The cause for this is debated among historians and biologists (Martin 1997; Burkhardt 1996). Primary accounts from that period do suggest that habitats utilized by the Lemhi Shoshone in 1800 were already modified in many respects from those in times before the "horse culture." A combination of environmental and human influences have been suggested that may have led to this state, among which was hunting pressure by more efficiently armed and mounted Native residents and

competition from the growing herd of horses, exacerbated perhaps by the affects of centuries-long global climatic cooling near the end of the so-called "Little Ice Age" (Eckerle 1998).

The Lemhi people at this time likely occupied a land affected to a certain extent by their own culture and technology. The study area and surrounding region were rich in natural resources. As in ancient days, the reliable and very plentiful runs of salmonids into all of the rivers and tributary streams of the area were critical. Anadromous fisheries played a key role in the subsistence of the mounted Lemhi people well into the 19th-century. At this time, the technology for taking of salmon was quite specialized, fish being harvested in great quantities by individuals or organized groups using weirs, gigs, nets, and many other techniques. The slopes and hills across the study area and throughout the region were literally covered in bitterroot, which persisted as a prized and nutritious root crop for these equestrian populations. Far-away tribes such as the Sahaptan-speaking Nez Perce made long journeys into the Eastern Idaho foothills in search of this root. A plethora of edible roots, berries, and seeds were gathered annually -- just as prehistoric occupants of the analysis area had done.

Usually, in the late summer the Lemhi Shoshone prepared for travel over Lemhi Pass to the bison plains on the east side of the Continental Divide. Bands under a specially appointed leader would converge in large numbers with other friendly bands (particularly with Flathead from the Bitterroot Valley, or visiting Snake River Bannock and Shoshone groups) for safety against the well-armed Blackfeet who had come to dominate the Northwest Plains in the early historic period. When the hunt went well, hundreds of pounds of meat per family were secured and dried for the coming winter, and hides were tanned for lodges, blankets, containers, and trade. Bison hunting had assumed an impassioned role in the social and mental life of the Lemhi people by A.D. 1800. The horse made this relatively new and much prized aspect of Shoshone life possible.

During the early 19th-century, many other mounted Indian tribes regularly visited and passed through the Lemhi Valley, including the Flathead, Nez Perce, Bannock, Blackfeet, and rarely Kootenai, Coeur 'd Alene and Kalispel [cf. Hafen 1983]. All of these mounted travelers routinely made long journeys to hunt, trade, and raid. Spanning the watersheds area was the familiar "road" leading up to Lemhi Pass, a vital portal between the interior Rocky Mountains and the east-flowing drainages of the upper Missouri River. This old travel route probably elevated the average numbers of Indian people found at any given time within the study area. The Lewis and Clark journals of 1805 observe a surprising flow of Indian passers-by (afoot and mounted) on the dusty "beaten road" from the numerous "villages" in the Lemhi Valley below, or descending from the opposite direction (Moulton 1988). Trappers and explorers who soon followed Lewis and Clark into the study area dubbed this busy divide "North Pass" in contradistinction with famous "South Pass" on the Green River (Idaho Historical Society 1975).

In the early decades of the 1800s (especially after the 1830s), as bison herds in the Southern Plateau and eastern reaches of the Columbia Basin dwindled, the Nez Perce were forced to make increasingly long eastward treks to reach the buffalo plains of the Missouri (Janetski 2002). In the process, they permanently blazed a trail corridor along ridge crests of the breaks of the Clearwater and Bitterroot Mountains. This route terminated in multiple branches in the general vicinity of Gibbons Pass and Lost Trail Pass several miles north of the study area (Rand 1937; Parker 1990). The west end of the trail over Lemhi Pass converged with one of these forks of the so-called "Southern Nez Perce Trail" veering due south through the length of the Lemhi and Birch Creek Valleys, eventually reaching the Snake River Plain. With horse travel some ancient footpaths were abandoned and all but vanished, while others, particularly those routes physically amenable to dragging a horse-travois, continued to widen and deepen, many eventually to become stage and freight roads.

Euroamerican Entry - Lewis and Clark Expedition and the Fur Trade Era (1805-1840)

On August 12, 1805, Capt. Meriwether Lewis and three others of the Corps of Discovery crossed Lemhi Pass on foot into the watershed analysis area. They followed the well-beaten Indian trail from the Pass northwest down the steep undulating west flank of the Continental Divide through "Ghoul Basin," past Pattee Creek and Warm Springs Creek, and onto the bottoms of the Lemhi River north of the present-day community of Tendoy, Idaho. Lewis and Clark historians argue as to the respective postulated routes followed through the area by the various detachments of the Expedition. A final resolution of these differences may not be obtainable, given the scant nature of the available historic record. Nevertheless, the alternative hypothesized routes are documented by the BLM in its management of possible trail courses in the vicinity of Pattee Creek and Warm Springs Creek.

President Jefferson's little exploring party nearly ended its adventures here in the Lemhi Valley due to a lack of horses, provisions, and direction. Sacajawea, a young Lemhi Shoshone woman long separated from her people and residing as a captive in a Mandan village, helped to reassure the worried Captains that they were headed in the right direction as the Corps ascended the east side of the Rocky Mountains. The unusual circumstances that lead to her traveling with the Expedition in the first place proved all the more miraculous when it was discovered that she was actually the sister of Chief Cameahwait, the influential Lemhi Shoshone band leader at the time. Cameahwait's Lemhi Shoshone band -- in a remarkable display of generosity after having recently suffered at the hands of Blackfeet raiders -- shared what little they had with the beleaguered soldiers of the Corps, equipped them with provisions (though not without shrewd barter), informed them of surrounding geography and routes to avoid, and provided a guide who lead the Expedition on its journey into equally generous Nez Perce country and beyond.

Near the end of August 1805, the Shoshone aided Capt. Lewis in retrieving cached goods from "Camp Fortunate" on the opposite side of Lemhi Pass. As the group, which was large (including the majority of Cameahwait's people) passed along established "roads" back over the Pass, they stopped at the same spring -- probably in "Ghoul Basin" overlooking upper Agency Creek -- at which he and his Advanced Party had encamped several days earlier. Shoshone women promptly began to gather sunflower seeds and "fennel" roots on the sunny slope above the spring (Moulton 1988: 171-172). Tall stands of timber were viewed on distant canyon faces, beneath snowcapped mountain peaks. The benches now referred to as "Alkali Flat" above the Lemhi Valley were lightly draped in brush, at least three species of cactus, and sparse "bearded grass" (Moulton 1988:78). Streams were described as high, fast, and clear with many gravel bars and shoals. Riparian areas were thick and red with ripened berries. This and other descriptions of scenery taken in during the brief two-week stay of the Expedition offer a glimpse at aspects of the verdant ecological condition of the watersheds area about 200 years ago.

The Indian road followed by the Expedition conveyed nearly all of the famous names of the American fur trade era across the slopes of the study area into the Salmon River country for the next 40 years. In April 1823, Finan McDonald and a group of Hudson's Bay trappers crossed over Lemhi Pass, barely descending the opposite side in the Agency Creek watershed, when they were ambushed by a party of Blackfeet. The encounter that ensued along the old trail earlier followed by the Expedition came to be known as "McDonald's Battle." The brigade suffered little from the attack, but the Blackfeet warriors were decimated when the trappers set fire to the riparian thickets within which they took cover on that windy spring day (Morgan 1953). The rapidity with which the flames "leaped up furiously" (Morgan 1953: 124) suggests an early dry season at that time.

During these fur trade decades, various groups of trappers were often greeted by heavily cropped potential campsites. At any given time, portions of the Lemhi Valley during this period were so denuded of grass (presumably by small roving herds of bison and large herds of Shoshone, Flathead, or Nez Perce horses) that

the parties and their stock were forced to press on many miles until suitable grass could be found. Beaver populations were significantly reduced in this region during the late-1820s by deliberate attempts to "clean the country" and reduce competition with rivals. These tactics undoubtedly directly affected riparian habitats and hydrology in the study area and surrounding land. Upland big game continued to be scarce as it had been in Lewis and Clark's day.

Euroamerican Settlement - Fort Lemhi and the Lemhi Indian Reservation (1855-1907)

In 1855, wagons carrying twenty-seven Mormon missionaries from Ogden, Utah, rolled along the old southern Nez Perce trail up Birch Creek and over into the Lemhi Valley. The settlers chose to build a small fort of upright logs, with an adjacent adobe-walled enclosure for stock, on the east side of the Lemhi River near the mouth of Pattee Creek (at the western extreme of the watersheds study area – see Map 10). They named the establishment "Fort Lemhi" after a heroic figure in the Book of Mormon. Ground was immediately broken on the rich Lemhi River bottoms to plant peas, corn, potatoes, and other food crops. Ditches were drawn out of Pattee Creek, cabins and other structures were erected. Friendly contacts and missionary efforts were initiated among the resident Shoshone. Wagon tracks quickly becoming roads were undoubtedly blazed up the principle drainages (e.g., Pattee Creek, Warm Springs Creek, and Agency Creek) to construct ditches and access stands of timber. Game was hunted in the watersheds area. Later that year, most of the men traveled back to Ogden for more supplies and returned with their families. Their livestock, including horses, mules, and cows, ranged over the hills of the watersheds. A second fort was built in 1857, possibly at or near the mouth of Warm Springs Creek a few miles north of the original (Terry Whittier, BLM Park Ranger; personal communication, 2002).

However, all was not well in the wider region. Nationally, anti-Mormon sentiment and political concerns abounded. This little Mormon incursion may also have been keenly perceived as a threat to a far-reaching business interest already established at Fort Owens in Montana's Bitterroot Valley, which held a virtual monopoly in regional trade with Indians and early settlements alike. Small animosities among the Indian people may have been fueled and encouraged by representatives of this interest. Locally, tension between the local tribes and a few of the settlers grew daily (Whittier, personal communication, 2002). Resentments were intensified with the sight of several of the Fort's wagons loaded with dried salmon making their way south out of the area toward Utah. It all came to a head on February 26, 1858, when a small party of Shoshones and Bannocks abruptly surprised and attacked the vulnerable main Fort from the bench just to the north of the mouth of Pattee Creek, stealing livestock and injuring and killing residents. This assault resulted in the rather quick decision to abandon the mission and return home, which was initiated by the end of the next month (Bluth 1900).

The end of free-roaming Shoshonean life was signed and sealed with the establishment of reservations, including the Fort Lemhi Indian Reservation in the study area. Article III of the *Treaty with Shoshones, Bannocks, and Sheepeaters*, signed in September, 1868 by various Shoshone and Bannock band leaders (including the soon to be famous Chief Tendoy) promised a reservation, ostensibly as protection for the Lemhi people due to substantial influxes of American prospectors, ranchers, and settlers into the region less than ten years after the Mormons abandoned the Valley. The Lemhi Reservation, formally drawn up in 1875, was small by comparison with others in the west, and was in fact never ratified by the U. S. Senate. It was surveyed across a portion of the Lemhi Valley that had always been traditionally important to the Shoshone people, a place where for uncounted generations fishing villages and winter camps had rested. The "reservation" saw a succession of appointed superintendents headquartered first at the mouth of Agency Creek (hence the name of the drainage) and later, several miles to the south at Lemhi. The superintendents were constantly frustrated in their attempts to secure appropriations of food and supplies. The Indian

boarding school and "educational" programs intended to transform the youth of Shoshone people into sedentary agriculturalists proved intolerant and harsh, and met with much disapproval by reservation parents. Times were more often hard than happy for the majority of the Indian people during this long period which reached into the early years of the 20th century (Sims 1978; Madsen 1980).

It was during this era that Chief Tendoy's influence solidified his role as the accepted leader of the Lemhi Shoshone, Sheepeater Shoshone, and Bannocks (after the Bannock War of 1878.) In 1889, the U. S. government formally dissolved the "reservation," and determined that its residents should be transported to Fort Hall. Yet Tendoy exercised shrewd diplomacy against repeated threats from Washington to remove his people and open up its lands and holdings for re-appropriation. Public sentiment was mixed, some advocating the dissolution of the reservation and others siding with Tendoy and his cause. Numerous mineral prospecting ventures (including the Copper Queen mine), sawmills, and homesteads were on-going during the reservation period, openly operating on "reservation" lands (cf. Madsen 1980; Shoup 1969).

The Indian people preserved their reservation homes until 1906, with the last sad tribal hunting foray into the hills transpiring a year earlier, entirely unsuccessful and never to happen again (Shoup 1940). That year, apparently ill-informed or misled, Tendoy abruptly persuaded his people that it was now time to leave the Lemhi valley and go to Fort Hall in southeastern Idaho. By the end of June, 1907, most of the people were gone, and the vacated land was subsequently re-surveyed for allocation. Chief Tendoy remained behind, having died under mysterious circumstances on Agency Creek in May of 1907. Near the end of that year, local business leaders donated a considerable sum of money to erect a fine sandstone monument over his resting place (Crowder 1969). Three years later (1910) a 40-acre parcel of land surrounding his grave site was set aside by Secretarial Decree. The Chief Tendoy Cemetery is now managed by the BLM under a cultural resource management plan.

Euroamerican Transformations

Gold strikes in Florence, Idaho, and others in the Central Idaho mountains drew early gold seekers and adventurers into the region and past the study area as early as 1862 (Sims 1917). But it was the Napias Creek discoveries and subsequent gold strikes at Loon Creek and Yellowjacket that founded the early communities of Leesburg and Salmon and brought an influx of miners and settlers between 1866 and 1869 (Smith 1973). By the early 1870s, homesteads were appearing up and down the Lemhi Valley. In 1872, Joseph Pattee, the last fur factor at old Fort Hall, homesteaded a ranch between Agency Creek and the mouth of Pattee Creek. About the same time, Frank B. Sharkey, who led the party of prospectors that had earlier founded Leesburg, settled on a ranch at old Fort Lemhi (part of the modern Muleshoe Ranch), taking in the bottoms of Pattee Creek and a prime section of the Lemhi Valley. In rapid succession, Charles Caty located his ranch immediately north of Sharkey's, bordering the mouth of Warm Springs Creek, while the Kenney ranch abutted the northwest edge of the study area in present-day Kenney Creek (Shoup 1969).

Free-ranging livestock herds were ubiquitous across the river bottoms and hillsides. But, the devastating winters of the 1880s doomed the open range system, forcing supplemental haying, hardier livestock breeds, and reduced and more effectively rotated herds. As the years passed, fields and pastures checkered nearly all of the Lemhi bottoms and began to drape onto the nearly level benches along the west border of the study area. The lowest reaches of all of the principle watershed streams were pastured or under plow by about 1880 (Shoup 1969). Many large-scale water diversions out of the drainages of the study area were excavated during those busy decades. Then, in the 1890s, showcased by the success of Emma Yearian, the sheep industry rapidly flowered. Tens of thousands of sheep roamed the hills and draws of Lemhi Valley and the Salmon River corridor on a year-around basis (Ankrum 1990). The sheep industry dwindled nearly as rapidly

as it took hold after World War II as new technology and fabrics supplanted the dominance of wool.

In the early 1880s the first concerted mining enterprise within the study area was under way at the Copper Queen Mine in upper Agency Creek. The Copper Queen and Wonderlode claims for gold and copper operated sporadically over many years (as late as 1949) and lasted through many owners. The most productive years were reported in the first two decades of the 20th Century (Smith 1973), after which activity at the Copper Queen sputtered. During the heyday around 1900, lodgepole pine stands were clearcut from the south canyon face of upper Agency Creek and its tributaries for use at the mine. Skid trails and haul roads scared the steep, denuded slopes. Much later, particularly through the 1950s and early-1960s, thorium and associated minerals were discovered along the Continental Divide, centered in the upper reaches of Pattee and Agency creeks and including Lemhi Pass and environs. Many national and international mining firms and investors funded extensive bulldozer explorations in search of what is probably the largest thorium load on earth. These roughly 20 years of thorium prospecting resulted in numerous interconnected roads, trenches, and open pits over hillsides and ridge crests. These routes are still clearly visible on National Forest and BLM lands in the watersheds analysis area.

The Salmon River Forest Reserve was approved by President Theodore Roosevelt in November, 1906, and in 1907 became the Salmon National Forest. A small Ranger Station was soon located in the analysis area about a mile and a half east and upstream of the mouth of Pattee Creek (Magoon 1991; Smith 1973). Rough two-track Forest roads pressed up Pattee Creek and other watershed canyons, encouraging later logging, mining, and recreational uses in the higher topography of the study area, which had largely escaped the brunt of landscape alterations during earlier settlement years.

Agricultural equipment and yield capacity improved in the years after World War II; these technological advances enabled settlers to nearly completely clear away and till over native stands of cottonwood and riparian thickets that had choked the floodplain of the middle and lower Lemhi Valley. Prior to 1905, public and forest lands were used by livestock operators in an unregulated fashion; in that year, the Forest Service initiated allotment and grazing systems. After passage of the Taylor Grazing Act in 1934, grazing management was extended over all the public domain (USDA-FS and USDI-BLM 1999). Extensive networks of buried water pipelines and livestock troughs took advantage of springs and seeps that were earlier unnoticed. A great many of these developments were installed after the BLM assumed management of public lands in 1947.

In 1883, construction was begun on the Agency Creek wagon road (the Red Rock Stage road), which passes through the watersheds area via Agency Creek over Lemhi Pass. The Red Rock Stage road was a busy artery from Leesburg and Salmon City to Red Rock and other destinations in Montana from 1883 through at least 1910, with passage nearly daily and through much of the year by a number of commercial freight and stage operators (Matz 1996). The Gilmore and Pittsburgh (G&P) railroad entered the Lemhi Valley at Bannock Pass in 1910, opening the region to efficient travel and haulage by short-gauge rail service from the booming mines at Gilmore and Leadville to the growing community of Salmon. What were earlier stage stops along the main wagon road traversing the east side of the valley in the vicinity of the analysis area either vanished entirely, or were re-located to serve as whistle-stops. Sunfield, once a tiny community on the wagon road at the mouth of Pattee Creek, was abandoned and essentially moved to present-day Tendoy, which hugged the railroad grade (Lemhi County History Committee 1992). The G&P had a short life, however, being directly dependent upon the health of the mines in the area. When the mines gave out during the Depression, so too did the rail line, which officially closed in 1940. In the late-1940s, long lengths of the old railroad grade were utilized to build State Highway 28.

Cultural Resources and Historic Landscapes

Prehistoric and early historic American Indian properties presently recorded in the analysis area are dominated by artifact scatters representing short-term encampments at favored stream or spring sites. Two toolstone quarries are documented within the watersheds. Low stone cairns, clusters, small circles or semi-circles, low stacked stone alignments, small earthen depressions, and other cultural features are also documented. Many of these features may be attributed to religious or ritual activities and probably extend into pre-Contact times. Another class of recorded features of aboriginal derivation is small conical depressions in talus (talus rock caches and/or big game hunting blinds). One rockshelter with pictographs is known, as are possible historic trail tread remnants and inferred travel routes. Some of these trailways may have provided passage for various detachments of the Lewis and Clark Expedition across the watersheds.

