CHAPTER 3 - AFFECTED ENVIRONMENT

This Chapter summarizes the physical, biological, social, and economic environments of the affected project area and is the baseline for the comparisons of effects Chapter 4. Despite the word "affected" in the title, this chapter does not present the effects of the alternatives. It describes those components of the environment that have been or may be affected by the proposed action or alternatives. This chapter is organized by Key Issues as identified in Chapter 1.

Changes to this Chapter between draft and final EIS include the incorporation of new management direction from the recently revised Sawtooth FLRMP (July 2003). Background research and a field investigation for heritage resources were conducted during the 2003 summer field season. The Heritage Resource section has been updated from the DEIS to include this new information.

OVERVIEW

On August 22, 1972, Congress passed Public Law 92-400 (PL 92-400) establishing the SNRA. The intent of establishing the SNRA was to protect the area's primary values - natural, scenic, pastoral, historic, and fish and wildlife values, and to enhance the recreation attributes.

The Upper and Lower East Fork Cattle & Horse Allotments are located in the White Cloud Mountain range in Custer County, south of Clayton, ID and are administered by the Sawtooth National Recreation Area (SNRA) of the Sawtooth National Forest. The allotments are located in portions of Townships 7 and 8 North and Ranges 15, 16, and 17 East, Boise Meridian.

The Upper East Fork Allotment covers 58,000 total acres, of which 3,450 acres are currently considered appropriate for grazing. The remaining area is timbered or steep and rocky. Major drainages include Bowery Creek, the South and West Forks of the East Fork Salmon River, and the main stem of the East Fork Salmon River above Germania Creek. The Bowery Creek drainage, within the Sawtooth National Forest proclaimed boundary but outside the SNRA proclaimed boundary, is administered by the Challis National Forest. A private land parcel of about 160 acres owned by the permittee lies within the allotment.

The Lower East Fork Allotment covers 73,000 total acres, of which 15,000 acres are currently considered appropriate for grazing. The remaining area is timbered or steep and rocky. Major drainages include Silver Rule, Mill, Holman, French, Sullivan, Big Lake, Big Boulder, Little Boulder, Wickiup, and Germania Creeks.

FLRMP standards specific to the SNRA are cited here:

Sawtooth National Recreation Area General Management Standards

- Manage both Federal and private lands to ensure the preservation and protection of the natural, scenic, historic, pastoral, and fish and wildlife values and to provide for the enhancement of the associated values in accordance with Public Law 92-400. (0301, III-131)
- Management, utilization, and disposal of natural resources on federally owned lands (such as timber, grazing, and mineral resources) shall be allowed only insofar as their utilization

does not substantially impair achievement of the purposes for which the recreation area was established. "Substantial Impairment" is defined as that level of disturbance of the values of the SNRA that is incompatible with the standards and guidelines of the Forest Plan (contained in this document). The proposed activities shall be evaluated as to (1) the period of impact, (2) the area affected, and (3) the importance of the impact on the SNRA values. (0302, III-131)

- The standard to which all activities on the SNRA are conducted is found in Public Law 92-400 Section 2.(a) (3): "the management, utilization and disposal of natural resources on federally owned lands such as timber, grazing and mineral resources, insofaras their utilization will not substantially impair the purposes for which the recreation area is established." (SNST01)

The goals, objectives, standards and guidelines which apply to the East Fork (Management Area 3) can be found in Chapter III of the Sawtooth FLRMP (2003).

LIVESTOCK MANAGEMENT AND DISTRIBUTION

Livestock grazing has been an important activity in the East Fork of the Salmon River since historic settlement of the area. With establishment of Federal Reserves and National Forest System (NFS) it was formally recognized and authorized under term livestock grazing permits. SNRA enabling legislation of 1972 (PL 92-400) considered and provided for the continued grazing use of NFS lands as part of the historic and pastoral values that led to the establishment of the SNRA. Livestock grazing in the East Fork of the Salmon River is viewed as one of the multiple uses of the area. Direction for continued management of the grazing resource is identified in the Sawtooth FLRMP.

As with much of the western U.S., grazing use and practices have changed considerably in the East Fork of the Salmon River. Much of the area at one time experienced common grazing use by sheep, cattle and horses. Market and management issues have lead to an evolution in grazing operations on the Upper and Lower East Fork Allotments to the current permitted authorization for cattle grazing (FS INFRA Database).

Table III-0

Current Grazing Permits					
Allotment	Livestock Number	Livestock Class	Date ON	Date OFF	HM's
Upper East Fork C&H	254	Cow/Calf	6/18	10/15	1016
Lower East Fork C&H	30	Cow/Calf	6/23	9/30	
Lower East Fork C&H	254	Cow/Calf	6/11	9/30	
Lower East Fork C&H	29	Cow/Calf	6/11	9/30	
Lower East Fork C&H	5	Yearling	6/11	9/30	
Lower East Fork C&H	248	Cow/Calf	6/23	9/30	
Lower East Fork C&H	566				1993

Controversy and conflict between livestock grazing and other resource uses has also been associated with grazing in the East Fork of the Salmon River over the long term. Permitted livestock operators, the Forest Service, other users and interested parties have actively been involved in addressing these conflicts over the years. In the late 1970's and early 1980's, the Idaho Rangeland Committee and the Challis Experimental Stewardship Group worked intensively with a cross section of interest groups and users to develop grazing allotment management plans to address the conflicts, improve resource conditions, and provide stability to the livestock grazing program. These efforts yielded important changes in management systems and grazing practices. The permittees and their families have lived in this area and grazed these allotments for several generations. They express strong commitment to managing natural resources for their posterity and are intent on maintaining local livestock ranching operations. They have strong opinions based on their experience and history on the allotments that these rangelands have shown vast improvement and exhibit upward trends in both riparian and upland ecosystems.

The most current Allotment Management Plan (AMP) for the Upper East Fork Allotment was completed in 1976. The most current for the Lower East Fork Allotment was written in 1981 and revised in 1985. Since development of these plans, changes have occurred affecting grazing management on the allotments. These include:

- The development of the Sawtooth National Forest Land and Resource Management Plan (Sawtooth LRMP) in 1987 with specific direction and standards and guidelines affecting both allotments. A number of the standards and guidelines from the Forest Plan were included in part 3 of the term grazing permits for these allotments in 1991.
- The listing of chinook salmon as 'threatened' under the Endangered Species Act (ESA) in 1992.
- The listing of steelhead trout as 'threatened' in 1997.
- The listing of bull trout as 'threatened' in 1998.
- The listing of Canada lynx as 'threatened' in 2000.
- Binding consultation agreements and Biological Opinions have been established between the SNRA and the NOAA Fisheries (previously known as the National Marine Fisheries Service) and the U.S. Fish and Wildlife Service (USFWS) for ESA-listed species on the allotments. (Biological Assessments, Biological Opinions and documentation of consultation requirements are available in the project record.)