Places associated with the Lewis and Clark Expedition's sojourn in the analysis area include the National Register listed First Flag Unfurling monument parcel dedicated in 1976. Recent historical research has indicated a more valid position of the BLM's Flag Unfurling overlook at "Alkali Flat" near the BLM/USFS Backcountry Byway kiosk. Capt. William Clark's Reconnaissance encampment (August 19, 1805) rests on upper Pattee Creek. At the headwater springs of Agency Creek (in "Ghoul Basin") are found two hypothesized locations of the First Idaho Encampment chosen by Capt. Lewis' Advanced Party of August 12, 1805. The Lemhi Pass National Historic Landmark on the Salmon-Challis National Forest spans either side of the ancient passage over the Continental Divide. Finally, various proposed routes of the Lewis and Clark National Historic Trail are traced over private and federally managed sections of the analysis area. One other possible Lewis and Clark property (resting on private land) is the debatable site of the Upper Indian Village of Cameahwait's band of Shoshone on terraces at the mouth of Kenney Creek, visited by Lewis' Advanced Party on August 13, 1805.

Historic features and properties not related to events of the Lewis and Clark Expedition on or near the analysis area include:

- The Red Rock-Salmon Stage road (now largely overridden by the present Agency Creek road);
- Standing structures, buildings, and diggings from 1880s to 1940s mining ventures at the Copper Queen and Wonderlode claims in upper Agency Creek;
- The site of the ca. 1907 Pattee Creek Ranger Station, along with remnants of the old Pattee Creek Forest Service road;
- Remnants of old Fort Limhi (1855) and its attendant constructions on private land bordering the west side of the study area, which includes the little known Lower Fort a few miles below Fort Limhi, built in 1857 to accommodate increasing numbers of settlers;
- The turn-of-the-century community of Sunfield, once standing along the old Lemhi Stage Road at the mouth of Pattee Creek;
- Fred Pattee's Tendoy Mercantile Co. store, built along the former Gilmore and Pittsburgh Railroad in 1911 (now Highway 28 at present-day Tendoy);
- The Chief Tendoy Cemetery (currently managed by the BLM and Shoshone-Bannock Tribes) and other scattered cabins and deteriorated remains on private lands in the southern end of the analysis area that attest to the era of the Lemhi Indian Reservation (1875-1907).

Though many of these properties are incompletely documented and lie on private land (some just outside the watersheds boundary), they represent historic developments that have directly or indirectly affected the adjacent study area.

To date, several project-driven cultural resource inventories and a few large-scale reconnaissance examinations have been conducted on lands within the analysis area. The latter were directed toward various

aspects of study of the Lewis and Clark National Historic Trail and the Lemhi Pass National Historic Landmark. These were inter-agency efforts coordinated by the Forest Service and BLM through the Forest's *Passport in Time* volunteer program. During archaeological inventory and documentation of cultural resources, the most common disturbances observed were incurred by livestock and natural erosion and deterioration. Impacts from 1950s - 1960s thorium prospecting in the higher reaches of the watersheds, existing two-track roads, and off-road vehicle disturbance are much less frequent, but have been noted.

Livestock impacts are manifest by localized site trampling or stream-bank cleaving, most often where animals group around salt blocks and livestock troughs, or where shade is afforded in confined settings on stream bottoms or spring benches. The extent of reported damage to sites by open rangeland grazing and trailing away from the above contexts falls far below that found in more vulnerable bottomlands settings. The study area has been the focus of intensified BLM range and riparian management efforts (in partnership with allotment permittees) in recent years. Exclosure and drift fences, reduced turn-out durations and numbers, and measures to disperse livestock over the higher slopes have yielded positive results in overall riparian and uplands health. These management strategies have in turn reduced localized impacts to the significant cultural properties recorded in the area.

American Indian Properties of Concern

Specific traditional uses of the study area have rarely been described in detail by the Shoshone-Bannock Tribes. It is clear, however, that certain landscapes within the watersheds analysis area are of great value in maintaining cultural continuity of the Tribes. The southern end of the area intersects the old Lemhi Indian Reservation, which was itself positioned directly across accustomed winter village sites and fishing encampments of ancient standing. The Lemhi Valley, especially the central portion of the valley drained on its east by the watersheds, is integral in the solidarity and living culture of the Tribes today -- particularly to the descendants of the Lemhi Shoshone (cf. Gowen 1998). Because these landscapes hold such great importance, the Shoshone-Bannock Tribes are diligent in respecting the privacy of tribal members and families who may seek these sacred places. Though trust between governments has improved in recent years, these tribal precautions can limit the capability of managing agencies to *proactively* identify and protect all significant cultural properties on federally administered lands in the study area. The Tribes therefore expect to be directly involved in the earliest phases of Forest or BLM planning efforts in order to ensure that their concerns are known and considered. Agencies should retain and appropriately manage confidential traditional knowledge shared by tribal representatives, using great care in the manner in which such information is presented and considered in documents and public interactions.

Ethnographic and anthropological literature provides several generally acknowledged settings that may potentially yield sacred values or qualities (e.g., Deaver 1986; Walker 1988). These would include *all* burial or cemetery areas, elevated topography that offers broad vistas and commanding views of surrounding landscapes, features or sites figuring prominently in oral legend or myth, rocky outcrops or cliffs (especially where secluded), places where pictographs may exist, hot springs or artesian spring outlets, and traditional fishing or hunting stations and areas where social gatherings were once common. Certain classes of archaeological features are also acknowledged as properties of cultural significance. The BLM is presently aware of two recorded properties that are reported by the Tribes as traditionally important within the overall analysis area. Four additional documented properties in the Lewis and Clark Trail SMRA are determined to be potentially sensitive, though their status is at present assumed rather than affirmed.

In a larger sense, the study area as a landscape retains historical and traditional value. The Agency Creek drainage in particular ranks high in this regard. It was considered *Ahome* by Chief Tendoy, the dynamic

leader of the Lemhi people through the difficult decades of the reservation era. Chief Tendoy's grave monument and managed cemetery area rest on a low rise just south of the mouth of Agency Creek. High, isolated knolls and ridges afford panoramic views of sacred geography encompassing the beloved Lemhi Valley. These watersheds may also include (or lie near) the birthplace and childhood homeland of Sacajawea, lending added importance to the landscape in the Tribes' own perspective of the Lewis and Clark celebration.

The Shoshone-Bannock Tribes are adamant that the ecological health and visual integrity of their homeland in the Lemhi Valley (which includes the watersheds study area) constitutes a major treaty rights concern. This is especially so with regard to those values directly related to the traditional cultural realm of the Tribes. Potential threats to their rights to visit places of traditional importance and to put into practice religious beliefs hinge on the need for (1) privacy and solitude; (2) the ability to access important properties, and (3) the preservation of ecosystem health and integrity in the face of increasing demographic growth and tourism (e.g., USDA-FS and USDI-BLM 1999; Gowan 1998; Matz 1997). The Agency Creek watershed is a priority on the Tribes' list of significant places. The drainage is partitioned by confusing and often poorly marked ownership boundaries, and is experiencing a steady incline in private residency, recreation, and a host of other uses. These same issues loom large in the assessment of the overall analysis area because of its central place in the forthcoming Lewis and Clark Bicentennial Celebration, which will culminate locally in August 2005. But in the longer term, multiple use demands will surely heighten as a consequence of state-wide demographic growth and emerging recognition of the region and its many values by the public.

Shoshone-Bannock Treaty Rights and Resource Uses

The Shoshone-Bannock Tribes reserve and exercise their off-reservation rights under the Fort Bridger Treaty of 1868 to hunt and fish, and the claimed right to gather on unoccupied lands in the Agency-Kenney Creek Watersheds study area. The Tribes expect that these "unoccupied" lands will be managed in such a manner as to sustain ecosystem health and diversity. It is also expected that appropriate tribal government representatives will be consulted and involved early in the processes of environmental analyses or planning on public lands.

Resources currently sought by tribal members in and near the study include steelhead and resident trout species; big game animals (especially deer and elk) and occasionally smaller mammals such as rabbits, marmots, and various game fowl; and a wide variety of plant resources. The latter include those important for food, a few of which are chokecherry, serviceberry, elderberry, gooseberry, currant, and huckleberry, along with root crops such as bitterroot, biscuit root, yampa, sego lily, wild onion, and yellowbells. Raw materials for utilitarian and craft items include various species of willow, red-osier dogwood, dogbane, nettles, syringa, and lodgepole pine. Tribal members also seek out species of plants indigenous to this region that are essential in religious practices or traditional medicinal treatments.

The pursuit and harvest of these treaty rights resources and many others not specifically identified, often by families or groups of families or friends, meets more than a basic need -- exercise of treaty rights reinforces cultural and tribal identity and tradition. After removal of the Indian people to Fort Hall from the Lemhi Reservation in 1907, opportunities to continue traditional subsistence and gathering activities were significantly reduced. Over the years, the exercise of these rights has continued to decline with the privatization of once verdant lowlands, access difficulties onto federal lands, the loss of the salmon runs and intensified competition for fowl and other game resources, and the introduction of non-native plants that overwhelm native species. Recreation and tourism upswings affect tribal members' privacy while visiting the area, and often heighten competition for many of the same treaty rights resources (USDA-FS and USDI-BLM 1999).

Presently, very little specific data are available on numbers of visits to the analysis area for treaty rights purposes by tribal members. Within the Hayden Creek watershed just across the Lemhi valley, "several families" are reported to visit the area at least five or six times per year for subsistence and traditional purposes (Gowan 1998: Sect. 3, pp. 40). It is not unreasonable to assume *at least* this rate of use, if not substantially greater, within the Agency-Kenney Creek watershed area. Many tribal members routinely drive the long road from Fort Hall to visit and respect the resting place of Tendoy at the Chief Tendoy Cemetery near the mouth of Agency Creek. Activities pursued at Agency Creek not only secure subsistence or material needs, but re-unite descendants of the Lemhi Shoshone with the cultural legacy they were forced to abandon in 1907.

In his ethnohistoric account of the Lemhi Shoshone, Walker (1994: 242) identified Kenney Creek as a "moderately" productive salmon fishery during the reservation era. All of the drainages of the analysis area were probably variably productive at different times in the yield of anadromous species so vital in the subsistence of Indian people in this region. Salmon harvests from the principle streams and tributaries persisted into relatively recent decades, until the runs failed completely in the early 1980s. The Tribes regard the "hunting" of salmon as a crucial treaty rights endeavor, and favor any planning or effort that may positively influence the prospects of the return of the species in harvestable numbers. The Shoshone-Bannock Tribes are working diligently in cooperation with federal agencies and other working groups throughout East-Central Idaho on habitat and salmon restoration programs with the ultimate goal of reviving and protecting this integral treaty rights resource.

The stance of the Shoshone-Bannock Tribes with regard to ecosystem management that supports treaty rights resources has been repeatedly stated and is quite clear. The Tribes support a restorative approach focused upon entire watersheds. Cumulative effects are particularly emphasized. Though "restoration" is a priority and goal among most western tribal governments -- including the Shoshone-Bannock Tribes -- definitions of the concept as it applies to resource management objectives often vary, and are not always compatible with the goals and wishes of tribal entities (USDA-FS and USDI-BLM 1997: 214). From an Indian tribal perspective, an important part of the equation for "restoring" acceptable ecological health would entail facilitating conditions that allow natural ecosystem resiliency itself to take hold and return to a balanced state. The Shoshone-Bannock Tribes advocate a management philosophy of minimal manipulation and intrusiveness when at all possible, except where impacts to a system have been so severe that the ecosystem's ability to rebound is exceeded (Matz 1997). The Tribes would recommend suspending certain public land uses if these uses are implicated in the "degradation" of an ecosystem or habitat, until such time as the system is stabilized and adequately protected from further impacts. The use of fire as a tool for changing habitat stand conditions is generally promoted. Projects designed to eradicate non-native plant and animal species are also encouraged, as are projects aiming to regain and protect riparian areas and wetlands (USDA-FS and USDI-BLM 1997; also Gowan 1998).

Commodity Uses

The BLM and Forest Service manage public lands in the analysis area for multiple use purposes, including commodity uses such as timber harvest, land use permits and authorizations, livestock grazing, minerals development, and permitted recreation activities. The concept of "multiple use" does not necessarily mean every land use will occur on every acre of federally managed lands; rather, it connotes that the aggregate of public lands will be managed for multiple uses. In some portions of the watershed analysis area, one or more commodity uses is restricted in order to address resource management concerns (such as habitat for listed

fish species) or emphasize different land uses for a particular area (for example, recreation uses along the Lewis and Clark National Historic Trail).

Forest Products

Wood products in the form of rough lumber, fuel wood, house logs, and posts and poles have been extracted from the area since the 1900s. Timber sales on Forest Service and BLM administered lands in the analysis area have harvested approximately 2,982 acres of timber lands since the 1960s (approximately 11 percent of the commercial timber base). Harvest methods included selection, shelterwood, and clear cutting. Post-sale treatments have included slash burning, thinning, and planting of sites that were clear-cut. Some areas have had pre-commercial thinning, but acreages are not available at this time.

Forested lands in the analysis area have the potential to provide wood products into the foreseeable future. Mining and logging have contributed to a fairly extensive road network, which will facilitate future extraction of forest products.

Lands

The Salmon-Challis National Forest plans to purchase from willing sellers the Copper Queen Mine (M.S. 993), consisting of the Blue Bird, Gold Flint and Copper Queen Lodes. The purchase of this 59.13 acre in-holding is being done in two phases, starting with the 19.55 acre Blue Bird Lode, which was purchased in July 2003, to be followed by the 19.50 acre Copper Queen Lode and the 20.08 acre Gold Flint Lode.

The intent of the Salmon-Challis National Forest in making this acquisition is to assure a scenic setting in keeping with the integrity of the Lewis and Clark National Historic Trail (L&C Trail) and Lemhi Pass National Historic Landmark (NHL). The property is located within ½ mile of the L&C Trail and National Historic Landmark Management Areas and within one mile of the crossroads of the L&C Trail and the Continental Divide National Scenic Trail. Interpretive opportunities of historic mining structures and activities could be developed for the public. Safety issues associated with mining structures could be addressed. The property can also be managed to preserve habitat for Forest Service Sensitive and Federal species of concern.

In January 2003, the Salmon Field Office - BLM acquired through purchase 930 acres of private land that adjoin public lands designated as the Lewis and Clark National Historic Trail Special Recreation Management Area (see Map 11). The private land owner also donated a road easement to the BLM for public access across his private land to the Pattee drainage. Acquisition of this land will allow the BLM to provide public access, expand recreational, educational, and interpretive opportunities, and protect the natural, cultural and traditional resources found within the National Historic Trail corridor. The BLM will also be able to protect key historic properties along the National Historic Trail and still retain the natural and visual integrity experienced by the Corps of Discovery nearly two centuries ago. The public will be allowed to easily access and appreciate these valuable resources.

Based on public demand, the Salmon Field Office processes and authorizes public use permits and rights-of-way. Uses may include road access, power lines, telephone lines, communication sites, etc. Existing uses in the analysis area presently include a major power line which supplies power from Montana, several road rights-of-way allowing access to private land, and several road easements granted to the BLM for public access across private land.

Livestock Grazing

Current Livestock Use: The analysis area includes all or part of seven grazing allotments (see Map 12):

Table 15: Livestock Grazing Administration in the Agency-Kenney Watersheds

Allotment Name	Allotment Number	Administration	Acres within Analysis Area
Sandy Creek	06226	BLM	3,605
Sandy Creek C & H	----	FS	1,179
Kenney Creek	06227	BLM	870
Rattlesnake	06228	BLM	1,374
Warm Springs/Pattee Creek	06229	BLM/FS	11,998 BLM/16,841 FS
Agency Creek	06231	BLM	13,819
Agency Creek C & H	----	FS	8,906

Livestock on these allotments are grazed by several different permit holders. The season of use on public lands allows the livestock operators to use private land holdings along the Lemhi River and adjacent tributaries to produce hay and grain for winter livestock feeding and supplementation. These allotments are managed under deferred rotation grazing scenarios, with the exception of the Agency Creek Allotment, which allows for rest rotation. The allotments are separated by fencing or natural barriers.

The permitted number of livestock, season of use, and forage allocations for these allotments are as follows

[**Note:** Permitted livestock numbers and season of use may vary on these allotments due to the livestock market and/or annual forage conditions.]:

Table 16: Livestock Grazing in the Agency-Kenney Creek Watersheds

Allotment	Livestock Allocation		Season of Use	Stocking Rate
Sandy Creek	175 cattle	543 AUMs	May 1 to Aug 31	6.6 Acres/AUM
Sandy Creek C&H	15 cattle	30 AUMs	June 1 to July 31	39.3 Acres./AUM
Kenney Creek	50 cattle	143 AUMs	May 11 to Aug 5	6.1 Acres/AUM
Rattlesnake	74 cattle	266 AUMs	May 11 to Sept 9	6.9 Acres/AUM
Warm Springs/Pattee Creek	500 cattle	2,696 AUMs (BLM) 707 AUMs (FS)	May 16 to Oct 20 (BLM) July 16 to Sept 15 (FS)	4.5 Acres/AUM (BLM) 23.8 Acres/AUM (FS)
Agency Creek	300 cattle	1,509 AUMs	May 1 to Sept 30	9.2 Acres/AUM
Agency Creek C&H	120 cattle	485 AUMs	June 15 to Oct 15	18.4 Acres/AUM

Grazing management takes into account other resource uses and activities that are occurring in the watersheds (such as fisheries management and recreation uses) by emphasizing the maintenance or improvement of upland and riparian condition. Grazing management involves the timing and intensity of grazing, as well as placement of fences, water tanks, and mineral licks to distribute livestock throughout the pastures. Range improvements facilitate uniform forage consumption across the landscape to help maintain or improve riparian and watershed health and provide for wildlife needs. Much consideration is given to the location, quality of material, and visual impact of such structures in order to maintain scenic integrity and yet facilitate grazing management.

Kenney Creek – Sandy Creek - Rattlesnake Watersheds

The Kenney Creek grazing unit was adjudicated in 1959 as part of the Agency Creek adjudication. In that year, the Advisory Board of the Salmon District recommended a 40% reduction on the unit, which set carrying capacity at 145 AUMs. Since 1979, the average use on the allotment has been 128 AUMs.

The 2003 Lemhi Subbasin Biological Assessment determined that livestock grazing on the Kenney Creek, Sandy Creek and Rattlesnake allotments was “no affect” on any listed or proposed-for-listing fish species. Kenney Creek is occupied bull trout habitat and influential habitat for chinook salmon and steelhead trout. Livestock from the Kenney Creek allotment have no access to the stream due to fencing (a 71-acre enclosure) installed in 1994. This enclosure also protects an old, decadent stand of cottonwoods and is intended to enhance age structure and riparian area vegetation recovery.

The Sandy Creek grazing unit was adjudicated in 1959. In January of 1960, the Advisory Board of Salmon District #4 recommended a 40% reduction on the unit, which set capacity at 500 AUMs among three cattle operators. Because the Sandy Creek allotment is unfenced, it is managed in conjunction with the adjoining Sandy Creek C&H allotment on Forest Service lands. Since 1979 the average use on the Sandy Creek allotment has been 518 AUMs. When the allotment was assessed in 1993, it was determined that existing livestock grazing management practices and levels of grazing use are (a) promoting achievement or significant progress toward the Idaho Standards of Rangeland Health and (b) conforming with the Guidelines for Livestock Grazing Management (USDI-BLM, 1997).

At present, livestock from the Sandy Creek allotment have no access to the Kenney Creek stream gorge due to fencing installed in 1997.

The Sandy Creek C & H Allotment is a small Forest Service allotment that has 240 acres of suitable range, lying within Sections 11 and 14 of T. 20 N., R. 24 E., most of which is within the Kenney Creek watershed. Authorized livestock use is currently for 15 cows from 6/1 to 7/30. The allotment is managed separately by the Forest Service.

The Rattlesnake allotment was adjudicated in 1959 as part of the Agency Creek grazing unit adjudication. In that year, the Advisory Board recommended a 40% reduction on the unit, setting grazing capacity at 272 AUMs. The allotment has been managed under a three pasture, deferred rotation grazing system since 1969. Since 1979, the average forage consumption on the allotment has been 169 AUMs.

In 1997, Rattlesnake Draw was fenced to block livestock access to Kenney Creek. In 1998, the Rattlesnake allotment was assessed and evaluated for upland health standards. In the summer of 2000, it was determined that the allotment was achieving all applicable standards of the Idaho Standards for Rangeland Health and conforming with the Guidelines for Livestock Management (USDI-BLM, 1997).

Pattee Creek Watershed

Pattee Creek is critical habitat for threatened chinook salmon, steelhead trout, and bull trout, as well as two sensitive plant species: Salmon twin bladderpod (*Physaria didymocarpa*) and Lemhi milkvetch (*Astragalus aquilonius*).

The Pattee Creek allotment was adjudicated in 1959 as part of the Agency Creek grazing unit adjudication. The capacities set forth by the Grazing Advisory Board were protested by numerous operators. The district manager at the time decided to conduct another full range inventory in the spring of 1961. In 1962, the grazing unit was broken up into grazing allotments and carrying capacities were set. For the Warm Springs allotment, capacity was set at 1,528 AUMs; for the Pattee Creek allotment, capacity was set at 1,154 AUMs. Since 1979, the average forage consumption on the Warm Springs and Pattee Creek allotments (combined) has been about 2,200 AUMs.

Beginning in 1992, the Warm Springs and Pattee Creek allotments on the BLM, and the Pattee Creek allotment on the USFS, were formally combined, divided into seven pastures, and managed under a Coordinated Resource Management Plan (CRMP). As a result of this management change, a voluntary reduction of 100 cattle (521 AUMs) was agreed upon. The Forest Service portion of the allotment was rested for three years (1994-1996), and in 1997, was again used as part of pasture rotation scheme with the BLM portion. In the spring of 1992 and in 1994, approximately two miles of Pattee Creek on BLM land was fenced and a water gap eliminated to exclude livestock and vehicle access, and enhance riparian and fisheries habitat recovery. As a result of this management, cottonwood and willow establishment has been on a steady increase. Bluegrasses, cheatgrass, and weeds are being out-competed and replaced by *Carex/Juncus* communities.

Agency Creek Watershed

The Agency Creek Unit was adjudicated in 1959. In 1960, the Advisory Board of the Salmon District recommended a 40% reduction on the unit, which set the capacity at 7,790 AUMs. The recommended capacity was protested by numerous operators. The district manager at that time decided to conduct another full range inventory in the spring of 1961. In 1962, a rangeline agreement determined the boundaries of the Agency Creek Allotment and the range survey established a capacity at 5,936 AUMs. Reductions ensued over the next three years to bring stocking rates in line with capacity.

Historical grazing activities resulted in generally unsatisfactory riparian conditions on public lands, due to a lack of any management scheme combined with a history of season-long sheep use. Riparian areas along the upper private lands were often in worse shape. These conditions contributed an obvious sediment load into all streams within the watershed, which in turn affect water quality in Agency Creek.

Beginning in the fall of 1993, the Squaw Creek and Gould Basin allotments on the BLM were combined, divided into pastures, and managed under an informal management plan. The rotational deferment of grazing use has helped to improve upland vegetative health. However, there are still areas of weed (thistle and knapweed) and cheatgrass infestations in areas of previous historical, season-long livestock use. Biological control agents were released in 1981 and 1982 to help control thistle, and active herbicide treatment has been applied along roads to control knapweed. Riparian condition along the mainstem Agency Creek and most tributaries is generally improving, but some areas still show bank instability, erosion, and undesirable species. Since 1994, changes in grazing management appear to have reversed downward riparian trend and have resulted in riparian and upland improvement throughout most of the watershed. In 1998, a multi-ownership riparian pasture was created from Copper Queen to White Creek. This pasture receives spring use or rest and is showing improvement in condition. Riparian recovery on National Forest lands is equally high due to a lack of permitted livestock grazing since 1994. Since 1999, livestock have been excluded from Agency Creek and the lower portions of Horseshoe Bend Creek. Livestock are also excluded from the Lemhi Pass National Historic Landmark and portions of the Lewis and Clark National Historic Trail in the Agency Creek area.

The Agency Creek C & H Allotment is comprised of two pastures, a North Unit and a South Unit, that contain approximately 2,000 acres of suitable range. The South Unit has been further divided by the addition of an enclosure fence within the Lemhi Pass National Historic Landmark, which excludes livestock use in the headwaters of Agency Creek. Authorized livestock use is currently for 120 cattle from 6/15 to 10/15. The allotment has been jointly managed with adjoining BLM pastures since 1998. The two Forest pastures have been rotated for mid- to late-summer grazing by up to 300 cattle for approximately 45 days. Use is not to exceed 480 head months total.

Minerals

Introduction: The mineral potential of the watershed can be identified based on past exploration and mining activities. Early explorers and prospectors searched for and mined several base and precious metals. Later mineral activities in the mid-1900s added thorium and uranium to the list of potentially exploitable commodities. The present list of mineral materials with potential for exploration and development includes copper, gold, silver, lead, zinc, thorium, uranium, bentonite, lignite (coal), sand and gravel, “shale” (rip-rap), and possibly building and decorative stone. In the future, gold and thorium will likely be the two most sought after elements in the Agency-Kenney watershed, based on projected economics as well as known occurrences of these commodities in the area.

Past exploration and exploitation of minerals in this area has left its mark on the landscape. Numerous abandoned mines, including underground workings (adits and shafts), and mine structures (cabins, mills, headframes, etc.) occur throughout the area. More recent thorium exploration activities left miles of exploration roads and trenches, primarily in the eastern and north-central parts of the watershed.

Historic Development: Considerable thorium exploration occurred in the watershed between 1950 and 1980, especially in the upper Agency and Pattee creek drainages. This exploration resulted in the digging of many miles of trenches, roads, and pits. Past mineral exploration and mining (production) also occurred in the watershed for base and precious metals, with some recorded production of copper, lead, zinc, gold and silver. Most of this base and precious metal production came from the Copper Queen Mine located approximately two miles west of Lemhi Pass. However, it should be noted that substantial mineral production also took place in other portions of the watershed analysis area. Essentially all of the metallic mineralization is associated with the major faulting in the region (see Geology, page 10). These fault areas would logically be the focus of any future minerals exploration.

Current Mineral Uses and Mineral Potentials: Potential for locatable metals that were previously mined (copper, lead, zinc, gold, and silver) still exists in the analysis area and could be of future public interest. There is a known (drilled) gold deposit of considerable size in the Kenney Creek drainage that is only awaiting favorable gold prices to spur further investment and exploration interest. Prospective gold exploration ground for deposits similar to Kenney Creek occurs over large areas in the watershed, and could be the target of future prospectors, miners, and promoters. Very large deposits of thorium (possibly one of the larger known lode deposits) are present in the watershed. Thorium is a likely replacement for uranium as a future energy source for two reasons: (a) a given unit of thorium produces approximately twice the amount of energy as the same size unit of uranium; and (b) thorium reactor by-products are less of an environmental waste disposal problem than uranium reactor by-products. A revival in thorium exploration and development is very likely to occur in the watershed.

Gold and thorium are the two locatable minerals that are most likely to be a future management concern in the watershed. A part of the Lewis and Clark National Historic Trail cuts through prime exploration ground for both of these elements. Some portions of the Trail corridor that pass through federally managed lands have been withdrawn from locatable mineral entry or are recommended for withdrawal (see Map 13). The other mineral commodities listed above are less abundant and have much lower potential for future development. Future minerals exploration and development have the potential to impact other resources and land uses within the watersheds (such as water and air quality, wildlife and fisheries habitat, visual, cultural, and historic resources, and recreation and tourism), and would be managed according to current law, regulation, policy, and management direction for the watersheds (see page 79).

Three rock pits in the Agency Creek area have produced small quantities of so called “shale” (actually scree deposits of broken rock). These deposits have been used as riprap and roadbed material. Two of the pits are still active -- one is a BLM community pit and one is located on private ground. Saleable mineral materials (such as sand and gravel or decorative rock) are not of sufficient quality or quantity to be considered important deposits in the watersheds. The unsorted gravels and sands of the Neogene sediments in the western parts of the analysis area have too much clay to represent quality deposits. This holds for the other saleable commodities listed above.

Abandoned Mine Concerns (Public Safety): The numerous abandoned mine features (including thorium exploration trenches) in the analysis area represent a public safety hazard. Although there are relatively few open mine features (such as adits and shafts) compared with other areas in Lemhi County, the few that exist pose a dangerous attraction to the unaware public. These features, including unstable mine structures, have been located and investigated as part of the BLM’s Abandoned Mine Lands program. The more obvious and dangerous mine features should be scheduled as priority mitigation projects before the Lewis and Clark Bicentennial commences and visitation increases substantially.

Thorium trenches present another public safety hazard in this watershed. Radiation from exposed thorium

mineralization represents a health hazard if ingested or inhaled. Most thorium radiation is alpha type, which is generally harmless as it cannot penetrate normal skin and, due to its low energy levels, can travel only short distances measured in a few feet (depending on the strength of the source). However, alpha-emitting dust particles, if ingested or inhaled in sufficient quantities, can, over time, damage delicate body and organ tissue, possibly resulting in cancer. This is essentially a dust hazard issue and should be kept in mind when planning projects and public use in areas of known thorium deposits or past exploration.

The Copper Queen mine site on Forest Service land has been identified for abandoned mine lands actions, including adit closures, site cleanup, and a preliminary site interpretive plan.

Recreation Resources

Recreation-related Designations - There is much local and national interest in how the watershed analysis area is managed. The Kenney-Agency watersheds contain portions of three congressionally designated areas: the Lemhi Pass National Historic Landmark (NHL), the Lewis and Clark National Historic Trail (NHT), and the Continental Divide National Scenic Trail (CDNST) (see Map 11). The thirty-nine mile Lewis and Clark National Backcountry Byway/Adventure Road (a scenic, interpretive, pleasure driving route) loops through the area.

Lemhi Pass National Historic Landmark: Probably the most well known portion of the analysis area is Lemhi Pass. The Pass has been a major transportation route in and out of the Lemhi Valley for as long as humans have inhabited the area. The Pass holds special historical significance as the point where the Lewis and Clark Expedition crossed the Continental Divide, left the lands of the Louisiana Purchase, and put to rest the notion of a northwest passage to the west coast by a navigable river. The Beaverhead-Deerlodge and the Salmon-Challis National Forests manage the National Historic Landmark, which draws visitors from around the world. The increasing popularity of the Lewis and Clark Expedition and the Bicentennial Commemoration (2003-2006) are resulting in exponential increases in visitation. In the summers of 2001 and 2002 the area received approximately 6,000 visitors – five times the estimated visitation of a decade ago. Picnicking, hiking, and photographing the vistas and wild flowers are favorite pursuits of visitors. An Environmental Impact Statement (EIS) was completed in 2002 for management of the NHL. This EIS analyzed a range of alternatives for management and development of visitor facilities. Changes to visitor facilities have been approved to enhance accessibility, interpretation, and the natural setting of the site.

Lewis and Clark National Historic Trail: Approximately 13 miles of the Lewis and Clark NHT (Trail) cross the analysis area from Lemhi Pass generally west-northwest to the valley floor near the intersection of the county road and the Warm Springs Wood Road. The route crosses some fairly rugged terrain, and relatively few people venture off the main roads to follow the signed Trail route. The modern, signed Trail route generally follows vehicle ways which were likely created when the electric transmission lines were constructed. These transmission lines bring electrical power from Montana and are the only lines serving the Salmon area. The Trail has a significant amount of spotted knapweed along it. There are some areas of erosion where the Trail goes through spring areas and drainage of the native soils and unimproved travel way are poor.

The Agency-Kenney watershed area also includes a large portion (23,500 acres) of the BLM-designated Lewis and Clark National Historic Trail Special Recreation Management Area (SRMA), recently expanded from 9,080 acres to approximately 30,014 acres (USDI-BLM, 2001). Management of the SRMA focuses on providing for the education and enjoyment of visitors to the area, while simultaneously retaining natural

aspects of the historic trail route and protecting the integrity of intact segments of trail tread and associated cultural sites. Recent management changes have been initiated to restore and protect the scenic integrity and natural setting of the historic Trail area. Off-highway vehicle use on BLM managed lands in the analysis area (including a portion of the Lewis and Clark NHT SRMA) have been designated “limited” to designated routes. Noxious weed treatments and modifications to range improvement projects located along the Trail have recently been implemented. Most of the spring developments along the Trail have been improved or replaced in the past couple of years; some have been relocated to a less conspicuous site in order to enhance the historical sense of place of the area. An interpretive trail and overlook site on the Alkali Flat Road have been planned to enhance Trail visitors’ experiences and to highlight the significant event when the expedition first unfurled the United States flag west of the Continental Divide.

Continental Divide National Scenic Trail: Approximately twenty-four miles of the Continental Divide National Scenic Trail (CDNST or Trail) cross the analysis area near the Idaho-Montana state boundary along the eastern edge of the watershed analysis area. The CDNST is primarily located in forested areas north of Lemhi Pass. Transportation routes cross and follow the Trail in some of this area, especially in the upper portions of the Pattee and Kenney Creek drainages. Firewood gatherers and hunters have pioneered most of these routes. Management direction for the CDNST calls for management of the Trail as non-motorized whenever possible.

The BLM has designated a Special Recreation Management Area (SRMA) of approximately 4,000 acres along the crest and state line to be managed for scenic qualities. Lemhi Pass serves as a take-off and re-supply point for hikers, who primarily use the Trail during the summer. The Trail is signed and marked in the forested areas with tree blazes. Rock cairns and wooden posts are used in areas where there are no trees. The Trail primarily follows a designated motorized travel route south of Lemhi Pass. From the pass to the south, this route consists of a constructed road and an old two-track vehicle way that were developed for mining exploration and later for timber harvest. There is support from constituent groups to relocate a non-motorized trail away from the designated vehicle route. The Lemhi Resource Management Plan (USDI-BLM 1987) recommends that a Recreation Area Management Plan be written to define management of the Trail area. This plan has yet to be written, but both internal and external scoping has been initiated.

Lewis and Clark National Backcountry Byway/Adventure Road: Driving the Lewis and Clark Backcountry Byway/Adventure Road has become a favorite activity in the area. The 39-mile loop utilizes the Warm Springs Wood Road and the Agency Creek Road to take drivers from Tendoy, Idaho, into the ascending foothills, up to the Continental Divide and Lemhi Pass, and back down the Red Rock Stage route to the floor of the Lemhi Valley. The steep, winding Warm Springs Wood Road is planned to become the primary route to Lemhi Pass. It is scheduled to receive major upgrades in 2003 in order to make access to Lemhi Pass easier and safer for motorists.

Developed Recreation Facilities – The analysis area contains two developed recreation areas administered by the BLM, Salmon Field Office (see Map 11). There are no developed recreation areas on the forest, but some minor improvements are planned for the NHL. Public lands on the Alkali Flat Road in the vicinity of the Lewis and Clark NHT are being considered for development as an interpretive overlook and trail. Recently acquired lands in Ghaul Basin are also being evaluated for potential development as a day use and overnight use recreation site.

Agency Creek Recreation Site: The Agency Creek Recreation Site is a forty-acre campground that straddles Agency Creek and a moist meadow; however, only about three acres are developed. The

campground, which is used primarily as a picnic area most of the year, has a single vault toilet, tables, and fire pits for approximately six campsites. The site is popular with local residents as a picnicking and camping area. Approximately 25 to 30 people at a time may camp at the site during the hunting season. During the fall, much of the recreation site turns to mud from vehicles being driven on wet soils. When the campground is full during certain periods of the fall, camping use spreads to undeveloped areas along the creek. With the recent acquisition of lands within the Agency Creek drainage, there is the potential to develop additional managed camping in the area. There have been discussions regarding future management of the site and whether to upgrade, modify, or even eliminate the site as a developed recreation area.

Sharkey Hot Springs: Sharkey Hot Springs was recently developed into a public use facility with regularly maintained soaking pools, restrooms, and picnic and parking areas. The site receives steady use estimated at approximately 500 visits per month.

First Flag Unfurling Interpretive Overlook: This is a planned development near the Lewis and Clark NHT. A parking area along the Alkali Flat portion of the Lewis and Clark Backcountry Byway/Adventure Road will serve as the trailhead for a one-eighth-mile accessible trail, which will wind its way to a knob that offers spectacular views of the Lemhi Valley and the surrounding mountain ranges. The overlook area affords an excellent opportunity to recount the events that transpired as the Lewis and Clark Expedition made initial contact with the Lemhi Shoshone people and unfurled the flag of the United States west of the Louisiana Purchase for the first time. Interpretive panels are being developed for display at the overlook.

Recreation Settings - The analysis area contains “rural,” “roaded natural,” and “semi-primitive motorized” recreation settings, with small “semi-primitive non-motorized” areas. Most of the area is “roaded natural,” with the “semi-primitive” areas in the higher elevations and “rural” settings near the valley floor. (See Glossary: *Recreation Opportunity Spectrum*.)