These changed conditions have required modifications in management, grazing strategies, proper use standards and mitigation measures for ESA-listed species, restricted stream access, and reductions in grazing period.

Since 1992, when salmon were first listed under ESA, an adaptive grazing management strategy has been applied through annual grazing instructions. This process has been necessary to meet NOAA Fisheries and USFWS consultation requirements. In 2000, as a result of bull trout consultation commitments, grazing seasons were modified in drainages with bull trout inhabited streams. The Forest Service required livestock to be removed by August 15, a date determined by oversight agencies to predict the onset of bull trout spawning activity.

In addition to the more restrictive management standards, modification of the sequence of pasture use, timing of use, and monitoring intensity has occurred. This has focused management and

monitoring emphasis on grazing impacts in key riparian areas. Some key monitoring requirements include:

- End-of-season residual streamside stubble height in key areas to determine successful compliance of the prescribed grazing strategy for each pasture.
- Indicators of allowable livestock use, referred to as "triggers", to determine when livestock should be removed from a drainage or pasture. These “triggers” include streamside and meadow stubble heights, upland forage utilization, streambank alteration, woody browse utilization, and pasture move dates.

Where monitoring identifies that prescribed standards are not met, ESA consultation agreements require a review of all pastures failing to meet the requirements, by a team consisting of specialists from the FS, NOAA and USFWS. These reviews have resulted in adaptive management actions aimed at modifying grazing practices to meet established standards, other consultation requirements, and Sawtooth LRMP direction.

The average actual grazing use, which has occurred for the Upper East Fork Allotment from 1992 – 2002, is 777 head months (HM’s). This equates to approximately 76% of the permitted use on the allotment. The average actual grazing use on the Lower East Fork Allotment from 1993 – 2002 is 1463 HM’s, approximately 73% of the permitted use. At these reduced grazing use levels, allowable use levels continued to be exceeded.

The Forest Service conducted an evaluation of the allowable grazing use levels that would be sufficient to stay within the established management standards and meet resource management objectives on a sustained basis. This analysis, which compared allowable use numbers versus actual use numbers and days of use, indicates that allowable grazing use on the currently described allotments should be 553 HM’s on the Upper East Fork Allotment and 962 HM’s on the Lower East Fork Allotment. This equates to 54% and 48% respectively of the current permitted use. The permittees believe that these allowable use levels should be considerably higher and that additional improvements (fences, livestock water facilities, and prescribed burns) and different management practices (deferred rotation) could be implemented to maintain higher levels of allowable grazing use.

Modifications to grazing management practices since 1991 have not been sufficient to address changed conditions and meet associated standards and management objectives. The permittees have made good faith efforts to address these problems, including taking voluntary partial non-use (reducing the grazing season and number of livestock on an annual basis), applying intensive herding practices, building drift fences and water developments, and attempting a time-controlled grazing system. These efforts have resulted in improvement. However, problems remain with livestock straying off the allotments or into rested pastures, livestock remaining on the allotments after the close of the grazing period, and use exceeding established standards on key riparian areas.

Modification of allotment boundaries, stocking levels, season and timing of grazing use, management systems and grazing prescriptions are considered administrative actions that may be made in the adaptive management process. While annual reductions in grazing use and grazing season have been made as part of the adaptive management process, neither the permitted grazing use nor allotment boundaries identified on current term grazing permits have been modified.

Ninety percent of the upland vegetation communities on both allotments are estimated to be in satisfactory condition, meeting Sawtooth FLRMP objectives for mid to late seral ecological condition. This estimate is based on a process where grazed rangeland sites were traversed by foot or horseback, and plant cover, species composition, vigor and age class were compared with similar ungrazed sites in the area. Shrubs such as bitterbrush appear to have normal distribution. Some of the more palatable native forbs appear to be missing or at a reduced density on sites that exhibited impacts from heavy grazing. Soil condition was documented by assessing soil movement such as rilling as well as by making note of plant debris covering the soil surface. Areas estimated as not meeting Sawtooth FLRMP objectives include loafing sites, bluegrass meadows adjacent to water sources, trailing areas where topography concentrates trailing impacts, and aspen stands.

Upland "lentic" riparian areas such as seeps, springs and wet meadows readily accessible to cattle grazing have been evaluated during allotment inspections and field observations. The sites that are readily accessible to livestock grazing exhibit pedestal formation, soil compaction, reduced plant vigor, productivity, and altered plant species composition. Many sites that originally supported stands of native sedges, grasses and riparian forbs are now dominated by Kentucky bluegrass and other plant species associated with disturbed sites. In some areas the seedling and sapling component in willow, aspen and cottonwood stands are missing or inadequate to maintain healthy stands over the long-term. This is likely the result of impacts from livestock grazing, wildlife browsing, and an altered fire regime. Lentic riparian sites observed in steeper, less accessible areas generally do not exhibit these same characteristics.

There are 4 water troughs and 3 small collection pits in hillside spring sites on the Upper East Fork Allotment. There is more extensive water development on the Lower East Fork Allotment including approximately 23 water troughs at springs, 4.3 miles of pipeline, and 26 ponds or collection pits. These livestock water facilities have been developed to improve the distribution of livestock in upland rangelands and draw them away from bottomland riparian areas. Although livestock make use of these developments, distribution continues to be a challenge. There are also locations where livestock water sources could be developed. However, where water is developed, the effects discussed in the previous paragraph (concerning seeps, springs and wet meadows) are likely.

Where topographic barriers are inadequate, fences have been constructed to contain livestock within the allotment boundaries and individual pastures. There are approximately 3.9 miles of fence in the Upper East Fork allotment and 7.8 miles in the Lower East Fork allotment. These fences consist of a combination of conventional barbwire containment fences and drift fences where the terrain dictates. The integrity of fences is always a problem in the presence of rough terrain, wildlife, and gates left open by recreation users. This accounts for many, (if not most) of the incidents of livestock being in a non-permitted area.

The permittees have increased livestock herding practices, moving cattle away from riparian bottomlands and streambanks to lesser-used uplands. While use data is inconclusive, this practice may have contributed to a longer grazing period. This, along with other management practices, has resulted in improved riparian conditions in many stream reaches. However, these practices have not adequately reduced livestock pressure on riparian areas sufficient to meet all established grazing standards and objectives. Approximately 14% of stream miles within the two allotments

are not meeting or trending towards achieving established vegetation management objectives (Table III-3, *Characteristics of streams within the major hydrologic drainages of the East Fork allotments).*

Upper East Fork Allotment

The allotment boundaries for the Upper East Fork allotment have been in place since 1979. Pastures within the allotment have varied, but currently consist of the Grouse/Albert, East Fork, West Pass, Bowery / Long Tom, and Narrow Canyon pastures. One permittee holds a term grazing permit for 254 cow-calf pairs from June 18 to October 15 (1,016 HM's). This permit was first issued to the current permittee on 10/23/79.

Control of livestock in the remote, forested, steep and dissected terrain of the allotment is an on-going problem. Typical management issues include livestock straying out of allotment boundaries or into previously grazed pastures, livestock remaining on allotments after the designated off-date, and repeated use of riparian areas. Relatively small numbers of livestock remaining in areas where allowable use standards have been met are found to graze riparian forage in excess of allowable standards in a very short time. The large land area and ruggedness of terrain makes the allotment difficult for riding and herding. Many parts of the allotment are so remote that it takes a half–day of riding to reach problem areas. Scattered livestock are often difficult to find because of forest cover and the rugged topography.

Livestock drift off the allotment into Grandprize Gulch of Pole Creek or the higher subalpine basins of the South Fork from remote areas in the South and West Forks of the East Fork Salmon River. Relatively small amounts of capable range are scattered in riparian corridors and avalanche chutes through the steep, inaccessible area. Cattle can be difficult to find here.

Management problems are illustrated by conditions on the Upper Bowery/Long Tom drainages and the South and West Forks of the East Fork Salmon River. The Upper Bowery/Long Tom area is remote and composed of steep high elevation drainage heads with relatively small percentages of capable range. Monitoring has shown that narrow riparian corridors sustain heavy grazing use within three weeks of livestock turn-in, despite riding and herding efforts. These riparian areas show evidence of severe historic grazing effects including gullying, bank shearing, trampling, and alternation of natural hydric plant communities.

Much of the capable range in the Upper East Fork allotment is not accessible due to steepness, distance from water or management challenges. Consequently, the most easily accessible areas with the greenest forage and close proximity to water receive much higher proportionate use.

Riparian allowable use standards have been exceeded in seven out of eleven years. Local overuse by recreational pack stock has compounded the effects of permitted livestock. Complaints by recreationists have focused on the appearance from the Bowery Creek trail. Rest strategies have been applied in recent years to allow for recovery of historically degraded riparian corridors but there have been problems keeping livestock out during rested years. Livestock remaining after designated off dates are a repeated concern, as well as livestock drifting off the allotment into the adjacent drainage.

In the Bowery pasture, which is used last on the Upper East Fork allotment, herding efforts and removing cattle 3 weeks early (9/25) have not been sufficient to prevent repeated overuse in

riparian areas. The above streamside corridors exhibit evidence of historic grazing use to the extent that streambanks and riparian vegetation is not meeting or moving towards Sawtooth FLRMP objectives. A period of rest is necessary to allow for recovery of these degraded stream reaches.

Lower East Fork Allotment

The current boundaries on the Lower East Fork allotment have been in place since 1985. There are three pastures within the allotment: French Creek, Big Lake Creek and Boulder Creek pastures. Each pasture is divided into units, which would continue to be grazed as outlined in Annual Operating Instructions each year.

On the Lower East Fork Allotment, problem areas are represented by the Big Boulder Pasture, upper Silver Rule / Big Lake Creeks, and Sullivan Creek.

Riparian allowable use standards in Sullivan Creek have been exceeded 8 of the past 9 grazing seasons. Streamside corridors such as Sullivan Creek, exhibit evidence of historic grazing use to the extent that streambanks and riparian vegetation are not meeting or moving towards FLRMP objectives. Managing for reduced levels of grazing use or rest has been difficult. A recently constructed fence on the watershed divide between Sullivan Creek and O'Calkins Gulch helps provide for exclusion of livestock from this drainage when it is rested. However, the fence needs to be extended by about ¼ mile to be effective.

In the Upper Silver Rule / Big Lake Creek area, which includes Railroad Ridge, the main concern is avoiding grazing and trampling effects to sensitive plants, alpine fellfield plant communities, and whitebark pine regeneration. The vast majority of this area is above 9,000 feet in elevation and listed in original range analysis maps as barren or unsuitable for cattle grazing. Exceeding allowable use standards on subalpine wet meadows and riparian areas is common, particularly at the headwater springs and meadows of Big Lake Creek. Fencing is an impractical option for protecting sensitive plants because of the wide dispersal of plant locations throughout the area, shallow, rocky soils, and snow loading on fences. Cattle drift into Big Boulder Creek often leads to recreation uses conflicts.

The most difficult area on the allotment to manage is the Big Boulder Creek Pasture (from Big Boulder Creek through Germania Creek). Capable range is a small percentage of the permitted area. The terrain is remote, steep, high elevation, dissected by canyons and ridges, and largely forested or barren/rocky. Cattle drift into the White Cloud Mountain lakes causing recreation use conflict. This has occurred five out of the seven years the pasture has been grazed. Livestock commonly drift into Fourth of July Lake, Washington Lakes, and Chamberlain Lakes basins from Germania Creek and Little Boulder Creek drainages.

Drifting cattle in high use recreation areas has generated local controversy and media attention. Livestock drift into the restricted Frog and Little Redfish Lake areas has been a problem since the SNRA was established. Fencing does not appear to be a practical option because of the excessive length required over difficult terrain. Providing effective livestock herding is difficult due to the remoteness, the terrain, and the economic impracticality of providing sufficient riders to cover the entire area.

The 1987 FLRMP grazing standard required leaving a 4-inch stubble height in riparian grass and grass-like plant species along the green line. There were problems meeting this management standard in key areas throughout the Lower East Fork Allotment. Riparian allowable use standards have been exceeded in key riparian areas, such as upper Big Boulder Creek meadows, Little Boulder and Chain Lakes Creek Meadows, Upper Wickiup Creek basin, and Germania Creek meadows. In recent years, livestock grazing has been reduced through a combination of voluntary permittee non-use and a shortened grazing season with an average off date of August 25 (past three years). Various grazing strategies such as time-controlled grazing, and different sub-pasture rotation sequences have been attempted, but have not been successful in meeting standards without reducing the grazing season.