Recreational Pursuits - Hunting is one of the primary recreational pursuits in the analysis area. The Idaho Department of Fish and Game (IDFG) manages the area for trophy elk hunting, and Idaho residents and non-residents also favor the area for hunting other big game (deer, elk, pronghorn, black bear, and mountain lion). Hunters also pursue upland game birds such as chukar and sage grouse. Through-hikers utilize the Continental Divide NST. Horn hunters scour the area in the spring in an attempt to find antlers shed by numerous big game which utilize the area. The area can be a gorgeous wildflower garden in the summer, attracting pleasure riders and photographers. Snowmobilers use the groomed trails in the area for winter play and to access the Montana trail network just over the mountains. Anglers try their luck in Agency and Pattee creeks where there are pools and beaver ponds that may hold catchable-size trout.

Some commercial outfitters are permitted for activities related to the Lewis and Clark NHT. Four outfitters are permitted for van tours associated with the Backcountry Byway/Adventure Road. Two outfitters are permitted for horseback riding, backpacking, and mountain biking. Most of these activities are new authorizations (in 2003), and actual use levels have yet to be reported. There are no commercial outfitters for big game hunting in this analysis area.

Transportation and Access

Roads are important from both an ecological and socioeconomic perspective (USDI-BLM and USDA-FS, 1997). During the Interior Columbia Basin Ecosystem Management Project (ICBEMP), individuals reviewing the issues found a great deal of ambiguity about the amount of roads required to satisfy public needs. Like many other issues, this one is very complex and includes the ecological consequences of roads and transportation networks, and the effects (both good and bad) on different kinds of public recreation. Roads are correlated with many changes in vegetation, land use, and hazards, yet a consistent inventory of roads across all ownerships within the Basin does not exist. Many people locally and within the Columbia River Basin as a whole oppose extensive road closures, but at the same time support improving habitats and reducing erosion. The result has been management strategies that include reducing road densities and redesigning and improving maintenance of road networks.

Off-highway vehicles (four-wheel-drive trucks and sport utility vehicles, all-terrain vehicles, motorcycles, and snowmobiles) are favored modes of transportation in the watershed analysis area. Motorized users are primarily engaged in the pursuit of big game, but these visitors also pleasure ride, hunt for shed antlers of elk and deer, and trap fur-bearing mammals. A recent (2001) amendment to the BLM - Salmon Field Office's land use plan re-designated OHV use on BLM-management lands within the analysis area as "limited," restricting use to designated or existing roads, vehicle ways, and trails, with additional seasonal limitations within critical big game winter range (USDI-BLM 2001). Existing OHV management for the analysis area is shown on Map 14. In general, motorized vehicle use on BLM-administered lands is prescribed to be managed in such a way as to not degrade the historic landscape within the Lewis and Clark Trail SRMA, while still allowing some motorized use for recreation purposes and commodity uses (e.g., livestock grazing, mineral development, timber harvest). OHV use on FS lands in the analysis area is also restricted (see Map 14); however, many new vehicle ways have been pioneered by unauthorized cross-country travel off of designated routes, especially along the Continental Divide. Access to public lands in the analysis area is good, due to several major access roads and large expanses of contiguous public lands.

Numerous vehicle ways have been created during the past 50 years for mineral exploration, livestock management, hunting, and firewood cutting. Many of these vehicle ways are located in areas that are inappropriate for casual vehicle use due to steepness, highly erodible soils, visual concerns (scarring of hillsides), proximity to springs and seeps, and lack of sustainability (unconstructed roads are difficult to maintain). Noxious weeds are infesting the analysis area, and vehicle routes appear to be a prominent vector of spread (weeds tend to grow in or adjacent to vehicle routes, and vehicle undercarriages spread seeds).

Overview of Roads and Road Conditions

Of the 301 miles roads, vehicle ways, and trails within the analysis area, very few are considered "engineered roads." The remaining "roads" have typically been created by casual use, without regard for resource impacts. About twenty-five miles (8%) of these routes are within 300 feet of perennial streams and have the potential to impact water quality and riparian vegetation, and thus aquatic species and habitat (see Map 15).

Of all the roads and ways in the analysis area, only a few have a high potential to impact water quality. These include the Warm Springs Wood Road, the Agency Creek Road, the Cow Creek Road, the Copper Queen Road, the Pattee Creek Road, and those portions of the Yearian Creek Road and Ramsey Mountain Road that lie within the Cow Creek drainage. None of the other roads in the analysis area will be discussed here.

The Warm Springs Wood Road parallels the uppermost reaches of Pattee Creek, and lies within the 300-foot Riparian Habitat Conservation Area (RHCA) for 2.0 miles, with 2.25 miles of the road having the potential to impact the stream due to drainage and distance from the stream. However, for most of its distance in this area, the road does not encroach upon the floodplain because it is upslope from the stream. Any sediment produced by the road is generally prevented from reaching the stream because of the well-vegetated nature of the floodplain. The road crosses an upper ephemeral tributary to Pattee Creek via a small, undersized culvert. Maintenance activities and the inadequate culvert have increased sediment input to Pattee Creek at this point (USDI-BLM, 2001a). A road reconstruction project proposed for 2003 will reduce sedimentation off the road and replace all undersized culverts.

The Agency Creek Road parallels Agency Creek for its entire length. The portions of the road with the greatest potential for impacts are upstream of the Cow Creek Road intersection. The proximity of the road to the stream and the erosive nature of soils in this area can lead to direct sedimentation into Agency Creek. In several locations fill slopes fall directly into the floodplain and occasionally the stream itself. Lemhi County, in partnership with the BLM, greatly improved drainage and surfacing in the worst portions of this road in 1999. Regular maintenance, including ensuring that drainage structures are functional, will need to continue and possibly increase as traffic increases with the upcoming Lewis and Clark Bicentennial Commemoration.

The Cow Creek Road parallels Cow Creek for its entire length, crossing the stream five times. Fill slopes fall into the floodplain in many locations. The road was originally created by use to access an early homestead, and has been improved several times over the years to provide access to timber sale areas. The road is a major travel route during hunting season. The entire road crosses unstable clay soils, and, due to the topography of the area, has very limited and inadequate drainage over much of its length. At one site, the road is sloughing off into the stream as the fill slope fails. The BLM is evaluating moving or modifying the road to address this issue. In recent years, the BLM replaced four undersized culverts, improved drainage, undertook more regular maintenance, and imported surfacing for several sections. Riparian vegetation improvements as a result of livestock grazing restrictions have provided more of a buffer for Cow Creek, but this road is still the primary sediment source during runoff events. Regular maintenance and efforts to stabilize the road surface need to be continued.

The Yearian Creek and Ramsey Mountain roads branch off the Cow Creek Road and cross the same erosive soils for approximately one mile each, with many of the same problems. Due to slope in the upper portion of this drainage, these roads funnel runoff down to the intersection and then into Cow Creek. The BLM has attempted to funnel runoff into a flat adjacent to the road, but this requires regular maintenance. Surfacing of the upper portion of the Yearian Creek Road near the Yearian/Cow ridge will reduce sedimentation in that area and provide for safer travel. Efforts to reduce sedimentation off these roads need to continue.

That portion of the Copper Queen Road on BLM managed lands is located directly in the floodplain. The stream was bermed when the mine was in operation to keep it off the road. Little to no riparian vegetation exists to buffer sediment in this area, but soils are more gravelly here compared to other roads, so direct sedimentation is naturally less. Very little can be done to improve this road or restore the stream except by removing the road prism entirely.

The Pattee Creek Road has a history of failure, which, in an extreme event, forced Pattee Creek out of its historic channel. In most areas however, the road is located outside the floodplain and has little effect on Pattee Creek. In addition to one culverted crossing, there are two stable wet crossings that show little evidence of accelerated erosion or stream widening. The section of road most prone to failure was relocated and the steeper portions of the adjacent road were resurfaced to reduce the potential for future failure.

The Effects of Roads

[Note: Also see “Effects of Roads on Aquatic Habitat” (pages 45-46).]

Failure to maintain road surfaces may result in undesirable conditions. User safety is compromised, ruts develop that tend to channel water for long distances, and drainage structures or profiles wear out and become ineffective. In the worst-case scenario, these roads may completely wash out, resulting in large amounts of sediment and loss of investment in the road. When and if maintenance is performed on these roads, the maintenance activity is usually much more extensive, and has potential to generate more sediment and affect larger areas for a longer period of time than routine maintenance normally would (USDI-BLM, 2002).

Dust from unstable road surfaces can result in several undesirable effects or events. User safety and comfort are compromised when large dust plumes reduce sight distance or vehicles become difficult to control on rough surfaces. Fugitive dust is deposited in streams or on streamside vegetation to be washed into the waterway during the next storm. Accelerated surface wear and erosion can lead to increased sediment and the need to develop new pits to replace this material. Substantial increases in maintenance costs are usually associated with failure to stabilize these surfaces. Maintenance requirements may include more frequent blading, drainage cleaning, and surfacing of damaged sections of roadway (BLM, 2002). Dust suppressants help maintain the surface of unpaved roads by reducing the loss of surface fines (small particles which act to bind the larger rock particles together) (Bolander and Yamada, 1999). When surfacing material is applied without dust abatement, it is three times less erosive than native surface. When combined with a dust palliative such as magnesium chloride, the road surface becomes 88% less erosive than roads with only native surfacing (Bonn, 2001).

Until recent approval of new off-highway vehicle use designations (USDI-BLM, 2001), BLM-administered lands in the watershed analysis area were open to cross-country motorized use, with the exception of wildlife winter ranges that were closed seasonally. OHV use on BLM lands in the Agency-Kenney watersheds is now limited to existing or designated routes (no cross-country travel allowed). Motorized use of National Forest lands in the analysis area has been primarily restricted to designated routes; however, many travel routes have been pioneered off of the designated routes (see Map 14).

OHV travel in the analysis area has slightly degraded baseline aquatic habitat conditions; these impacts are likely to become more severe unless management direction is changed on Forest Service lands and enforced on all public lands. Cross country motorized travel has the potential to adversely impact overall ecosystem health by increasing erosion and the spread of noxious weeds. Improved OHV technology and increased OHV use have resulted in many new “user-created” travel routes, increasing the likelihood of adverse impacts that can indirectly affect ESA-listed anadromous salmonids and their critical habitats. Qualitative assessments indicate that, although some localized habitat damage has occurred, the effects of OHV travel on listed fish species and their critical habitats are probably minimal; however, quantitative assessments have not been conducted.

Due to rugged terrain that precludes OHV use in most riparian and aquatic habitats on BLM lands in the watershed analysis area, most impacts of OHV use on anadromous salmonids and their habitat are associated with increased spread of noxious weeds and ground disturbance in upland areas. In recent years, increased OHV use and increases in OHV technology have adversely impacted overall ecosystem health to the point that changes OHV management were required. The approved OHV designations are expected to reduce adverse impacts to ecosystem health and simplify the identification and monitoring of specific areas (e.g., stream

crossings and eroding trails that route water and soil into streams) where impacts to anadromous salmonid habitat may occur (NMFS, 2001). The new designations should also help the BLM attain Riparian Management Objectives (RMOs) for salmonid habitat on Federal lands (NMFS, 2001).

Although OHV impacts will be less severe under the amended Lemhi Resource Management Plan (RMP) than under the current RMP, some designated and existing OHV routes may be in unfavorable locations and may continue to have adverse impacts to ESA listed species and critical habitat. These impacts are not expected to be severe at current use levels; however, as OHVs become more popular, impacts to listed species and their critical habitat are likely to increase. Incorporating information from road and way inventories into a current travel management plan should minimize these impacts. Adverse effects should be further minimized through (a) consultation on all projects that utilize vehicles to access the proposed project area or implement the project, and (b) continued application of requirements in the amended RMP, PACFISH, and NMFS 1995 and 1998 Biological Opinions.

Chapter 4 - Management Direction and Past Recommendations for the Watershed Analysis Area

The Salmon-Challis National Forest and Salmon Field Office, BLM have implemented management direction that influences the land uses and resource management occurring on federally managed lands within the Agency-Kenney watersheds (approximately 60,000 acres, or 90 percent of all land ownership in the analysis area). Management direction for National Forest lands in the analysis area is primarily stated in the Land and Resource Management Plan (LRMP) for the Salmon National Forest (USDA-FS 1988, as amended) and an LRMP map that depicts the designated Management Areas (see Map 16). The Lemhi Resource Management Plan (RMP) (USDI-BLM 1987), as amended, describes the majority of management guidance for public lands managed by the Salmon Field Office – BLM (formerly the Lemhi Resource Area). Nationally, regionally, and locally adopted management and policies also affect public lands management within the watersheds. The following summary highlights the land use allocations, resource management objectives, and other management actions that presently guide public lands management of the analysis area.

Air Quality – All Forest Service and BLM lands within the analysis area are managed as Class II areas (which can have moderate air quality deterioration associated with moderate, well-controlled industrial and population growth). Management activities such as use of prescribed fire must consider air quality concerns and conform to relevant state and Federal direction for air quality management.

Cultural Resources

Salmon Field Office, BLM:

1. All cultural sites eligible for nomination to or listed on the National Register will be protected from deterioration and retained in federal ownership (USDI – BLM, 1987, p. 47).
2. Protect and preserve documented prehistoric and historic sites (USDI – BLM, 1987, p. 27).
3. Manage the Chief Tendoy Cemetery as a property with special historic and sacred significance to the descendents of the past residents of the former Lemhi Indian Reservation and to the members of the Shoshone-Bannock Tribes of the Fort Hall Reservation. (BLM Memorandum of Understanding ID-268) More specifically, continue to manage the Cemetery to achieve the objectives and management actions stated in the Chief Tendoy Cemetery Cultural Resource Management Plan (USDI-BLM 1986) (primary on-going actions include monitoring, site inventory, site cleanup, and consultation with the Tribes).
4. Management of the Lewis and Clark National Historic Trail SRMA shall provide for the education and enjoyment of visitors to the SRMA, while simultaneously retaining natural aspects of the historic trail route and protecting the integrity of intact segments of trail tread and associated cultural sites (USDI – BLM, 2001, p. 7).

Salmon-Challis National Forest:

1. Designate a minimum ½ mile wide corridor (1/4 mile either side of the Lewis and Clark NHT) as Management Area 6.1. Trail Segment 6.1a includes the trail segments adjoining the Lemhi Pass Area. (USDA Forest Service, 2000) Cultural resource-related management includes the following:

Goals:

- Preserve and protect cultural resources, including prehistoric and historic sites.
- Provide recreation opportunity oriented to traveling, understanding and appreciating the L&C Trail while maintaining the Trail's natural characteristics and historic value.
- Coordinate L&C Trail management activities with [...various agencies, organizations, and other entities listed...] to ensure protection and enhancement of the heritage values and recreation resource values of the Trail.

Objectives:

- Provide an opportunity for the public to travel segments of the Lewis and Clark NHT and provide a variety of recreational opportunities along the Trail.
- Protect historic properties (i.e., sites eligible to the National Register of Historic Places (NRHP)) along the Trail.
- Provide a natural-appearing landscape and sense-of-place.
- Provide interpretation and information for visitors to enhance understanding and enjoyment of the Trail.

Standards and Guidelines:

- Locate, evaluate, and protect historic properties. Nominate documented Lewis and Clark campsites and intact trail segments to the NRHP. Provide interpretation when compatible with management objectives for historic properties.
 - Except for motor route segments, provide semi-primitive non-motorized opportunities.
 - Scenery management will be retention in the foreground and partial retention in the mid/background.
 - Only permit developed recreation sites where cultural resource scenery management and sense-of-place objectives can be met.
 - Manage dispersed camping to maintain visual resources and natural conditions. Only construct facilities needed to protect, use, and interpret the Trail.
 - Mountain bikes are permitted if they meet natural condition/sense-of-place objectives and do not adversely affect historic properties.
 - Recreation special uses are permitted when compatible with the Recreation Opportunity Spectrum (ROS) and travel management, meet natural condition/sense-of-place objectives, and have no adverse impact to historic properties.
 - No audible elements out of character with the area are permitted.
 - Mark the Trail route using standard Lewis and Clark signs
 - Provide information/interpretation related to the Expedition, native cultures, landscape at the time of Lewis and Clark, and changes over time.
2. Management Area 6A (The Lemhi Pass NHL): Emphasis is on protection and interpretation of areas of unusual scenic, archaeological, and historical character. Manage the NHL to maintain site integrity and for recreation use substantially in its natural condition. Do not permit destruction or alteration of the NHL, or alteration of the surrounding environment. Follow a rehabilitation treatment approach which acknowledges the need to alter/add to a cultural landscape to meet continuing/new uses while retaining the landscape's historic character. (USDA-FS, 2002, pp. 4-8).
 3. Management Area 6A (Kenney Creek RNA): Manage for recreation use substantially in its natural condition. (USDA-FS, 1988)

Fire Management

Salmon Field Office, BLM:

1. Manage fire and fire suppression activities so as to minimize ... harmful impacts to resource values (e.g., National Historic and Scenic Trails, cultural sites, habitat for special status species). Avoid fire suppression actions which cause ground disturbance along the ... Continental Divide National Scenic Trail and Lewis and Clark National Historic Trail, unless required for public or firefighter safety. (USDI-BLM, 2001, p. 1)
2. Use prescribed fire and other vegetation treatment methods to reduce fuel hazards and the threat of catastrophic fire, protect/enhance resource values and conditions or otherwise support resource values, protect/enhance habitat for TES species, for research/education, or to support tribal treaty rights or otherwise address tribal interests (USDI – BLM, 2001, p. 2).
3. Ensure that prescribed fire and suppression activities do not harm ESA listed species or adversely modify critical habitat. Ensure that fire management increases overall ecosystem health. (NMFS, 2001, p.20)
4. Proposed fire management for the watersheds area includes the following general direction (resource management objectives and use/non-use of fire to achieve objectives) (North Wind, Inc., 2003)
 - Protect private property by reducing hazardous fuel loading and risks of wildfire escaping public lands. Immediately suppress fires in WUI areas. Work with the County and FS to assess WUI areas needing treatment, update existing mitigation plan, and implement prevention and education actions.
 - Protect/maintain populations of sensitive plant and animal species.
 - Maintain/improve designated critical habitat for special status fish species.
 - Reduce the spread of noxious weeds and invasive plants. Continue to inventory, treat, and monitor noxious weeds. Use prescribed fire plus herbicide to control spotted knapweed.
 - Increase the quantity and diversity of herbaceous understory in sagebrush habitat, while maintaining/protecting sage grouse wintering habitat and critical deer winter range. Immediately suppress wildfire in critical deer winter range and sage grouse breeding habitat. Small-scale, carefully limited prescribed fire may be used to create seral mosaics in decadent sagebrush stands and improve herbaceous understory.
 - Use prescribed fire and non-fire fuels treatments to reduce hazardous fuels and tree stocking densities in appropriate areas.
 - Treat dense dry Douglas-fir forest and Douglas-fir encroachment into sagebrush/ grasslands.
 - Minimize potential erosion and noxious weed invasion in highly erodible soils (Pattee and Sharkey creeks).
 - Maintain scenic quality along the Continental Divide Scenic Trail, Lewis and Clark Backcountry Byway, and Lewis and Clark National Historic Trail.
 - Protect developed recreation sites.
 - Use prescribed fire and non-fire fuels treatments to restore/rejuvenate aspen and whitebark pine.
 - Follow Minimum Impact Suppression Tactics (MIST) where appropriate, including areas with highly erodible soils, areas at high risk for noxious weed/cheatgrass invasion, sensitive plant locations, significant cultural sites, and riparian habitat conservation areas.
 - Avoid fire suppression actions along the Lewis and Clark NHT and Continental Divide NST that cause ground disturbance.