Sawtooth FLRMP standards relative to Range Management include:

- Management actions shall be designed in a manner that maintains or restores water quality to fully support beneficial uses and native and desired fish species and their habitat, except as allowed under SWRA Standard 4. (SWST01)
- Management activities that may affect soil detrimental disturbance (DD) shall meet the following requirements:
  1. In an activity area where existing conditions of DD are below 15 percent of the area, management activities shall leave the area in condition of 15 percent or less detrimental disturbance following completion of the activities.
  2. In an activity where existing conditions of DD exceed 15 percent of the area, management activities shall include mitigation and restoration so that DD levels are moved back toward 15 percent or less following completion of the activities. (SWST02)
- Integrated Weed Management shall be used to maintain or restore habitats for sensitive plants and other native species of concern where they are threatened by noxious weeds or non-native invasive plants. (NPST11)
- Maximum forage utilization of representative area within each pasture shall not exceed the values shown at the end of growing season. Variation in utilization standards in order to achieve specific vegetative management objectives shall occur with a site-specific or project-level decision according to direction in FSM 1922.5:
  1. Riparian Areas: Maximum 45 percent use or retain a minimum 4-inch stubble height of hydric greenline species, whichever occurs first.
  2. Upland Vegetative Cover Types: Early season or season long pastures – 40 percent use.Vegetative slow growth, after seed ripe conditions, or late season pastures – 50 percent use. (RAST01)
- Livestock trailing, bedding, watering and other handling efforts shall be limited to those areas and times that maintain or allow for restoration of beneficial uses and native and desired non-native fish habitat. (RAST02)
- New, constructed or replaced livestock water developments must provide access and escape to and from water for all types of wildlife. (RAST09)
- Forage utilization for riparian areas will not exceed 30 percent use of most palatable forage species, or must retain a minimum 6-inch stubble height of hydric greenline species, which ever occurs first, when riparian goals and objectives are not being met. (03109)
- Livestock fences must provide for big-game passage. (03110)

Plant Diversity

The Upper and Lower East Fork allotments are characterized by many subalpine and alpine plant communities that occur on mountain ridgetops, slopes and basins generally above 8,000 to greater than 10,000 feet. Alpine and sub-alpine plant species persist in high elevation environments primarily through special adaptations such as low mat or cushion growth forms and higher levels of certain photoreactants that reflect intense solar radiation. At such high elevation, the growing season is often very short and intense UV light is common. The phenology (timing) of growth and flowering for most montane and alpine plant species is determined by the timing of snowmelt, which is determined by the amount of snowfall and spring temperatures (Inouye and Barr, 2001). Upland and high elevation plants in this area are often snow-covered until early July and then are subject to killing frosts in late August. Global climate changes may alter the timing of growth, flowering, and interaction with pollinators and may make such species more vulnerable to livestock impacts (Inouye and Barr, 2001). Soils supporting these plants are generally poorly developed and highly erosive. Given the short growing season and somewhat infertile and unstable soils, alpine and subalpine plants are subject to grazing and associated impacts such as trampling or congregation over their entire growth period, unlike plants in lower elevations, which benefit from "range readiness".

Alpine zones occur above tree line in mountainous regions in contrast to subalpine (immediately below tree line) and montane (generally forested) zones. Alpine habitats are sensitive and often-understudied ecosystems composed of dense turf-like or cushion communities and typically infertile shallow soils. Alpine systems and species often serve as a model for predicting likely impacts from climatic change such as global warming (Vitousek, 1992; Braun and Brown, 2001). Rapid changes can be detected over a small amount of space and time within these areas and may be useful for predicting climate change impacts in biota in lower elevations. Air pollution has been documented as a stressor of alpine ecosystems. Linked with climate change and increased UV radiation, air pollutants pose threats to wildlife, biogeochemical processes, plant growth and phenology, and surface water quality (Iuouye and Barr, 2001; Tonnessen, 2001). Cumulative effects of livestock grazing, land management activities, recreational impacts, and environmental changes will be discussed further (see Alpine effects section).

The White Cloud Peaks consist of extremely steep and rugged slopes that provide little opportunity for extensive alpine vegetation development (Richardson and Henderson, 1999). Railroad Ridge, however, is an exception with gently sloping terrain that supports some of the most unique and well-developed alpine plant communities in Idaho. The substrates of Railroad Ridge are composed of granitic material and glacial deposits of silecious black argillite mixed with occasional fine sandstone and sandy limestone. Other substrates found within this area include sedimentary rock, metasedimentary rock, and intrusive rocks such as granodiorite and aplite. This area also receives more precipitation than other alpine areas studied in Idaho (Richardson and Henderson, 1999). As such, Railroad Ridge and surrounding alpine and subalpine habitats support a wider variety of alpine communities than in any other Idaho studies.

Railroad Ridge supports eight community types that represent some of the general physiognomies found in other North American alpine ecosystems (i.e. fell-field, turf, and snowbed) (Richardson and Henderson, 1999). However, other communities found on Railroad Ridge are uncommon and known only from a few alpine sites in Idaho and the Great Basin (i.e. *Ivesia gordonii* / fellfield).

Indeed, the Northern sagewort, *Artemisia campestris* community has not been documented in any other Idaho alpine studies (Richardson and Henderson 1999). This area is also host to several extremely rare Threatened, Endangered, Proposed, Candidate, or Sensitive (TEPCS) species (discussed below). Unique substrate, increased precipitation, and topography as compared with other alpine areas in Idaho and the Great Basin, make Railroad Ridge and the surrounding area more botanically diverse than most alpine communities in North America.

Range monitoring and botanical surveys within the Upper and Lower East Fork Allotments have recorded evidence of moderate to high livestock impact, mostly through trampling, soil disturbance or loafing within these fragile areas. Some excess livestock use has been observed on the west side of the Railroad Ridge outside of the Upper East Fork allotment. Observed grazing use has been fairly light in most alpine plant communities on this allotment, except for small-localized impact areas on ridgetops, where cattle tend to loaf or congregate. Cattle tend to spread out in very small groups of 4 to 10 head in higher elevations, following ridgetops and drainages. Cursory range inspections have found high elk use and an apparent below-normal plant diversity in some alpine basins.