Salmon-Challis National Forest:

1. MA 6.1 (Lewis and Clark NHT) – Prescribed fire may be used to meet historic landscape vegetation objectives. Allow natural fire that meets vegetation management objectives to restore and maintain

the historic landscape of the Trail. Conduct fire management/suppression activities to minimize damage and allow for rapid recovery of desired natural and scenic landscape condition (USDA FS, 2000).

2. MA 6A (Lemhi Pass NHL) – Allow natural and prescribed fire that meets historic landscape vegetation objectives within the Landmark. Conduct fire management/suppression activities to minimize damage and allow rapid recovery of desired natural and scenic landscape condition (USDA-FS, 2000a and 2002)

Salmon Challis National Forest and Salmon Field Office, BLM:

1. Follow applicable management direction stated in PACFISH (USDA-FS and USDI-BLM, 1994).

Fisheries

Salmon Field Office, BLM:

1. Implement habitat improvement projects where necessary to stabilize/improve unsatisfactory or declining habitat condition (USDI-BLM, 1987, p. 39).
2. Ensure that disposal of public lands in the Agency Creek watershed does not impede attainment of PACFISH Riparian Management Objectives (RMOs) within the watershed. Land with critical habitat for listed salmon/steelhead will not be disposed of unless a commensurate or greater amount of designated critical habitat with equal or greater potential for salmonid production is acquired or otherwise permanently protected (NMFS, 2001).

Salmon Challis National Forest and Salmon Field Office, BLM:

1. Follow applicable management direction stated in PACFISH (USDA-FS and USDI-BLM, 1994).

Forest Management

Salmon Field Office, BLM:

1. Close new timber harvest roads when sales are completed, except for use in forest/fire management (USDI-BLM, 1987, p. 13).
2. Restrict forest management activities on 518 acres within the Continental Divide Trail SRMA to maintain existing visual qualities (restrictions may be imposed on size of harvest units, road location, slash disposal, and the percentage of cover reduction) (USDI – BLM, 1987, pp. 11 and 14)
3. Set aside 75 acres of commercial timber land along the Continental Divide Trail (USDI – BLM, 1987, p. 11). These lands may receive limited forest management activities (i.e., not commercial harvest).
4. Harvest methods include clearcut or shelterwood systems. Clearcuts are limited to 40 acres and must be irregularly shaped. Timber marking prescriptions will concentrate on genetic improvement of the regenerated stand and designed to encourage natural regeneration (USDI-BLM, 1987, p. 35).
5. Intensively manage 28,865 acres of commercial timber lands to sustain a 2.4 mmbf annual cut (USDI-BLM, 1987, p. 10).
6. All forest practices will meet or exceed those set forth under the Idaho Forest Practices Act, Title 38, Chapter 13, Idaho Code (USDI-BLM, 1987, p. 36).

Salmon-Challis National Forest:

1. Management Area 2A-1 (headwaters of Kenney Creek drainage) – Plan no timber harvest unless the timber is substantially damaged by fire, windthrow, or other catastrophe. (USDA-FS, 1988, p. IV-102)
2. Management Area 5B (majority of NF lands in the analysis area) - Management emphasis is on a medium level of commercial sawtimber production, while maintaining habitat for target or viable populations of all native vertebrate species of fish and wildlife (USDA-FS, 1988, p. IV-116). Follow this additional direction within MA 5B:
 - a. Personal or commercial use of material for posts and poles can be emphasized in areas with flat terrain and easy access (USDA-FS, 1988, p. IV-117).
 - b. Clearcutting is normally the preferred harvest method in lodgepole pine cover type (USDA-FS, 1988, page IV-117).
 - c. Manage big game summer ranges to support target populations on each game management unit (USDA-FS, 1988, page IV-121).
 - d. Manage long narrow stringers and natural forested islands on big game summer and winter ranges to support target populations of big game (USDA-FS, 1988, page IV-121).
 - e. Design first entry cutting units within cover blocks so that no point within the harvest area is more than 800 feet from cover (USDA-FS, 1988, page IV-121).
 - f. Cover patches will be designed to be at least 600 feet wide and should be at least 25 acres in size (USDA-FS, 1988, p. IV-121).
 - g. Plan logging and road building activities to provide suitable displacement areas for big game (USDA-FS, 1988, page IV-121).
3. Management Area 6.1 (Lewis and Clark NHT) and Management Area 6A (Lemhi Pass NHL) – Implement Standards and Guidelines from Forest Plan Amendment #7 (USDA-FS, 2000a):
 - a. Lands in the MA 6.1 and MA 6A (NHL) are removed from the suitable timber base. Limited vegetation practices may be compatible with maintenance of the historic landscape of the NHL.
 - b. Manage forest and rangelands to prevent adverse impacts on historic properties and scenery. Consider forest product harvest opportunities, including firewood gathering, where necessary for long-term maintenance of the historic landscape of the Trail.
 - c. Prescribed fire may be used to meet historic landscape vegetation objectives.
4. Management Area 8A – Follow Management Area 5B Standards and Guidelines. In addition:
 - a. Maintain cover patches at least 600 feet wide between cutting units. Minimum size for cover patches is 30 acres.
 - b. Maintain cover at no less than 30 percent of an elk home range (4,000 acres or larger).
 - c. Where slash is hand piled, leave two piles per acre unburned. (USDA-FS, 1988, p. IV-142).
5. Standards and Guidelines:
 - a. Maintain adequate structural diversity of vegetation to provide representations of the various ecological stages of endemic plant communities (USDA-FS, 1988, page IV-1).
 - b. Provide a continuous flow of raw material available to dependent manufacturing companies (USDA-FS, 1988, page IV-2)
 - c. Provide a personal use and commercial use firewood program to meet the demands of local communities (USDA-FS, 1988, page IV-2)
 - d. Improve growth, health and vigor of timber stands through silvicultural treatments while maintaining or improving other resource values (USDA-FS, 1988, page IV-2)
 - e. Provide a cost effective level of fire protection to minimize the combined costs of protection and damages and prevent loss of human life.

- f. Use prescribed fire to treat hazardous fuel conditions and create diversified forest condition (USDA-FS, 1988, page IV-3).
- g. In forested areas, 10 percent or more should be in old growth (USDA-FS, 1988, page IV-17).
[**Note:** the Salmon-Challis NF has designated specific areas to be managed for old growth characteristics. Those designated areas within the Agency-Kenney Watersheds are shown on Map 5.]
- h. Provide at a minimum, an average of 20 to 30 hard snags per 10 acres (USDA-FS, 1988, page IV-17).
- i. Manage aspen for perpetuation wherever it occurs (USDA-FS, 1988, page IV-18).
- j. Commercial sale of forest products will be made in a variety of sizes and species mix in order to provide a wide range of timber purchaser opportunities (USDA-FS, 1988, page IV-31).
- k. Treatments in dwarf mistletoe infected stands will generally use adequate natural or man-made barriers to prevent re-invasion (USDA-FS, 1988, page IV-32).
- l. Maintain soil productivity, minimize man-caused soil erosion, and maintain the integrity of associated ecosystems (USDA-FS, 1988, page IV-57).
- m. Modify activity fuels to permit fire suppression forces to meet fire protection objectives for the area (USDA-FS, 1988, page IV-71).
- n. Use prescribed fire to accomplish resource management objectives such as reducing fuel load buildup, wildlife habitat improvement, etc. (USDA-FS, 1988, page IV-71)

Salmon-Challis National Forest and Salmon Field Office, BLM:

- 1. Implement applicable forest management direction from PACFISH (USDA-FS and USDI-BLM, 1994) and the Canada Lynx Conservation Assessment and Strategy (Reudiger et. al. 2000).

Lands

Salmon Field Office, BLM:

- 1. Consider disposal of the Agency Creek Recreation Site and approx. 2,200 acres of other public lands (USDI – BLM, 2001, p. 2).
- 2. Seek to acquire land/easements containing important public and natural resource values and to consolidate public land, resolve unauthorized use conflicts, and acquire public access (USDI – BLM, 2001, p. 3).
- 3. The SFO will ensure that disposal of Federal lands in the Agency Creek watershed does not impede attainment of PACFISH RMOs within the Agency Creek watershed (NMFS, 2001, p. 20).
- 4. Land with critical habitat for listed salmon/steelhead will not be disposed of unless a commensurate or greater amount of designated critical habitat with equal or greater potential for salmonid production is acquired or otherwise permanently protected (NMFS, 2001, p. 21).

Salmon-Challis National Forest:

- 1. Achieve the optimum land ownership pattern to provide for resource uses to meet the needs of the public now and in the future (USDA-FS, 1988, p. IV-3).
- 2. Classify lands or interest in lands for acquisition where lands are valuable for National Forest System purposes according to the following priorities:
 - a. In designated Wilderness Areas and other Congressionally classified areas.
 - b. Where lands or rights-of-way are needed to meet resource management goals and objectives.
 - c. Lands which provide habitat for threatened and endangered species of animals and plants.
 - d. Lands which include floodplain or wetlands. (USDA-FS, 1988, p.IV-56).

3. Management Area 6.1 (Lewis and Clark NHT) – New utilities, utility corridors, or electronic sites must meet scenery management objectives. Where feasible, remove/modify existing utility structures to meet scenery management objectives. Seek protection of and access to the Trail via scenic easements, cooperative agreements, acquisition, etc. (USDA-FS, 2000a)
4. Management Area 6A (Lemhi Pass NHL) – Authorize no new utilities, utility corridors, or electronic sites within the Landmark. Identify and monument all corners and boundaries. (USDA-FS, 2000a)

Salmon Challis National Forest and Salmon Field Office, BLM:

1. Follow applicable management direction stated in PACFISH (USDA-FS and USDI-BLM, 1994).

Livestock Grazing/Rangeland Management

Salmon Field Office, BLM:

1. Implement grazing systems to reduce livestock grazing impacts in riparian zones (BLM, 1987, p. 41).
2. Manage I category allotments to improve resource conditions (USDI – BLM, 1987, p. 36). Specific “I category allotment” objectives are as follows (USDI – BLM, 1985, pp. B-44 to B-45):
 - Warm Springs – reduce sagebrush density, improve livestock distribution, control the spread of noxious weeds, develop a coordinated grazing system with the FS, manage areas of highly erodible soils to prevent accelerated erosion, determine proper stocking rates and use areas, increase livestock distribution, improve riparian condition along Warm Springs Creek, increase forage production, develop an Allotment Management Plan (AMP).
 - Pattee Creek – reduce sagebrush density, reduce livestock/big game conflicts, improve livestock distribution, manage areas of highly erodible soils to prevent accelerated erosion, improve condition and vigor of key forage species, determine proper stocking rate and usable areas, improve riparian area condition along Pattee Creek, increase key forage species production, develop an AMP.
 - Squaw Creek (now part of the Agency Creek Allotment) – reduce livestock/big game conflicts, formally establish and document boundary, improve livestock distribution, control the spread of noxious weeds, determine proper stocking rate and use areas, improve riparian condition along Cow Creek, develop an AMP.
3. Range improvements/vegetation manipulation projects should be designed to achieve both wildlife and range objectives (USDI- BLM, 1987, p. 40).
4. Tracts currently closed or restricted to grazing will remain so. [**Note:** in the Agency Creek area this would include the Chief Tendoy Cemetery and the Agency Creek developed recreation site.] (USDI-BLM, 1987, pp. 39, 47)

Salmon-Challis National Forest

1. Management Area 5B: Do not increase livestock use based on anticipated increase in forage production within logged areas. Transitory forage may be utilized if regeneration can be protected. Protect regeneration when necessary to achieve timber management objectives. (USDA-FS, 1988, p. IV-120)
2. Management Area 6A (Lemhi Pass NHL): Manage livestock to minimize adverse impacts on vegetation, historic properties, and recreation facilities. Construct no new range improvements. Existing improvements must meet or exceed scenery management standards. (USDA-FS, 2000a).
3. Management Area 6.1 (Lewis and Clark NHT):
 - Manage rangelands to prevent adverse impacts to historic properties and scenery.
 - Range improvements will meet or exceed scenery management standards.

- Manage livestock to minimize adverse impacts to vegetation, historic properties, and recreation facilities. (USDA-FS, 2001a)
4. Management Area 8A (lower elevation lands in the Pattee Cr. drainage): Manage non-forested areas to maintain or improve soil and vegetative conditions and provide forage for domestic livestock. Improve conditions through vegetation/soil restoration, livestock management, and regulation of other resource activities. Utilize structural and nonstructural improvements (e.g., seeding, burning, and spraying) as needed; where improvements include water developments, obtain a water right in the name of the U.S. Discontinue livestock grazing when recovery to fair condition cannot be attained or where fair or better range condition cannot be maintained through implementation of an AMP. (USDA-FS, 1988, P. IV-158)

Salmon-Challis National Forest and Salmon Field Office, BLM:

1. Utilize consolidated grazing management (FS-BLM) on the Agency Creek and Warm Springs/Pattee allotments in order to provide better control and distribution of livestock and facilitate proper resource management on the allotments. (BLM – FS, 2001)
2. Manage grazing to maintain the structure and composition of native plant communities. Manage grazing in aspen stands to ensure sprouting and regeneration of aspen clones. Manage high elevation shrub-steppe habitats and riparian areas to maintain or achieve mid to late seral conditions (lynx cover and prey availability). (Reudiger, et. al., 2000)
3. Manage the Warm Springs and Pattee Creek Allotments (FS and BLM allotments) according to the Coordinated Resource Management Plan (CRMP) (USDI-BLM and USDA – FS, 1992). Remaining CRMP objectives to be achieved include the following:
 - improve 50% of fair condition range to good condition (as measured by Ecological Site Inventory) by attaining uniform utilization;
 - improve 2,985 acres by increasing the frequency of established bluebunch wheatgrass;
 - improve 1,376 acres of unsatisfactory condition watershed (fair condition range on highly erodible soils) to good condition;
 - maintain or increase the population size of Lemhi penstemon; collect information to project future population;
 - maintain or increase population size of *Physaria didymocarpa* var. *lyrata*;
 - burn sagebrush to improve diversity in age class of sagebrush;
 - adjust grazing use by 1995;
 - evaluate big game use by measuring forage use prior to cattle grazing;
 - treat noxious weeds to eradicate (by 2002);
 - establish a test seeding in the Lower Warm Springs pasture;
 - limit livestock use of the Pattee Creek riparian pasture to trailing;
 - move troughs out of riparian zones;
 - salt outside of riparian zones and timber harvest areas

Minerals

Salmon Field Office, BLM:

1. Withdrawals from mineral entry are only used where there are significant resource values that cannot be adequately addressed under the surface management regulations (areas recommended for wilderness designation, important historical/cultural resources, and recreation developments). (USDI-BLM, 1987, pp. 33-34).
2. Some minerals activities are restricted, as shown on Map 3 of the PRMP/FEIS. Restrictions in the Agency-Kenney watersheds include seasonal (11/15-3/15) restrictions within big game and sage grouse winter range and no-surface-occupancy (NSO) stipulations within a few zones, including the Continental Divide National Scenic Trail and Lewis and Clark National Historic Trail. Some sites in the watersheds are recommended for withdrawal from locatable mineral entry, but haven't yet been withdrawn: Lewis and Clark NHT corridor, Chief Tendoy Cemetery, and developed recreation sites (Agency Creek Rec. Site, Sharkey Hot Springs) (USDI-BLM, 1986, Map 3 and USDI-BLM, 1987, pp. 25, 34, and 47; USDI-BLM, 2001, p. 3)
3. Sharkey Hot Springs is closed to geothermal leasing (USDI-BLM, 1987, pp. 14-15).
4. Recommend 4,840 acres along the Lewis and Clark NHT for withdrawal from locatable mineral entry. Stipulate this area no surface occupancy for mineral leasing. Limit minerals exploration/development in the Lewis and Clark Trail SRMA to locations along designated routes and to project designs that conform to VRM Class II guidelines. Incorporate measures to protect the Trail and related recreational, cultural, historical, scenic, and natural values. (USDI-BLM, 2001, p. 3)

Salmon-Challis National Forest:

1. Management Area 2A-1: Open for exploration/development of locatable minerals, leasable minerals and energy resources. (USDA-FS, 1988, p. IV-103)
2. Management Area 6A (Lemhi Pass NHL): About 1,505 acres within the Lemhi Pass National Historic Landmark are withdrawn from locatable mineral entry (Federal Register, 2002). Also retain the existing mineral withdrawal. Do not authorize removal of common variety mineral materials (USDA-FS, 2000a).
3. Management Area 6.1 (Lewis and Clark NHT): Except for valid existing claims, withdraw the Trail MA from mineral entry. Design facilities associated with valid existing operations on unpatented mining claims to meet scenery and historic sense-of-place objectives. Do not authorize removal of common variety mineral materials or oil/gas exploration/development within the MA. (USDA-FS, 2000a)

Salmon Challis National Forest and Salmon Field Office, BLM:

1. Implement the following measures for mineral developments in lynx habitat areas (Reudiger, 2000):
 - Restrict over-snow access to designated routes (limit the amount of compaction in lynx foraging areas).
 - Develop stipulations for limitations on the timing of activities and surface use and occupancy.
 - Utilize remote monitoring to reduce intrusion into lynx habitat areas.
 - Develop a road and vegetation reclamation plan for abandoned/closed mine sites to restore suitable habitat for lynx.
 - Close newly constructed roads to public access during project activities. Reclaim or obliterate roads when project is completed.

Noxious Weeds

Salmon Field Office, BLM:

1. Control noxious weeds in cooperation with Lemhi County/County Agent. Where biological controls have proven to be effective, they will be used in preference to chemical or mechanical methods. (USDI-BLM, 1987, p. 5)

Salmon-Challis National Forest:

1. Management Area 6A (Lemhi Pass NHL) – Monitor and control to eliminate the spread of noxious weeds and exotic plant species (USDA-FS, 2000a). Aggressively control State-listed noxious weeds within the Landmark on adjoining lands (USDA-FS, 2002).