In addition to unique alpine and subalpine communities, the Upper and Lower East Fork allotments are hosts to occupied or potential habitat for several TEPCS plant species. These TEPSC species will be discussed in detail below. For TEPC species, the USDA Forest Service is responsible for implementing the Endangered Species Act (ESA) within their authorities. These responsibilities include, but are not limited to, efforts to promote the conservation and recovery of listed species, and provisions to conserve the ecosystems upon which listed species depend. Sensitive species require special management efforts and conservation needs under Forest Service Handbook guidelines (FSH 2609.25, 1988) and Forest Service Manual directives (FSM 2670), and they are examined separately from the sensitive species. The U.S. Fish and Wildlife Service (USFWS) monitors and prescribes management for federally listed threatened and endangered plant species. The National Forest Management Act and Forest Service policy require that National Forest System lands be managed to maintain populations of all existing native animal and plant species at or above minimum viable populations levels. A viable population is the maintenance of enough individuals throughout their range to perpetuate the existence of the species in natural, self-sustaining populations.

Table III-1 provides a list of plants that have state or federal status as threatened, proposed, or candidate species or Region 4 Sensitive or proposed sensitive status. There are no plants currently listed as endangered within the Sawtooth National Forest.

Table III-1 Threatened, Proposed, Candidate, Sensitive or Proposed Sensitive, or Watch Species within the Upper and Lower East Fork Allotments

Scientific Name	Common Name	Status	Habitat Description
Botrychium lineare	Slender Moonwort	**Candidate**	Alpine, grassland, meadow, forest, cliff
Spiranthes diluvialis	Ute ladies'-tresses Orchid	**Threatened**	Riparian, streamside, lakeside
Artemisia campestris ssp. borealis var. purshi	Northern Sagewort	Proposed Sensitive	Alpine,

Astragalus vexilliflexus var. *nubilus*	White Cloud milkvetch	Sensitive	Subalpine/alpine
Astragalus amblytropis	Challis milkvetch	Proposed Sensitive	Shrublands
Carex breweri ssp. paddoensis	Brewer's Sedge	Proposed Sensitive	Grassland/alpine
Draba globosa	Pointed draba/rockcress draba	Proposed Sensitive	Alpine
Primula incana	Silvery/Jones' Primrose	Proposed Sensitive	Riparian – meadow, hotsprings
Salix farriae	Farr's Willow	Proposed Sensitive	Subalpine/riparian
Saxifraga adscendens ssp. oregonensis	Wedge-leaf Saxifrage	Proposed Sensitive	Alpine, rock

Threatened, Endangered, Proposed, Candidate (TEPC) Plant Species

Slender Moonwort – *Botrychium lineare*

Slender moonwort, *Botrychium lineare*, was discovered on Railroad Ridge in 2002 just below the western boundary of the Upper East Fork Allotment. This is the only known population of this rare fern in Idaho and is the largest known population of this species known globally. Potential habitat also exists for this species throughout the White Cloud Peaks and within the allotments examined here.

In July 1999, the USFWS was petitioned to add the slender moonwort, *Botrychium lineare*, to the List of Threatened and Endangered Plant Species. The Service published the 90-day petition finding and initiated a 12-month status review in May 2000. On June 6, 2001, the FWS found that a petition to list *B. lineare* as threatened was warranted, but preparation of a proposed rule was precluded by other higher priority listing actions. FWS, therefore, placed the slender moonwort on the candidate species list (Federal Register Vol. 66, No. 109, 2001).

In the United States, Slender moonwort, is currently known from a total of ten populations: three in Colorado, two in Oregon, three in Montana, one in Washington, and one in Idaho. The total number of individuals for all ten occupied sites is about 352 (190 without the SNRA population (Rey-Vizgirdas, 2000), although this number should be viewed as an estimate since *Botrychium* species do not always come up every year and exist below ground for most of their life cycle (Federal Register Vol. 66, No. 109, 2001). Only five populations contain more than 15 individuals (USDI FWS 2002). The largest known population to date is found on the Sawtooth NF, with an estimated 200 (162 counted in 2002) individuals (Donaldson, , 2003). Two of the other large populations are found in Montana and one occurs in Colorado. Of the remaining six slender moonwort populations, four occur on Federal land, including the Pike-San Isabel NF (Colorado), Glacier National Park (Montana), Wallowa-Whitman NF (Oregon), and Colville NF (Washington). One population occurs on private land in Lostine Canyon, Oregon, which is a private inholding within the Wallowa-Whitman NF. The slender moonwort site in Lake County, Colorado is currently only known from an herbarium specimen consisting of two slender moonwort plants collected in 1992 at 10,640 feet elevation (3,243 meters) near Leadville, Colorado.

Habitat - Previous distribution data suggested that the amount of habitat occupied by the *B. lineare* appears to be very small. The population found on the SNRA, however, appears to be scattered over a 100-acre area making it the largest known population of this species. Other sites are smaller than 465 square meters (5,000 square feet). The small size of existing slender moonwort populations makes this species vulnerable to extirpation due to random naturally occurring events. A single random event could extirpate a substantial portion or all of the individuals at a given site. This diminutive fern was located on sparsely vegetated rocky outcrops and ridgelines. Associated species included goldenrod, gooseberry, green gentian, oat grass, stonecrop, flax, silvery lupine, littlebunch lupine, mat milkvetch, little flower Penstemon, whiteleaf phacelia, prickly sandwort, paintbrush, yarrow, and sagewort.

The habitat for the slender moonwort has been described as "deep grass and forbs of meadows, under trees in woods, and on shelves on limestone cliffs, mainly at higher elevations" (Wagner and Wagner 1994), but they also state that to describe a typical habitat for this species would be problematic since the known sites are so different. Also, its current and historically disjunct distribution ranges from sea level in Quebec to nearly 3,000 meters (9,840 ft) in Boulder County, Colorado. *Botrychium* spores are small and lightweight enough to be carried by air currents. This dispersal mechanism may explain the broad and often disjunct distribution patterns exhibited by moonworts (Vanderhorst 1997).

Threats – There are many threats that have been documented for the slender moonwort. They include impacts associated with recreational activities (trampling by hikers, off-road vehicle use, or pack animals), roads (construction, maintenance, use, and decommissioning), habitat succession, fire suppression, livestock grazing (primarily trampling and soil compaction), and non-native plant invasion. Few threats have been documented in the population of slender moonwort located on the Sawtooth National Forest, however, unauthorized livestock use may be impacting the occupied habitat for this rare species. Impacts to potential habitat through trampling and congregation within such habitat may also be occurring. (Appendix B)

Within the *B. lineare* population located on the SNRA, the number of introduced species is extremely low and no noxious weeds have been identified within the occupied or potential habitat. Smooth Brome is found along closed roads associated with previous mining activity. This often-invasive species was planted to stabilize the soil within these areas and to prevent sedimentation further down slope. The *B. inermis* populations appear to be isolated to previously disturbed sites and do not appear to be expanding at this time (Taylor and Pierson, 2002, personal observation). Dalmatian toadflax has been located along the Livingston Mill road and could potentially be transported up to Railroad Ridge and surrounding areas by vehicles, ATVs, and/or livestock.