Salmon Challis National Forest and Salmon Field Office, BLM:

1. Implement actions spelled out for County Weed Management Area – Zone 4 (Lemhi River):
 - eradicate leafy spurge using chemical and cultural control,
 - eradicate yellow toadflax and Russian knapweed using chemical control,
 - control musk and Canada thistle using chemical and biological control,
 - control spotted knapweed using chemical and cultural control,
 - control black henbane using cultural control. (Lemhi County, 2002)
2. Implement other, general, management priorities for the Lemhi CWMA:
 - prevent establishment of potential invaders
 - eradicate new invaders
 - reduce spread of weeds by treating transportation corridors/areas of concentrated activities and satellite infestations of established invaders
 - contain locally established invaders
 - reduce the density/slow the spread of widespread established invaders
 - map current weed infestations
 - monitor sites for effectiveness of control actions (Lemhi County, 2002)

Off-Highway Vehicle Use/Transportation Management

Salmon Field Office, BLM:

1. Reassess OHV use by 2007 to determine if changes are needed. (USDI-BLM, 2001, p. 4)
2. Manage the watersheds according to the “limited” OHV designations for the area (primarily seasonal restrictions to designated routes, with a small area on the west bank of Kenney Creek limited to existing roads/ways) and the one area closed to OHV use (near the Chief Tendoy Cemetery) (USDI-BLM, 2001) (see Map 14)
3. Restrictions and closures will be established for specific roads, trails, or areas only where problems have been identified (USDI-BLM, 1987, p. 45).
4. Roads/utility corridors will avoid riparian zones to the extent possible (USDI-BLM, p. 44).
5. Construct and maintain roads and trails based on consideration of resource management needs, user safety, impacts to fish/wildlife habitat, soil stability, recreation, scenery, and costs (USDI-BLM, 1987, p. 48).
6. The SFO will take immediate measures to ensure that OHV travel does not harm ESA listed species or destroy or adversely modify critical habitat. (NMFS, 2001, p. 20)
7. The SFO will identify and monitor areas (e.g., stream crossings and trails that route water-eroded soil into streams) where existing and designated OHV routes may adversely affect listed species and critical habitat. Areas in which OHV travel is likely to harass juvenile or adult anadromous salmonids,

damage redds, or damage critical habitat, should be closed until the adverse effects can be sufficiently mitigated in a travel management plan. (NMFS, 2001, p. 20)

Salmon-Challis National Forest:

1. Travel Map (1988) lists the following management for the analysis area:
 - Most of the Agency-Kenney watersheds are in Restricted Use Area 4: All motorized vehicles prohibited Sept. 25-May 15 except on designated routes shown on the Travel Map.
 - A small part of the Kenney Creek watershed is in Restricted Use Area 7: 4-wheel drive vehicles prohibited yearlong unless on designated roads; 2-wheel vehicles and ATVs prohibited yearlong except on designated roads/trails (**Note:** No routes are designated in the WA area); snowmobiles allowed after Dec. 15.
2. Management Area 2A-1: Specific land areas or routes may be closed seasonally or year round. Provide loop routes of ½ to one day's travel time. New roads will not be constructed unless necessary for minerals or energy exploration/development or timber salvage. Access authorized for these activities will be the minimum necessary. Temporary access will be rehabilitated to semi-primitive condition when no longer needed. Do not exceed an average motorized trail to corridor density of 2 miles per square mile in non-forested watersheds and 4 miles per square mile in forested watersheds (USDA-FS, 1988, p. IV-103).
3. Management Area 6.1 (Lewis and Clark NHT): Only permit new road construction if it meets standards for historic properties, scenery management, and sense of place. Manage the Agency Creek Road and first 2 miles of Warm Springs Wood Road to provide safe travel for vehicles less than 26 feet. Maintenance/construction activities will meet scenery management/sense of place objectives. (USDA-FS, 2000a)
4. Management Area 6A (Lemhi Pass NHL) – Limit motorized vehicle use (except snowmobiles) to designated routes. Only permit new road/trail construction within the NHL where historic property, scenery management, and sense of place can be met. Monitor traffic over Lemhi Pass and establish thresholds and traffic controls if necessary. Maintain the Agency Creek and Warm Springs Wood Roads to Level 3 standards. Utilize two routes for the CDNST north of Lemhi Pass: Warm Springs Wood Road for bicycle and stock travel; establish trail for hikers (USDA-FS, 2000a and 2002).

Salmon Challis National Forest and Salmon Field Office, BLM:

1. Consider road management guidance from the Canada Lynx Conservation Assessment and Strategy (part of the watersheds area is in a lynx analysis unit and migration corridor):
 - design trails/roads to direct winter use away from daytime security habitat
 - allow no net increase in groomed or designated snowmobile routes/play areas
 - locate roads/trails away from forested stringers and other areas of habitat connectivity (ridgetops)
 - in areas with high road density in lynx habitat (>2 mi./sq. mi.) prioritize roads for seasonal restrictions or reclamation
 - minimize roadside brushing (affects snowshoe hare habitat)
 - do not upgrade roads traversing lynx habitat in a manner that increases width of cleared right-of-way, traffic volume, or speed (Reudiger, et al., 2000, p. 7-10)
2. Follow applicable roads management direction from PACFISH (USDA-FS and USDI-BLM 1994).

Recreation

Salmon Field Office, BLM:

1. Recognize recreation as a principal use in the Continental Divide Trail SRMA and Lewis and Clark NHT SRMA. Prepare a Recreation Area Management Plan (RAMP) for each SRMA. (USDI-BLM, 1987, p. 13)
2. Manage for dispersed recreation by maintaining existing ROS settings. (USDI-BLM, 1987, p. 13)
3. Manage the Lewis and Clark Trail SRMA to provide for education and enjoyment of visitors to the area while also retaining natural aspects of the historic trail route and protecting the integrity of intact segments of trail tread and associated cultural sites. (USDI-BLM, 2001, p. 7)
4. Withdraw acreage in developed recreation sites from mineral entry, and close sites to mineral material sales and non-energy leasing. Stipulate energy leasing NSO. (USDI-BLM, 1987, p. 21)
5. Provide a broad range of outdoor recreation opportunities. Maintain and develop trails where necessary to enhance recreation opportunities and allow public use (USDI-BLM, 1987, p. 44).

Salmon-Challis National Forest:

1. Management Area 2A-1 (headwaters area of the Kenney Creek drainage)
 - Emphasize dispersed recreation and semi-primitive motorized recreation opportunities.
 - Manage use to allow low to moderate contact with other groups and individuals (trail/camp encounters during peak use days are less than 25 other parties per day).
 - Facilities may include development level 1 and 2 campgrounds, trails suitable for motorbike use, local roads with primitive surface, and parking lots at trailheads.
2. Management Area 5B: Emphasize roaded-natural recreation experiences; can also provide semi-primitive non-motorized and semi-primitive motorized.
3. Management Area 6.1 (Lewis and Clark NHT): For land trail segments, utilize the existing trail where possible, maintaining the original design (tread, grade, clearing). Maintain/manage trail use to protect historic properties, scenery, and sense of place.
4. Management Area 6A (Lemhi Pass NHL): Prohibit overnight camping within the Landmark. Manage the NHL as a “roaded natural” setting. (USDA-FS, 2002)
5. Management Area 8A: Semi-primitive non-motorized, semi-primitive motorized, and roaded natural recreation opportunities can be provided.

Salmon Challis National Forest and Salmon Field Office, BLM:

1. Coordinate (BLM/FS) the joint administration of special recreation permits for outfitting and guiding and non-commercial recreation activities which utilize NF and BLM lands.

Roadless Areas

Salmon-Challis National Forest:

1. Follow interim direction contained in FS Manual 1925 (expires 6/14/2003): The Regional Forester shall review and determine whether to recommend to the Chief a decision for any road construction, reconstruction, or timber harvest project within inventoried roadless areas.
2. “Roadless Rule” adopted in 2001 supercedes Forest Plan direction for roadless areas. The roadless rule requires that roadless areas be managed for their roadless area values and specifically limits road construction or reconstruction in roadless areas. Final resolution of the rule is pending further court actions.
3. Agency Creek Roadless Area – Management Area 5B: Meet anadromous fish species habitat needs and produce moderate timber outputs.

4. West Big Hole Roadless Area – Management Area 2A-1: Emphasize dispersed recreation activity. Limit OHV use to designated routes. Allow minerals and energy activities, grazing, and vegetation manipulation. No timber harvest planned.

Special Status Species (also see Fisheries, Wildlife)

Salmon Field Office, BLM:

1. Follow BLM policy and Manual Direction, which state a commitment to manage non-listed special status species so that BLM actions do not contribute to a need to list those species.

Salmon-Challis National Forest:

1. Follow Forest Plan guidelines and Forest Service policy and manual direction for special status species, so that Forest Service actions do not contribute to a need to list those species as threatened or endangered under the ESA.

Visual Resources

Salmon Field Office, BLM:

1. Manage the Continental Divide National Scenic Trail SRMA as VRM Class I. Manage the majority of the watersheds as VRM Class II (with small portions of forested lands in VRM Class III) (USDI-BLM, 2001).

Salmon-Challis National Forest:

1. Management Area 2A-1: Design/implement management activities to provide a visually appealing landscape. Enhance or provide more viewing opportunities and increase vegetation diversity in selected areas. Do not permit Visual Quality Objectives lower than Partial Retention. Designated travel routes in MA 2A-1 are Sensitivity Level 1 or 2.
2. Management Area 6A (Lemhi Pass NHL and Kenney RNA): Design and implement management activities so the impact of man is not apparent (VQO= Retention). Do not allow introduction of visual elements that are out of character with the property and setting.
3. Management Area 8A: Design/implement activities to blend in with the natural landscape.

Wildlife

Salmon Field Office, BLM:

1. Implement habitat improvement projects where necessary to stabilize/improve unsatisfactory or declining habitat condition. (USDI-BLM 1987, p. 39).

Salmon-Challis National Forest:

1. Management Area 2A-1: Maintain big game habitat capability at 80% or more of potential. To accomplish this, the road density per square mile of area should be less than or equal to 0.5 miles of road per square mile of area. Manage recreation and motorized vehicle use to be compatible with big game population objectives. (USDA-FS, 1988, pp. IV-103-104)
2. Management Area 5B: Provide habitat for target or viable populations of all native vertebrate fish and wildlife species. Follow wildlife standards and guidelines (USDA-FS, 1988, p. IV-121):
 - a. Manage long narrow stringers of timber (less than ¼ mile wide) and natural forested islands (less than 25 acres) on big game summer and winter ranges to support target populations of big game.

- b. Individual timber cutting-unit boundaries will not exceed 1000 ft. along ridgetop ecotones. “Wolfy” type trees will be left along ridgetops, unless the tree is mistletoed.
 - c. Within cover blocks of timber, first entry timber cutting-units will be designed so that no point within the harvest unit is more than 800 ft from cover.
 - d. Provide cover for big game at least 2 sight distances (400 ft) wide along ½ of the length of the road through cover blocks of timber.
3. Management Area 8A (Pasture Mountain area between Wade Creek and lower Pattee Creek): Maintain habitat capability for viable or target populations of all species of vertebrate wildlife. Do not increase forage use by livestock on critical big game winter range. (Projects such as water developments to increase livestock use of the area will not be implemented). Structural improvements will not adversely affect big game movement.

Salmon Challis National Forest and Salmon Field Office, BLM:

1. Implement relevant actions from the Canada Lynx Conservation Assessment and Strategy (Reudiger, et. al., 2000), *such as*:
 - Design vegetation management strategies that are consistent with historical succession and disturbance regimes. Timing, intensity, and extent of treatments should maintain required lynx habitat components.
 - Use timber management/fire as a disturbance process to create/maintain snowshoe hare habitat, alternative prey habitat, and denning habitat.
 - Allocate land uses to maintain lynx landscape connectivity and key linkage areas.
 - Maintain, and if feasible restore, habitat connectivity across forested landscapes. Pursue opportunities for cooperative management with other landowners.
 - Map and monitor the location and intensity of snow compacting activities that coincide with lynx habitat.
 - Management actions (e.g., timber sales) shall not change more than 15% of lynx habitat within an LAU to an unsuitable condition within a 10-year period.
 - Pre-commercial thinning will only be allowed when stands no longer provide snowshoe hare habitat.
 - Timber management practices should be designed to maintain or enhance habitat for snowshoe hare and alternate prey such as red squirrel. Use of regeneration harvest strategies is recommended.
 - Allow no net increase in groomed or designated over-the-snow routes (such as trails) and snowmobile play areas (i.e., dispersed recreation opportunities) within Lynx Analysis Units (LAU).

Management Recommendations Identified through Lemhi Sub-basin Review

In 1999 the BLM and Forest Service completed a review of the Lemhi River sub-basin which included management recommendations for the Agency-Kenney Creek Watersheds area. The following management recommendations are still considered to be relevant. Any comments on the recommendations are indicated with a “Note.”

Lemhi River Subbasin Review (USDI-BLM and USDA-FS, March 1999)

Aquatic/Riparian – Implement in cooperation with BLM, FS, USBWP, permittees, private landowners, DEQ, NRCS, and IDFG.

- Continue to improve fish passage/migration between tributaries and the Lemhi River. [**Note:** Efforts are in progress to improve flow to Pattee Creek and fisheries access and flow to Agency Creek.]
- Continue to work with grazing permittees to improve riparian conditions.
- Inventory creeks to determine fish species presence and abundance. [**Note:** Most streams have been inventoried. The BLM/FS continue to perform trend monitoring of fish species presence and abundance.]
- Continue to monitor watersheds for temperature, riparian functionality, stream habitat, and riparian grazing use levels.

Forest Vegetation – Implement in cooperation with BLM and FS.

- Continue harvesting and prescribed fire plans on low elevation Douglas-fir stands to reduce stand density and promote resistance to wildfire in the Copper Queen sub-watershed.
- Continue stand replacement fire plans in the upper Copper Queen area in the subalpine fir-lodgepole zone. [**Note:** prescribed fire would be utilized following harvest of the Copper Queen timber sale. The sale was previously offered but didn’t sell. It will be re-offered after the Lewis and Clark Bicentennial.]
- Continue density reduction harvesting that encourages whitebark pine growth in the upper Horseshoe Bend sub-watershed.
- Determine opportunities for modification of previously harvested areas for reintroduction of prescribed fire and further thinning that also meets wildlife, recreation, and Native American objectives.
- Explore interpretation possibilities for recreation users.
- Inventory the condition of whitebark pine stands to identify white pine blister rust infections. Develop strategies to deal with problem infection areas.

Range/Weeds – Implement in cooperation with the BLM, FS, private landowners, permittees, interested publics, Lemhi County.

- Continue to implement grazing management for riparian area improvement in the Agency Creek, Warm Springs/Pattee, and Kenney Creek allotments.
- Identify opportunities to educate visitors about natural resources in conjunction with the Lewis and Clark Bicentennial.
- Continue to identify and control noxious weeds.

Wildlife – Implement in cooperation with the BLM, FS, Lemhi County, ORV Committee, private landowners, permittees.

- Complete a road/vehicle way inventory. [**Note:** roads and vehicle ways in the analysis area have been inventoried. Transportation management is being revised to address findings.]
- Assess wildlife habitat fragmentation extent and cause.
- Initiate a travel management plan that addresses access needs, alternative route development, seasonal or permanent road/trail closures to reduce disturbance to wildlife species, erosion, and noxious weed spread, especially along the Continental Divide. [**Note:** The BLM has completed travel management planning for BLM-administered lands in the watersheds analysis area. This management is stated in the Lemhi RMP amendment (USDI-BLM, 2001). This watershed analysis document primarily makes recommendations for travel management on Forest Service-administered lands.]
- Explore options for road relocations or road abandonment if not necessary for access.
- Evaluate all loop roads that promote travel in sensitive wildlife areas.
- Consider signing, information kiosks, and improved and simplified maps to increase understanding of travel regulations.
- Implement an aspen/cottonwood restoration plan with partners to establish/re-establish historical clones and sites. Consider planted root stock collected locally and planted locally by the “workers to woods” program.

Human Uses – Implement in cooperation with the BLM, FS, private landowners, Lemhi County, Lewis and Clark National Committee, USBWP, Shoshone-Bannock Tribes, and Lemhi County ORV Committee.

- Develop a recreation plan (including outfitters/guides) to manage visitor use on the Lewis and Clark NHT and Backcountry Byway.
- Continue to manage for posts/poles and firewood.
- Open up views from the Continental Divide Road. [**Note:** This recommendation should be revised as follows: “Where feasible, open up views along the Lewis and Clark Backcountry Byway.”]
- Pursue land exchange opportunities or easements with willing landowners to allow additional public land access.
- Consider Shoshone-Bannock Tribal interests in management plans. Maintain access to traditional use areas.
- Continue coordination with the ~~Lemhi Riparian Habitat Conservation Group~~ and Upper Salmon Basin Watershed Project to improve resource conditions. [**Note:** the Lemhi Riparian Habitat Conservation Group no longer exists.]
- Continue efforts to reconnect streams to the Lemhi River and restore native riparian vegetation.

Chapter 5 - Recommendations

In addition to the Lemhi Sub-basin Review recommendations stated on pages 85 to 86, the watersheds analysis team recommends implementing the following actions.

Cultural Resources/Tribal Concerns

1. The Agency Creek watershed is of particular tribal importance, and is one of only two specific watersheds in the region highlighted by the Tribes in the Lemhi River Subbasin Review. Several recommendations pertain to management of the Agency Creek watershed:
 - a. Property ownership boundary confusion may be at least partially remedied by providing land status maps of the Agency Creek drainage to interested users, perhaps via the BLM kiosk site at the Tendoy store.
 - b. Continue efforts to work cooperatively with private landowners and other agencies on riparian area stabilization and restoration in the middle and lower stretches of this drainage. These efforts would have a direct beneficial effect upon any cultural resources or traditional resources found in these vulnerable areas.
 - c. Continue to manage and maintain the Chief Tendoy Cemetery in accordance with provisions of the Cultural Resource Management Plan (1987) for the traditional property, in close coordination with the Shoshone-Bannock Tribes.
 - d. Monitor all recorded or suspected cultural properties identified in archaeological inventories within the watershed. Coordinate with Tribal Cultural Resources specialists to identify and preserve these and other cultural resource values.
 - e. Seek to provide protection of the historically significant remains at the Copper Queen and Wonderlode mines as potential Wildland Urban Interface areas.
2. An important portion of the Lewis and Clark National Historic Trail passes across the study area. Certain of these landscapes and historic values (such as the area of the first unfurling of the American flag and Capt. Lewis' first contact with Lemhi Shoshone people) are thought to be little changed from that witnessed by the Corps of Discovery. These are places of national significance and historical relevance. Initiate measures to list certain of these historically important properties on the National Register of Historic Places, or, where warranted, consider the potential for National Historic Landmark designation.
3. Strive to directly involve the Shoshone-Bannock Tribes in the earliest phases of federal resource management planning in the watersheds area. Potential lands and recreation actions, particularly within the Agency Creek watershed, may affect sensitive tribal values. Equally important, make a dedicated effort to involve appropriate Tribal representatives in project implementation and resource data review and monitoring programs. Ensure that the unique knowledge of the Tribes is taken advantage of when designing and implementing wildlife (especially anadromous fish) and vegetative enhancement projects within the study area.
4. Access to federal lands is crucial for the exercise of tribal treaty rights and religious freedom. Agencies will ensure that every effort is made to provide for public easements when lands actions (such as exchanges) are undertaken. Also consider the Tribes' needs for access when developing travel management plans and off-highway vehicle designations.
5. Restorative management efforts promoted by the Tribes:

- a. Continue to pursue fire management strategies in order to restore balanced habitats understood to have existed in pre-fire suppression times.
- b. Continue to identify, treat, and monitor noxious weed infestations. Enforce efforts to stop re-introduction of invasive weed seeds (by mandatory use of weed-free hay by outfitters and campers, etc.).
6. Continue to provide for physical protection of fragile streamside riparian habitats and spring sources by use of enclosure fences and other measures. These actions would protect known and unrecorded cultural resources and treaty right values. Also, continue working with permittees to modify watersheds area allotment grazing schedules and turnout numbers in order to reduce domestic livestock impacts on lowland areas and to enhance vegetative health across the uplands.
7. Emphasize land management with a focus upon entire watersheds and cumulative effects of individual proposed actions. Proposed management should endeavor when possible to minimize intrusiveness and maximize the restorative capacities and resiliency of the ecosystem.