Current Management - Section 7 guidelines are followed where potential habitat for slender moonwort on the Sawtooth National Forest exists. In 2001, the USFWS asked the Sawtooth National Forest to consider *B. lineare* in our planning but the species was not added to the 90-Day Update of Forest Wide Species List because the distribution and habitat description were "problematic".

In November 2002, the Sawtooth NF began preparing a conservation assessment and strategy for *B. lineare*. The anticipated completion date for the Conservation Strategy for *Botrychium lineare* is December 2003.. Once completed and signed by the Area Ranger and Deputy Area Ranger and the Sawtooth Forest Supervisor, the strategy will provide the management direction and

conservation actions needed to maintain and/or enhance the population that occurs on Railroad Ridge and other potential habitat. Completion of this assessment and strategy will also comply with the Sawtooth FLRMP objectives, and conservation recommendations that will be provided in the Biological Opinion for the Southwest Idaho LRMP revision consultation with USFWS.

Ute ladies'-tresses Orchid –*Spiranthes diluvialis*

Both the Upper and Lower East Fork allotments are within the potential habitat region of Ute ladies' tresses orchid. In 1984, Ute ladies'-tresses orchid was named as a new species and was federally listed as threatened on January 17, 1992 under the ESA. *Spiranthes diluvialis* occurs in relatively low-elevation riparian, spring, and lakeside wetland meadows in these general areas of the interior western United States: near the base of the eastern slope of the Rocky Mountains in southeast Wyoming and north-central and central Colorado; in the upper Colorado River Basin; along the Wasatch Front and westward in the eastern Great Basin, in north-central and western Utah, and extreme eastern Nevada. In 1994, the range was expanded north by discoveries in central Wyoming and western Montana, and in 1996, *S. diluvialis* was discovered in southeast Idaho, along the Snake River. However, no populations have been found closer to the SNRA than Heise, Idaho. Fairly extensive surveys within the general Salmon River drainage by State, Forest Service, and BLM personnel have not resulted in any additional locations.

Ute's ladies-tresses orchid is endemic to moist soils in mesic or wet meadows near springs, lakes, and perennial streams. The elevation range of known habitat is 1500 to 7000 feet. Most of the occurrences are along riparian edges, gravel bars, old oxbows, and moist-to-wet meadows along perennial streams and rivers, although some localities are near freshwater lakes or springs. Ute ladies'-tresses orchid appears to be well adapted to disturbances caused by water movement through flood plains over time. It often grows on point bars and other recently created riparian habitat. The orchid appears to require permanent sub-irrigation, with the water table holding steady throughout the growing season and into late summer and early autumn. *S. diluvialis* occurs primarily in areas where the vegetation is relatively open and not very dense. Potential habitat in the Challis Volcanics and Idaho Batholith regions of Idaho, in which these allotments lie, is considered to have an upper limit of 6,500 feet elevation (Moseley, 1998). Less than 2 miles of streamside habitat in these allotments are below 6.500 feet,

Populations appear to fluctuate dramatically from year to year, making it difficult to assess population status and distribution. This has held true during studies conducted on the Idaho population since its discovery. The genus *Spiranthes* also undergoes a dormant period that may last 7-10 years, apparently with no evidence of above ground structures. Nothing is known about the dormancy-triggering mechanisms. In order to locate this species, potential habitat should be surveyed every year, for 7 to10 years, before ground-disturbing activities take place. Reproduction is strictly sexual, with ground- and log-nesting bumblebees as the primary pollinators (Pierson and Tepedino 2000). Successful conservation of this orchid will require protecting suitable habitat and pollinator habitat in and around orchid populations.

Threats – *S. diluvialis* is found infrequently and in scattered locations. Threats include livestock grazing, exotic weed invasion, controlled flooding, dewatering of streams, loss of pollinators, and development. Because it prefers open, early seral riparian areas, its management may be in direct conflict with rare fish habitat management that emphasizes undisturbed climax conditions. Riparian areas that are not properly functioning within the Upper and Lower East Fork allotments may have been degraded to a point that potential habitat may reduced. (Appendix B)

Current Management - The USFWS has prepared a draft recovery plan which includes actions designed to restore populations and remove threats. Ecogroup personnel survey potential habitat every year where ground-disturbing activities are proposed and implement appropriate mitigation measures, including stockpiling and returning topsoil, and protection of high potential habitat. ICDC is currently developing a predictive plant habitat model for the state of Idaho, which will further refine focus areas for future surveys and management.

Sensitive, Proposed Sensitive, and Watch Plant Species

White Cloud milkvetch, -*Astragalus vexilliflexus* var. *nubilus*

White Cloud milkvetch, -*Astragalus vexilliflexus* var. *nubilus*, a Region 4 sensitive species, is endemic to the White Cloud mountains and is found in high elevations, along ridge crests and exposed alpine talus slopes with sparse vegetation. There are only nine populations known globally, all of which occur within the Upper and Lower East Fork allotments. White Cloud milkvetch is a perennial, low growing cushion plant with irregularly shaped pale yellow flowers with purple tinged keels that are almost hidden in the silvery foliage. It flowers in July and August. Populations occur at high elevations, along ridge crests and upper slopes between 8,400 and 9,900 feet. Primary habitat is exposed alpine talus slopes with sparse vegetation, underlain with volcanic, granitic, and metamorphic rock (Mancuso and Moseley 1990).

Range monitoring has documented that 44% (4 of 9) of the populations are experiencing moderate to locally heavy livestock use (grazing, trampling, and loafing) (Phalen, personal communication, 2003). These populations are located at the following sites:

- along jeep trail near head waters of Big Lake Creek,
- along cut slope and adjacent areas along road to Livingston Mine,
- along trail to Frog Lake, and
- on ridge-top directly east of the Bowery Guard Station.

These sites are extremely vulnerable to continued degradation and potential loss of viability under the current grazing systems. All populations are accessible to cattle and changes in salting or herding strategies could also contribute to increased threats for all known population. Several weedy species including Dalmation toadflax, yellow toadflax, and musk thistle, and spotted knapweed have infestations near the impacted populations described above. Indirect impacts due to livestock activities could include soil compaction, introduction of noxious weeds from adjacent areas, and trampling. (Appendix B)

A draft Conservation Assessment and Strategy has been prepared by a volunteer botanist for the Sawtooth NF (Clebsch, 2002). This assessment and strategy outline the population trends, research needs, action items, and protection needs for this rare species.

Proposed Sensitive Species

Silvery/Jones Primrose – *Primula incana*

The only known Silvery/Jones primrose populations in Idaho occur along the East Fork Salmon River. Jones' primrose has small white to lilac flowers that are clustered and deeply notched and

grayish-green steams and leaves. It blooms May-July Jones' primrose is found on streambanks and moist meadows in moist alkaline soils of valley bottoms often where hummocky. Nothing is currently known about its reproductive biology, but it is known that a pollinator is needed for reproduction given the self-incompatibility structures of primrose species.

One population occurs within the exclosure at Bowery Guard Station. However, maintenance of the fence has often been low and cattle have been documented within this extremely rare population. Elk and moose have also been documented within the population and have caused trampling effects. The other population of silvery/Jones' primrose is outside of the current exclosures and severe trampling effects from livestock were recorded in botanical surveys in 2002.

Declines in population numbers and fecundity for both populations have been documented for both populations. Indeed, Clebsch (personal communication, 2002) reported extreme decline in numbers of individuals and number of flowers produced. Clebsch (2003) recorded declines from hundreds of individuals down to five individuals in the Bowery Exclosure over a 3-year period. In 2002, botanists from the Sawtooth NF established long-term monitoring transects and discovered over 125 individuals within these same populations. Small, semi-contained populations of musk thistle, spotted knapweed, yellow toadflax, and black henbane are found in close proximity to these two populations. Livestock and/or wildlife could serve as vectors for dispersal of these non-native plants and could indirectly create disturbances sufficient to allow establishment within the populations. Given the dynamic ranges of individuals and apparent threats from excess livestock use and wildlife use and indirect effects, efforts for protection of this species on the SNRA are among the highest priority for plant species conservation. (Appendix B)

A draft Conservation Assessment and Strategy has been prepared by the botanists of the Sawtooth NF and will likely be combined with such management documents for slender moonwort and White Cloud milkvetch. This assessment and strategy outline the population trends, research needs, action items, and protection needs for this rare species. To offset effects from livestock use and other documented impacts, this draft assessment and strategy must be finalized and implemented to be in compliance with FSM 2670 and the Sawtooth NF FLRMP objectives.

Northern sagewort - *Artemisia campestris* ssp. *borealis* var. *purshii*
Northern sagewwort is a widespread, circumboreal taxon that extends south in North America to Oregon, Arizona, Michigan, and Vermont. It ranges from the high mountains of northern Washington to northern Montana and Colorado (Cronquist 1950) but is known in Idaho only from the White Cloud peaks. Northern sagewort is a mildly scented, non-woody perennial with several branching stems that bloom from July to September.

The only know population of northern sagewort in Idaho is found on Railroad Ridge
The population of Northern sagewort in the White Cloud Mountains is found in xeric alpine fellfield habitat with SE aspect, 0-15% slope, open light, between 4,000 and 12,000 feet elevation. Substrate is gravelly, moderately unstable, and granitic glacial till deposits. The impacts of current livestock use in this population is currently unknown, however, livestock have been observed in the area and may indirectly impact individuals through trampling and soil compaction. (Appendix B)

Other proposed Region 4 Sensitive species

A final revised Region 4 Regional Forester's Sensitive list is anticipated in summer 2004. Several other proposed sensitive species occur within the Upper and Lower East Fork allotment including wedge-leaf saxifrage, pointed draba/rockcress draba, Farr's willow, Challis milkvetch, and Brewer's sedge. Livestock impacts to these species are currently unknown, however their close proximity to the species described above would suggest that they would suffer similar impacts. Inventory and monitoring is needed to determine threats and trends of these populations. (Appendix B)

Whitebark Pine - *Pinus albicaulis*

Subalpine habitats, not unlike alpine habitats, are often hosts to unique and representative species across the landscape. Whitebark pine, *Pinus albicaulis*, is one of the most unique treeline, supalpine species found within the Upper and Lower East Fork allotments. Whitebark pine is an important food source for many small mammals and bird species. It is also one of the most rapidly declining subalpine species in the western montane forest ecosystems (Tomback, 2001). An assessment of the interior Columbia River Basin determined that the Whitebark pine cover type has declined by 45% since the turn of the century (Keane, 2000). Alarmingly, this loss occurred within the more productive, seral Whitebark pine types and estimated 98% of this type has been lost (Montana Partners in Flight, Bird Conservation Plan, 2001). This decline is attributed to a combination of mountain pine beetle epidemics (Arno and Hoff, 1989), Whitebark pine blister rust (Keane and Arno, 1993), fire exclusion (Keane 2000), widescale grazing (especially historical sheep impacts; Willard, 1989) and poor seedling recruitment (Maher, 2002). Mountain Pine beetle has been determined to be the most damaging insect to mature stands of Whitebark pine (Arno and Hoff, 1989). Mountain pine beetle epidemics spread rapidly upwards from lodgepole pine forests. Given the current epidemic of mountain pine beetles on the SNRA (Red Tree EA, 2003), the mature Whitebark pine stands within this and other allotments may be at greater risk than originally believed.

Perkins (1997) completed an extensive study of Whitebark pine stands on the SNRA and reported serious declines in population vigor and health across the landscape. Cattle bedding and trailing may be impacting the seedling establishment of declining Whitebark pine, especially on Railroad Ridge (Perkins, 1997). Livestock have been observed loafing in Whitebark pine stands and may be contributing to indirect effects to population vigor and long-term viability. In Whitebark pine forest habitat types, which occupy the subalpine regions throughout the West, forage production may sustain light grazing but grazing abuse may easily decimate the forage and expose the soil. Vegetation recovers very slowly, and in some areas soil loss can prevent complete restoration (Keane 2000). These effects are not specific only to the East Fork Allotments but are a risk to White Bark Pine populations throughout their range when standards for livestock utilization are not met.

Cottonwood stands are limited to streamside riparian habitat along the main trunk of the East Fork. Regeneration of cottonwood is very low. Young age classes are absent. Seedling establishment and survival appears very low also. The seedlings and saplings that exist are heavily browsed. Browsing by cattle is expected to be a small component of this as cattle are present from June 18 - August 15.

Aspen stands occur in widely scattered clones of varying size throughout the allotment, usually associated with riparian areas. Stands vary in regeneration status. Many small stands appear to be dying out, with very little young shoots in the understory. A few others are quite vigorous.

Browsing by elk and cattle is likely to be a factor in many areas. Most aspen stands in areas frequented by cattle show very poor reproduction and age class diversity.