Fisheries/Water Quality

1. Modify livestock grazing management in the USFS Pattee Creek allotment to reduce impacts to Pattee Creek.
2. Continue regular maintenance and improve drainage on the Cow Creek, Ramsey Mountain, and Yearian Creek roads to reduce sedimentation to Cow Creek. Relocate or stabilize the portion of the Cow Creek Road which is failing and impacting upper Cow Creek.
3. Continue to assist the Upper Salmon Basin Watershed Project (USBWP) efforts to improve fish passage and flow where Kenney, Pattee and Agency Creeks flow through private lands.
4. Increase maintenance and reduce dust on the Agency Creek Road during the Lewis and Clark Bicentennial commemoration to reduce sedimentation to Agency Creek and improve visitor safety.
5. Review and modify existing and proposed fence locations on the BLM portion of Pattee Creek to further reduce impacts by livestock.
6. Modify the Kenney Creek diversion structure on BLM to prevent fish entrainment in the ditch and eliminate the migration barrier.
7. Review and modify the Warm Springs/Pattee Coordinated Resource Management Plan (CRMP) to effectively address current issues, especially special status species and riparian habitat. In the short term, implement an allotment agreement (BLM) and annual operating instructions (FS) to address fisheries concerns while the CRMP is being revised.
8. Perform a complete fisheries inventory of Pattee Creek to better define fish distribution and densities, especially bull trout.
9. Modify the current FS travel management plan restrictions to reduce the proliferation of roads and ways that currently occur.
10. Develop a CRMP for management of the BLM and USFS Agency Creek allotments. Seek to address upland vegetative health, grazing management, fisheries, and weeds concerns.
11. Evaluate relocating or obliterating the Copper Queen road (from the FS boundary to the switchback), and reconstructing the stream channel to restore the functionality of this drainage. (Consider a work-trade agreement with a timber sale contractor to harvest the Copper Queen sale, close the existing road, and construct a new road.)

Forestry/Fuels/Restoration

These recommendations are all longer term projects that can be completed in stages depending on the resources available and public needs and desires. Agencies should consider time lags associated with NEPA, consultation, cultural clearances, and the Lewis and Clark Bicentennial (2003-2006). Treatments should be implemented with as many cooperators as possible to enable funding and large landscape projects that cross multiple jurisdictions.

Shorter term (more feasible during the Bicentennial):

1. Coordinate with the recreation program to identify past or current restoration projects in the Kenney to Agency Creek area that can be used as interpretive/education sites.
2. Prioritize aspen stands for treatment to change stand structure and composition and to benefit wildlife. Remove all conifers from existing aspen stands and from areas where aspen remnants remain. Increase aspen patch sizes by removing competing conifers from around aspen areas. In some areas, cut or burn all mature trees to encourage aspen suckers. Protect suckers from ungulate browsing until aspen reach six feet tall. Seek to provide forest products from mechanical treatments. Seek to partner with the Rocky Mountain Elk Foundation to obtain funding to buy materials (e.g., enclosure fencing).
3. Work cooperatively (BLM, FS, and Lemhi County) to identify treatments needed in the Wildland Urban Interface (see page 16 for definition of WUI areas).
4. Analyze fuels inventory data to identify areas with high concentrations of down woody fuels that are a high priority for treatment.
5. Continue coordination with the Lemhi County Wildland Urban Interface working group to implement a fire prevention and education program to reduce the incidence of human-caused fires.

Longer term (after the Bicentennial):

6. Increase structural diversity in whitebark pine stands. Burn and/or mechanically treat whitebark pine to encourage seedlings and to reduce subalpine fir and lodgepole pine. This will create a landscape less susceptible to mountain pine beetle and increase development of whitebark pine blister rust resistant trees. Mechanical treatments would provide forest products. These treatments would benefit wildlife and provide interpretive opportunities. Collect whitebark pine seeds from blister rust resistant trees.
7. Reintroduce fire onto the landscape in the dry Douglas-fir habitat type to more closely reflect Fire Group 2 (fire interval of 12 to 22 years). Mechanical treatment may precede fire treatments to prevent catastrophic fires. Treat approximately 30 percent (3,750 acres) of the dry Douglas-fir that is currently out of the natural range of variability over the next 10 years. This would reduce tree density, remove mistletoe infested trees, increase production of understory vegetation, reduce continuous canopy cover (provide speed bumps to uncharacteristic wildfire), and create fire resistant stands. Target steeper slopes and inaccessible areas where mechanical treatment is less feasible.
8. Mechanically treat high density pole size lodgepole pine stands to reduce and prevent stand stagnation. This will provide future old single strata stands, reduce canopy cover, and provide post and pole products to the public. Re-offer the Copper Queen and Horseshoe Bend sales.
9. A continuous mature conifer canopy exists across the landscape with few breaks. Treat condition class 3 and 2 and maintain condition class 1 adjacent to private land, structures, and cultural sites. Strategically located treatment areas that break up the continuous conifer canopy would increase fire suppression effectiveness in the vicinity of human developments and significant cultural resource sites. New treatment areas should extend prior treatment areas in strategic locations as well as create new strategic suppression locations.

10. Change stand structure in conifer communities to represent desired future conditions (Douglas fir, lodgepole pine, and whitebark pine lack structural diversity). Decrease Douglas fir succession into sagebrush areas. Treating these cover types would reduce the susceptibility to bark beetle, reduce dwarf mistletoe infestations, and reduce the risk of large scale high intensity wildfire. Treatments would be a combination of logging, mechanical ladder-fuel and down-fuel reduction, and prescribed burns. Treatments would not occur in all conifer stands, allowing non-treated areas to progress naturally through succession.
11. Maintain fire regime condition class 1 and decrease fire regime condition classes 2 and 3 through broadcast burning and mechanical treatments. Remove ladder fuels in all cover types. Decrease old multi-strata forests in the Douglas fir types by removing second canopy layer (this would increase old single strata, a structural stage currently lacking in the watershed). Increase old single strata and stand initiation in lodgepole and whitebark pine to increase resistance to blister rust in whitebark pine and to create structural diversity and increase speed bumps across that landscape.
12. Reintroduce fire onto the landscape in the upper elevations in lodgepole, Douglas fir and whitebark pine cover types. This would increase stand initiation, remove mistletoe infested trees, reduce continuous canopy cover (provide speed bumps to uncharacteristic wildfire) and provide areas for whitebark pine seed caches.
13. Allow fire to play a natural role within the Kenney Creek RNA.
14. Treat Mountain big sagebrush habitat where there is the absence of weeds and cheatgrass. Treat older stands that are losing biological diversity of grasses and forbs. Treat approx. 3,000 acres in units up to 600 acres to create a mosaic pattern of grasses and break up horizontal continuity.
15. Allow fire to play a natural role in old growth stands. In lower elevations (dry Douglas-for), reintroduce fire into the ecosystem to allow fire to play a more natural role.
16. Evaluate the presently designated old growth stands and re-designate stands to increase continuous blocks of old growth greater than 250 acres.
17. Where feasible, open up views along the Lewis and Clark Backcountry Byway.

Lands

1. Define management of acquired lands in Ghoul Basin (e.g., grazing management, wildlife habitat (including winter range), OHV). Include acquired lands in the big game winter range.
2. Identify priorities for acquisition or access/easements.
3. Seek to acquire patented land inholdings from willing sellers.

Livestock Grazing – Note: These recommendations are the same as four of the recommendations for fisheries/water quality, but a different priority for implementation.

1. Review and modify existing and proposed fence locations on the BLM portion of Pattee Creek to further reduce impacts by livestock.
2. Modify livestock grazing management in the USFS Pattee Creek allotment to reduce impacts to Pattee Creek.
3. Develop a CRMP for management of the BLM and USFS Agency Creek allotments. Seek to address upland vegetative health, grazing management, fisheries, and weeds concerns.
4. Through the CRMP revision process, look at grazing management of recently acquired lands in Ghoul Basin (incorporate into the South Agency pasture).

5. Review and modify the Warm Springs/Pattee CRMP to effectively address current issues, especially TES species and riparian habitat. In the short term, implement an allotment agreement (BLM) and annual operating instructions (FS) to address fisheries concerns while the CRMP is being revised.

Minerals

1. Pursue the recommended locatable mineral withdrawals along the Lewis and Clark NHT (4,840 acres of BLM lands identified in the 2001 Lemhi RMP amendment and an additional ½-mile Trail corridor identified in the Salmon National Forest LRMP Amendment #7).
2. Evaluate whether BLM lands along the CDNST should be recommended for withdrawal from locatable mineral entry.
3. Evaluate whether the Agency Creek Recreation Site, Sharkey Hot Springs, and other recreation sites developed in the future should be withdrawn from locatable mineral entry.
4. Based on input provided by the Shoshone-Bannock tribes to the BLM, do not pursue the recommended withdrawal from locatable mineral entry for the Chief Tendoy Cemetery.
5. Complete the abandoned mine lands (AML) inventory of the watersheds.
6. Prioritize AML sites based upon environmental risks; perform cleanup and stabilization.
7. Evaluate historic mine sites for historical integrity and interpretive potential. Sign, if appropriate.
8. Gain additional knowledge of the minerals distribution in the watersheds, to aid planning efforts and evaluation of minerals exploration/development proposals.
9. Seek to partner with agencies such as INEEL or IDEQ to assess alpha radiation levels in areas with thorium deposits and/or man-made (trench) or natural (landslide) surface exposure to thorium dust. Use the information gathered to evaluate the risks of thorium dust exposure, develop appropriate mitigation measures if necessary (e.g., rehabilitation, signing), and guide project planning in the affected areas.

Non-forested Vegetation

1. Analyze data obtained from ecological site inventories of BLM lands conducted in 1983 and digitized in 2001-2002. Incorporate findings into management of the watershed analysis area.

Noxious Weeds

Upland range condition and health in the analysis area appear positive. Potentially, the largest threat to these areas is invasion of noxious weeds. The following recommendations are in conformance with the Lemhi County Cooperative Weed Management Area (CWMA) priorities for Zone 4, the Lemhi River zone:

1. Aggressively treat the only known population of rush skeletonweed (*Chondrilla juncea*) in the Wade Creek area to totally eradicate the population. Monitor the adjacent uplands to ensure it didn't spread, and inventory similar habitats in the area to ensure there aren't other patches.
2. Continue and increase biological control of spotted knapweed in the riparian zone of Pattee Creek. Use herbicide along the Alkali Flat and Pattee Creek roads from Agency Creek. Treat the infestations of spotted knapweed at Sharkey Hot Springs and the Gould Basin road.
3. Enforce weed-free hay at hunting camps, etc. Ensure all mulch/straw bales used for erosion control are certified weed-free.
4. Continue herbicide treatment of Canada thistle and Hound's tongue to eradicate.

5. Treat black henbane as encountered, especially at Sharkey Hot Springs.
6. Continue to monitor cheatgrass. On BLM-managed lands, treat cheatgrass along roadsides in accordance with the Cheatgrass Restoration Environmental Analysis (USDI-BLM, 2003).
7. Complete transfer of existing weed maps into GIS. Consider re-inventory of noxious weeds in the Watershed Analysis area based on analysis of existing weed inventory and mapping.
8. Implement OHV restrictions to help prevent weed spread.
9. Identify weed-free areas within the watersheds, and maintain these areas as weed-free zones. In addition, prioritize portions of the analysis area for weeds eradication. As weeds are eradicated from these locations, maintain them as weed-free zones.
10. Re-inventory within 5 years to identify new infestations.

Rare Plant Species and Communities

1. Continue to monitor Salmon twin bladderpod populations. The Salmon twin bladderpod appears to be declining in numbers throughout its known locations in Lemhi County, and is also threatened by weed invasion in some areas. Therefore, monitoring and preservation of the populations within the Agency-Kenney watersheds are extremely important.
2. Populations of Bitterroot milkvetch and Lemhi penstemon and their habitats should be monitored to assess population viability and habitat integrity, especially where weed invasion is a problem. Implement applicable measures for Lemhi penstemon stated in the Habitat Conservation Assessment and Conservation Strategy (USDI-BLM and USDA Forest Service, 1997a).
3. Re-identify the location of the known population of Lemhi milkvetch and assess for condition and threats.
4. Monitor the known population of Idaho range lichen.
5. Visit the Kenney Creek RNA to determine whether the vegetation is intact and undisturbed. Maintain adjacent timber stands to protect the RNA from livestock trampling, which could destroy the sedge "mats" (Jones 1999). Implement applicable measures stated in the Conservation Strategy for Wetlands in East-Central Idaho (Jones, 1999)

Recreation

1. Use vegetation treatments to enhance visitor experiences (e.g., open up views from the Continental Divide NST, treat noxious weeds, restore riparian areas, and restore native vegetation in recreation sites).
2. Complete a Recreation Area Management Plan for the Continental Divide NST and Lewis and Clark NHT.
3. Withdraw recreation sites from locatable mineral entry.
4. In conjunction with recreation activity planning for the Lewis and Clark Trail SRMA, consider disposal of the Agency Creek Recreation Site and approx. 2,200 acres of other public lands (USDI – BLM, 2001, p. 2)
5. Consider moving developed, overnight camping opportunities from the Agency Creek Recreation Site to a more appropriate location.
6. Consider developing a designated camping area in the Kenney or Pattee Creek area.
7. Develop a trailhead for the Lewis and Clark NHT at Flume Creek or Ghaul Basin.
8. Develop a public safety action plan in coordination with land owners of AML sites (e.g., Copper Queen).

Research Natural Area

1. Visit the Kenney Creek RNA to determine whether the vegetation is intact and undisturbed. Maintain adjacent timber stands to protect the RNA from livestock trampling, which could destroy the sedge "mats" (Jones 1999).
2. Control firewood cutting to stop the encroachment of user-created roads and the disturbance of vegetation and natural features in the RNA.
3. Allow fire to play a natural role in the RNA.

Soils

1. Consider soil types and erosion potential (e.g., slope instabilities) when planning activities in the analysis area, especially along the Agency Creek fault zone.

Transportation/OHV Management

Recommendations on BLM-administered Lands:

1. Implement the OHV designations in the Lemhi RMP Amendment (USDI-BLM, 2001). Review the location of mapped designated routes using GPS data, and correct the mapped routes for future editions of a published travel plan/map. During activity/project planning, complete necessary public involvement and environmental analysis to implement route changes that are more substantial than "plan maintenance."
2. Visit the Sandy Creek area to consider travel limitations (e.g., designated routes) on BLM-administered lands within 1/2 –mile of the FS boundary, to help the FS implement motorized travel restrictions in the West Big Hole Roadless Area.
3. Regularly maintain the Agency Creek Road to ensure drainage structures are functional and minimize sediment impacts to Agency Creek.
4. Continue regular maintenance of the Cow Creek Road and other efforts to stabilize the road surface.
5. Continue efforts to reduce sedimentation from the Yearian Creek and Ramsey Mountain roads.

Recommendations for BLM- and FS-administered Lands:

6. Complete an "open road" density assessment of combined (BLM/FS) miles of open road per square mile. Compare road density under existing management ("no action") with the proposed travel management from this watershed analysis. Develop recommendations for road closure/decommissioning.
7. Keep the designated snowmobile routes on BLM/FS lands as currently managed. Continue to maintain groomed trails via a Cooperative Agreement.
8. Ensure that BLM and FS routes connect across jurisdictions and type and season of motorized use are consistent.
9. Evaluate the Agency Creek Road in cooperation with the County for future upgrades and hazard removal.
10. Minimize roads in moderate-to-high-risk areas for erosion, sediment transport, and landslides. Design roads to better fit the land surface and avoid cut slopes that bring subsoil water flow to the surface.
11. Where possible, remove roads from flood plains or other areas subject to events that may affect hydrologic flows, erosion, or sedimentation.

12. Minimize soil disturbance activities in areas susceptible to establishment of exotic plant species.
13. Consider the balance between roaded natural and unroaded recreation settings, while considering the risks to aquatic strongholds and terrestrial habitats from road building.
14. Consider the need for commodity uses (e.g., livestock grazing, timber harvest, minerals development, recreation), resource management (e.g., fuels management), and public and tribal access when making travel management and roads management recommendations.
15. Implement measures to promote the public's safe, responsible use of authorized routes, including "Tread Lightly" information, ranger patrols, and appropriate signing of travel routes and information kiosks.
16. Ensure that designated routes shown on maps match GPS'd, drivable routes.

Recommendations on FS-administered Lands:

17. Pursue management changes in the next Travel Plan revision that would make all areas closed year long to motorized use except where designated.
18. Evaluate seasonal wildlife restrictions (dates/effectiveness) and recommend routes for seasonal restrictions. Seasonal restriction options are: (a) same as current; (b) align with BLM's dates; (c) align with IDFG dates.

Visual Resources

1. In Fiscal Year (FY) 2004 the Salmon Field Office BLM should assess the visual sensitivity of routes in close proximity to FS lands (such as the Ghoul Basin Road), using the FS definitions of sensitivity levels (USDA-FS, April 1974, Ag. Handbook Number 462). Notify the FS of any Sensitivity Level One or Two routes.
2. Based on the recommended travel route designations in this watershed analysis, in FY 2004 the FS should complete "seen area" mapping (of foreground, middleground, and background distance zones) from BLM and FS Sensitivity Level One and Two routes and the Lewis and Clark National Historic Trail. This inventory would be done for the purpose of identifying areas currently designated as VQO "Modification" or "Maximum Modification" that should be changed to a VQO of partial retention or retention. [Note: Amendment #7 to the Salmon National Forest LRMP states that scenery management of the Lewis and Clark National Historic Trail management area (1/4-mile either side of the designated trail) will be retention in the foreground and partial retention in the middleground and background (USDA-FS, 2000, page 4).]
3. Final scenery management recommendations should be based on identified visual resource parameters (e.g., variety classes/sensitivity levels/distance zone classifications and corresponding visual quality objectives - see USDA-FS, 1974, page 43)), but seek to balance visual resource management with other resource/commodity uses in the watersheds.
4. Change the visual quality objective for the Kenney Creek RNA to "Preservation."
5. Where feasible, open up views along the Lewis and Clark Backcountry Byway.
6. Consider reclaiming prior disturbance from mineral activity if lands can be restored to native vegetation (prioritize areas for reclamation to restore visual, vegetative, and other resources of concern).

Wildlife

1. Implement aspen and riparian habitat restoration projects to improve those wildlife habitats.
2. Implement travel management changes on FS lands.

3. Identify wildlife habitat recommendations for FS management indicator species utilizing the analysis area.
4. Manage human uses to protect deer and elk winter range.
5. Follow the Lynx Conservation Strategy for FS and BLM lands within the North Beaverhead Lynx Analysis Unit.

Appendix A
Special Status Terrestrial and Plant Species Known to Occur
on Lands Managed by the Leadore Ranger District (FS)
and/or Salmon Field Office (BLM)

Federally Listed Terrestrial Species

Canada lynx (*Lynx Canadensis*) -Threatened
Bald eagle (*Haliaeetus leucocephalus*) - Threatened
Gray wolf (*Canis lupus*) - Experimental/Nonessential Population

US Forest Service Intermountain Region (Region 4) Sensitive Terrestrial Species

Wolverine (*Gulo gulo*)
Fisher (*Martes pennanti*)
Western big-eared bat (*Corynorhinus townsendii*)
Spotted bat (*Euderma maculata*)
Harlequin duck (*Histrionicus histrionicus*)
Peregrine falcon (*Falco peregrinus anatum*)
Northern goshawk (*Accipiter gentilis*)
Great gray owl (*Strix nebulosa*)
Boreal owl (*Aegolius funereus*)
Flammulated owl (*Otus flammeolus*)
Three-toed woodpecker (*Picoides tridactylus*)
Spotted frog (*Rana pretiosa*)

Salmon-Challis National Forest Management Indicator Species (MIS)

Elk (*Cervus elaphus*)
Mule deer (*Odocoileus hemionus*)
Bighorn sheep (*Ovis canadensis canadensis*)
Mountain goat (*Oreamnos americanus*)
American marten (*Martes americana*)
Brown creeper (*Certhia Americana*)
Pygmy nuthatch (*Sitta pygmaea*)
Yellow warbler (*Dendroica petechia*)
Mountain bluebird (*Sialia mexicana*)
Vesper sparrow (*Pooecetes gramineus*)
Pileated woodpecker (*Dryocopus pileatus*)
Red-naped sapsucker (*Sphyrapicus nuchalis*)
Ruby-crowned kinglet (*Regulus calendula*)

Salmon-Challis National Forest Species of Concern

Pronghorn antelope (*Antilocapra americana*)
Moose (*Alces alces*)
Bobcat (*Lynx rufus*)
Brewer's sparrow (*Spizella breweri*)
Blue grouse (*Dendragapus obscurus*)
Spruce grouse (*Dendragapus canadensis*)

Salmon-Challis National Forest Species of Concern (continued)

Sage grouse (*Centrocercus urophasianus*)
Sharp-shinned hawk (*Accipiter striatus*)
Cooper's hawk (*Accipiter cooperii*)
Western boreal toad (*Bufo boreas boreas*)
Tailed frog (*Ascaphus truei*)
Long-toed salamander (*Ambystoma macrodactylum*)

US Forest Service Intermountain Region (Region 4) Sensitive Plant Species

(*species known to occur in the watershed analysis area)

Pink Agoseris (*Agoseris lackschewitzii*)
Lemhi penstemon (*Penstemon lemhiensis*)*
Flexible collomia (*Collomia debilis* var. *camporum*)
Douglas biscuitroot (*Cymopterus douglassii*)
Salmon twin bladderpod (*Physaria didymocarpa* var. *lyrata*)*
Marsh's bluegrass (*Poa abbreviata* var. *Marshii*)
Idaho range lichen (*Xanthoparmelia idahoensis*)*

BLM Sensitive Terrestrial Species

(2003 list of sensitive species known to occur on lands managed by the Salmon Field, BLM. The Idaho State list is longer, but the other species have not been documented in Lemhi County to date.)

Pygmy rabbit (*Brachylagus idahoensis*)
Greater sage-grouse (*Centrocercus urophasianus*)
Townsend's big-eared bat (*Plecotus townsendii*)
Fisher (*Martes pennanti*)
Wolverine (*Gulo gulo luscus*)
Peregrine falcon (*Falco peregrinus anatum*)
Prairie falcon (*Falco mexicanus*)
Northern goshawk (*Accipiter gentilis*)
Ferruginous hawk (*Buteo regalis*)
Flammulated owl (*Otus flammeolus*)
Calliope hummingbird (*Stellula calliope*)
Lewis' woodpecker (*Melanerpes lewis*)
Williamson's sapsucker (*Sphyrapicus throideus*)
Willow flycatcher (*Empidonax trailii*)
Hammond's flycatcher (*Empidonax hammondii*)
Olive-sided flycatcher (*Contopus borealis*)
Loggerhead shrike (*Lanius ludovicianus*)
Sage sparrow (*Amphispiza belli*)
Brewer's sparrow (*Spizella breweri*)
Common garter snake (*Thamnophis sirtalis*)
Western toad (*Bufo boreas*)

BLM Sensitive Plant Species

Lemhi penstemon (*Penstemon lemhiensis*)
Salmon twin bladderpod (*Physaria didymocarpa* var. *lyrata*)
Idaho range lichen (*Xanthoparmelia idahoensis*)
Lemhi milkvetch (*Astragalus aquilonius*).

Acronyms and Glossary

Acronyms Used

AML	Abandoned Mine Lands
AMP	Allotment Management Plan
AUM	Animal Unit Month
BLM	Bureau of Land Management
BP	Before Present
BMP	Best Management Practice
BURP	Beneficial Use Reconnaissance Program
cfs	cubic feet per second
CRMP	Coordinated Resource Management Plan
CWMA	County Weed Management Area
DEQ	Department of Environmental Quality
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FS	Forest Service
FY	Fiscal Year
GIS	Geographic Information Systems
ICBEMP	Interior Columbia Basin Ecosystem Management Project
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
LAU	Lynx Analysis Unit
LRMP	Land and Resource Management Plan
MIS	Management Indicator Species
mmbf	million board feet
NHL	National Historic Landmark
NHT	National Historic Trail
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSO	No-surface-occupancy
NST	National Scenic Trail
OHV	Off-highway Vehicle
RHCA	Riparian Habitat Conservation Area
RMO	Riparian Management Objective
RMP	Resource Management Plan
RNA	Research Natural Area
ROS	Recreation Opportunity Spectrum
SFO	Salmon Field Office
SHIPUSS	Screening/Habitat Improvement Prioritization for the Upper Salmon Sub-basin
SRMA	Special Recreation Management Area
USBWP	Upper Salmon Basin Watershed Project
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USRB	Upper Salmon River Basin

VRM	Visual Resource Management (BLM)
VQO	Visual Quality Objective (FS)
WUI	Wildland Urban Interface

Glossary Terms

Anadromous Fish – Species of fish which hatch and rear in fresh water, migrate to the ocean (salt water) to grow and mature, and migrate back to fresh water to spawn and reproduce.

Animal Unit Month (AUM) – The amount of forage needed to sustain one cow unit or its equivalent (one horse or five sheep, all over six months old) for one month (approximately 800 pounds of forage).

Beneficial Use – Any of the various uses which may be made of water, including, but not limited to: domestic water supply, industrial water supply, agricultural water supply, navigation, recreation, wildlife habitat, and aesthetics. A beneficial use is based upon actual use, the ability of a water body to support a non-existing use now or in the future, and its likelihood of being used in a given manner (Idaho Water Quality Standards – IDAPA 16.01.02.100).

Best Management Practice (BMP) – A practice or combination of practices determined by the state to be the most effective and practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals.

Critical Habitat – Habitat of Federally listed threatened or endangered species that is formally designated (by the Secretary of Interior or Commerce) as critical for the survival and recovery of the listed species. This habitat may be currently occupied or determined to be essential for areas outside the species' current range.

Endangered Species - Any species in danger of extinction throughout all or a significant portion of its range and has been officially listed as endangered by the Secretary of Interior or Commerce.

Endemic – An organism whose natural occurrence is confined to a certain region and whose distribution is relatively limited.

Euroamerican – For the purposes of this document, this term refers to anyone not of native North American descent.

Fire Groups – Ecosystems delineated by cover types and size classes to provide approximate classifications of fire potential based on historic processes and site potential.

Fire Regime – Periodicity and pattern of naturally occurring fires in a particular area or vegetative type, described in terms of frequency, biological severity, and area of extent (North Wind Environmental, Inc., 2002).

Fire Regime Condition Classes - Condition class is a description of ecosystem health, defined as follows:

Condition Class 1: For the most part, fire regimes are within historical ranges. Vegetation composition and structure are intact. The risk of losing key ecosystem components from the occurrence of fire remains relatively low.

Condition Class 2: Fire regimes on these lands have been moderately altered from their historical range by either increased or decreased fire frequency. A moderate risk of losing key ecosystem components has been identified on these lands.

Condition Class 3: Fire regimes on these lands have been significantly altered from their historical return interval. The risk of losing key ecosystem components from fire is high. Fire frequencies have departed from historical ranges by multiple return intervals. Vegetation composition, structure and diversity have been significantly altered. Consequently, these lands verge on the greatest risk of ecological collapse.

Fuel Model – Site-specific vegetation used in modeling to determine a wild- or prescribed fire’s rate of spread over time and space.

Fuel Model 2 – Open shrubs and pine stands that cover one-third or two-thirds of the area may generally fit this model; it may also include clumps of fuels that generate higher intensities and may produce fire brands (Rothermel, 1983, p. 11).

Fuel Model 10 – Any forest type may be considered if heavy down material is present, for example, insect- or disease-ridden stands, wind-thrown stands, over-mature stands with deadfall, and aged slash from light thinning or partial cutting (Rothermel, 1983, p. 12).

Greenstripping – Seeding an area with appropriate vegetation which has the potential to reduce the spread of wildfire.

Integrated Weed Management – The use of a combination of biological, chemical, mechanical, and cultural management techniques to control a weed species with minimal adverse effects to non-target organisms (North Wind Environmental, Inc., 2002).

Leasable Minerals – Minerals subject to lease by the Federal government under the Mineral Leasing Act of 1920: coal, oil, gas, phosphate, sodium, potassium, oil shale, sulfur, and geothermal steam.

Locatable Minerals – Generally, the metallic minerals subject to development specified in the General Mining Law of 1872; includes metallic minerals such as gold, silver, copper, and iron, and all other minerals not subject to lease or sale (limestone, talc, gypsum, etc.).

Management Indicator Species (MIS) (FS) - Any species, group of species, or species habitat element selected to focus management attention for the purpose of resource production, population recovery, maintenance of population viability, or ecosystem diversity. Management Indicator Species are selected because their population changes are believed to indicate the effects of management activities. Population trends of MIS will be monitored and relationships to habitat changes determined.

Mineral Withdrawal - Closure of public land to specific mineral development laws such as the Mining Law of 1872 and the Mineral Leasing Act of 1920. Withdrawal of public lands is subject to valid existing rights, such as valid mining claims and mineral leases which precede the withdrawal.

National Register of Historic Places (NRHP) – A register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, established by the National Historic Preservation Act and maintained by the Secretary of the Interior.

No-surface-occupancy (NSO) Stipulation – A stipulation which prohibits construction or placement of energy mineral development facilities (buildings, roads, drilling equipment, etc.) on a specified area of land surface.

Off-highway vehicle (OHV) (off road vehicle) - A motorized vehicle which can travel off of constructed road surfaces, such as a motorcycle, all-terrain vehicle, four-wheel drive vehicle, or snowmobile.

Old Growth – Forest land that is comprised of mature trees whose vigor is being maintained or declining. Old growth is characterized by plants and animals which prefer or depend upon a climax or late successional habitat. Old growth characteristics include (a) a patchy, multi-layered canopy with trees of several age classes; (b) the presence of large living trees; (c) the presence of larger standing dead trees (snags) and down woody debris; and (d) the presence of species and functional processes which are representative of the potential natural community.

PACFISH – A joint BLM and FS interim strategy for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho, and portions of California.

Prescribed Fire – A fire ignited by management actions to meet specific objectives that have been documented in a written prescribed fire plan and analyzed/approved in accompanying NEPA documentation (North Wind Environmental, Inc., 2002).

Recreation Opportunity Spectrum – A classification system which characterizes the ability of the land resource to provide opportunities for certain types of recreation experiences. Classifications (listed in order of increasing development (modification of the natural environment) and decreasing opportunities for solitude) include the following: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban.

Primitive: An essentially unmodified natural environment of fairly large size.

Semi-primitive Non-motorized: A predominantly unmodified natural environment of a size and location that provides a good to moderate opportunity for isolation from sights and sounds of man. The area is large enough to permit overnight foot travel within the area and presents opportunity for interaction with the natural environment with moderate challenge, risk, and use of a high degree of outdoor skills.

Semi-primitive Motorized: A predominantly unmodified natural environment in a location that provides good to moderate isolation from sights and sounds of man except for facilities/travel routes sufficient to support motorized recreational travel opportunities.

Roaded Natural: A predominantly natural environment with evidence of moderate permanent alternate resources and resource utilization. Evidence of the sights and sounds of man is moderate, but in harmony with the natural environment. Opportunities exist for both social interaction and moderate isolation from sights and sounds of man.

Rural: A substantially modified natural environment with obvious resource modification and utilization practices. Sights and sounds of man are readily evident, and the concentration of users is often moderate to high. Facilities are designed for specific activities or use by a large number of people. Developed sites, roads, and trails are designed for moderate to high use.

Research Natural Area (RNA) - An area in as near a natural condition as possible, which exemplifies typical or unique vegetation and associated biotic, soil, geologic, and aquatic features. The area is set aside to preserve a representative sample of an ecological community primarily for scientific and educational purposes.

Riparian Habitat Conservation Area (RHCA) – Portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. RHCA's include traditional riparian corridors, wetlands, intermittent headwater streams, and other areas where proper ecological functioning is crucial to maintenance of the stream's water, sediment, woody debris, and nutrient delivery systems. (USDA-FS and USDI-BLM, 1994, p. Glossary-4)

Riparian Management Objectives (RMOs) – Quantifiable measures of stream and streamside conditions that define good fish habitat and serve as indicators against which attainment or progress toward attainment of goals will be measured (USDA-FS and USDI-BLM, March 1994, Glossary-4).

Road - A vehicle route which has been improved and maintained by mechanical means to ensure relatively regular and continuous use.

Road Density – For the purposes of this watershed analysis, road density includes the miles of constructed/maintained roads and vehicle ways (two-track routes) shown on USGS maps within a specified land area, usually expressed as miles of road per square mile.

Sensitive Species (BLM) – Plant and animal species identified by the BLM State Director as sensitive; may include species (a) under status review by the USFWS or NMFS; (b) whose numbers are declining so rapidly Federal listing may become necessary; (c) with small and widely dispersed populations; or (d) inhabiting ecological refugia of other specialized or unique habitats (BLM Manual 6840).

Sensitive Species (FS) - Those plant and animal species identified by a Forest Service Regional Forester for which population viability is a concern, as evidenced by (a) significant current or predicted downward trend in population numbers or density or (b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Special Recreation Management Area (SRMA) - BLM administrative units established to direct recreation program priorities, including the allocation of funding and personnel, to those public lands where a commitment has been made to provide specific recreation activities and experience opportunities on a sustained yield basis.

Stand – A plant community which possesses uniformity in vegetation type, age class, vigor, size class, and stocking class and is distinguishable from adjacent plant communities.

Stream Channel Types – The following broad-level classification criteria for stream channel types are from Rosgen (1996):

A channel - Very steep, deeply entrenched, debris-transport streams. Very high relief. Erosional, bedrock or depositional features; debris flow potential. Vertical steps with deep scour pools; waterfalls.

B channel - Moderately entrenched, moderate gradient, riffle-dominated channel with infrequently spaced pools. Very stable channel and profile. Stable banks. Moderate relief, colluvial deposition and/or residual soils. Moderate entrenchment and width/depth ratio. Narrow, gently sloping valleys. Rapids dominate with occasional pools.

C channel - Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains. Broad valleys with terraces, in association with floodplains, alluvial soils. Slightly entrenched with well-defined, meandering channel. Riffle-pool bed morphology.

Threatened Species- Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Treaty rights - Those provisions negotiated in treaties between the U.S. government and Indian tribes which retain certain "rights" for the Indian tribes, such as hunting and fishing rights, land rights, water rights, etc.

Vehicle Way (Way) – A route established and maintained solely by the passage of motor vehicles.

Visual Resource Management (VRM) Classes (BLM) –

Class I - Preservation. The objective of this class is to maintain a landscape setting that appears unaltered by humans. Natural ecological changes and very limited management activity are allowed. Any contrast created within the characteristic landscape must not attract attention. It is applied to wilderness areas, some natural areas, wild portions of Wild and Scenic Rivers, and other similar situations where management activities are to be restricted.

Class II - Retention. The objective of this class is to design proposed alterations so as to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III - Partial Retention. The objective of this class is to design proposed alterations so as to partially retain the existing character of the landscape. Contrasts to the basic elements (form, line, color, and texture) caused by a management activity may be evident and begin to attract attention in the characteristic landscape. However, the change should remain subordinate to the existing characteristic landscape. Structures located in the foreground distance zone (0-2 mile) often create a contrast that exceeds the VRM class, even when designed to harmonize and blend with the characteristic landscape. This may be especially true when a

distinctive architectural motif or style is designed. Approval by the District Manager is required on a case-by-case basis to determine whether the structure(s) meet the acceptable VRM class standards and, if not, whether they add acceptable visual variety to the landscape.

Visual Quality Objectives (FS) – Categories of acceptable landscape alteration measured in degrees of deviation from the natural appearing landscape.

Preservation: Ecological change only.

Retention: Human activities should not be evident to the casual Forest visitor.

Partial Retention: Human activities should remain visually subordinate to the characteristic landscape.

Modification: Human activity may dominate the characteristic landscape but must, at the same time, follow naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in the foreground or middleground.

Maximum Modification: Human activity may dominate the characteristic landscape, but should appear as a natural occurrence when viewed as background.

Watershed – A topographically defined area drained by a river, stream, or system of connecting rivers or streams such that all outflow is discharged through a single outlet.

Watershed Analysis – A procedure used to characterize and document the human, aquatic, riparian, and terrestrial features, conditions, processes, and interactions within a defined area. It provides a context and focus for resource activity or project planning, design, and implementation.

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