Non-Native Plants

Competition from invasive non-native species and noxious weeds can result in the loss of habitat, loss of pollinators, species composition conversion, decreased vegetation integrity, and loss or decline of TEPC species viability. Roads, trails, livestock, and canopy reduction can provide ideal pathways for the introduction of exotic and non-native species. According to the Nature Conservancy, alien species are one of the leading threats to U.S. species and ecosystems. Indeed, exotics have contributed to the decline of 42 percent of U.S. threatened and endangered species (The Nature Conservancy 2000).

Within the Upper and Lower East Fork Allotments, small semi-contained populations of spotted knapweed, diffuse knapweed, spurge, yellow toadflax, musk thistle, black henbane, cheatgrass, and Dalmatian toadflax have been documented, particularly along main road and trail corridors. Disturbance from livestock grazing may result in portions of the project area being susceptible to noxious weed and non-native plant invasions and establishment. The main weed of concern for this area is spotted knapweed, a highly invasive species, which is currently found in small, scattered populations. Current infestations of spotted knapweed can be found along roads and trails in Carbonate Creek, French Creek, and West Pass Creek. However, infestations on adjacent private and BLM lands may serve as a source for increased infestation.

Along with a small population of spotted knapweed, musk thistle, black henbane, and cheatgrass are found along Bowery Creek both within the exclosure and along the main East Fork road. These infestations are extremely close to the rare silvery/Jones' primrose populations. The largest infestation of Dalmation toadflax is found with the Livingston mill area along Big Boulder Creek. Dalmation toadflax and yellow toadflax, both aggressive species, are also known to currently occur near populations of White cloud milkvetch.

Livestock can serve as vectors for non-native plant seeds in remote areas in the following ways: (1) transporting weed seeds into un-infested sites on their coats and feet, (2) preferentially grazing native plant species over non-native species, (3) habitat creation for non-native plant species by creating patches of bare, disturbed soils that act as weed seedbeds, (4) destroying microbiotic crusts that stabilize soils and inhibit weed seed germination, (5) creating patches of nitrogen-rich soils which may promote establishment of non-native plant species, and (6) accelerating soil erosion, which may allow for seed burial and germination (Belsky and Gelbard, 2000).

Weed eradication efforts by the SNRA have resulted in the relatively successful containment and control of most infestations along main roads and trails. The distribution of non-native plants in remote areas within the allotments is not as well known, though few infestations of spotted knapweed and yellow toadflax have been located in non-motorized areas of the allotment (Seeley, 2003).It is important to note that as weeds move away from main travel corridors, the ability to detect and treat such invasions decreases and containment becomes increasingly difficult. The FLRMP has a standard that will require the SNRA to "implement the Forest Noxious Weed Management Plan upon completion" (NPST12). Completion and implementation of such a plan will enable the SNRA to better identify and treat infestations of non-native plants within the allotments.

The FLRMP standards applicable to plant diversity and TEPC plant protection include:

Forest-wide direction:

- Management actions that have adverse effects on Proposed or Candidate species or their habitats, shall not be allowed if the effects of those actions would contribute to listing of the species as Threatened or Endangered under the ESA (TEST04).

- Management actions shall be designed to avoid or minimize adverse effects to listed species and their habitats. (TEST06).

- Avoid management actions within occupied TEPC plant species habitat that would adversely affect the long-term persistence of those species (TEST08).

- Management actions that may contribute to establishment or spread of non-native invasive weed species within occupied TEPC plant habitat shall include measures to avoid weed establishment and spread (TEST10)
-
- Livestock trailing, bedding, watering, and other handling efforts shall be mitigated, through avoidance, to address adverse effects to occupied TEPC plant habitat (TEST22).

- New water developments, corrals, and other handling or loading facilities shall not be located within occupied habitat of TEPC plant species unless it can be demonstrated these facilities shall not adversely affect occupied TEPC plant habitat (TEST23).

- Livestock salting and/or bed grounds shall be located outside occupied TEPC plant habitat so that plants shall not be adversely affected by associated trampling (TEST24).

- Mitigate, through avoidance, effects to occupied TEPC plant habitat through grazing system design and implementation, and livestock handling adjustments (TEST26).

- Management actions that occur within occupied sensitive plant species habitat must incorporate measures to ensure habitat is maintained where it is within desired conditions, or restored where degraded (BTST01).

- Projects that may contribute to the spread or establishment of noxious weeds shall include measures to reduce the potential for spread and establishment of noxious weed infestations. (NPST10)

- Integrated Weed Management shall be used to maintain or restore habitats for sensitive plants and other native species of concern where they are threatened by noxious weeds or non-native invasive plants. (NPST11)

- Maximum forage utilization of representative areas within each pasture shall not exceed the values shown at the end of growing season. Variation in utilization standards in order to achieve specific vegetative management objectives shall occur with a site-specific or project-level decision according to direction in FSM 1922.5.

    a) Riparian Areas : Maximum 45 percent use or retain a minimum 4-inch stubble height of hydric greenline species, whichever occurs first.
    b) Upland Vegetative Cover Types : Early season or seas on long pastures – 40 percent use. Vegetative slow growth, after seed ripe conditions, or late season pastures – 50 percent use. (RAST01)

Management Area 3 - East Fork Salmon River/White Clouds

- Maintain or restore whitebark pine to desired conditions in High Elevation Subalpine Fir vegetation group where it is the major early seral species, as described in Appendix A (Objective 0344).

- Restore the early seral aspen component in the Warm Dry Subalpine Fir and Cool Dry Douglas-Fir potential vegetation groups to desired conditions, as described in Appendix A, to improve visual quality and wildlife habitat. (Objective 0346)

- Maintain and restore cottonwood regeneration and age class diversity in East Fork Salmon River, French Creek, Sullivan Creek, Big Boulder Creek, Germania Creek, and West Pass Creek. (Objective 0347)

- Restore the Montane Shrub and Mountain Big Sage vegetation groups in the lower elevations of the East Fork Salmon River, Sullivan Creek, French Creek, Big Boulder Creek, Little Boulder Creek, and Big Lake Creek drainages, where these groups have been altered by the exclusion of fire and livestock use. (Objective 0348)

- Restore willow composition, structure, and density, and hydric forbs and grasses in riparian areas in East Fork Salmon River, Big Boulder Creek, Little Boulder Creek, West Pass Creek, Big Lake Creek, Sullivan Creek, and French Creek drainages by reducing impacts from livestock grazing. (Objective 0349)

- Maintain or restore populations and occupied habitats of TEPCS species, including slender moonwort, White Cloud milkvetch, Challis milkvetch, northern sagewort, Farr's willow, silvery/Jones' primrose, wedge-leaf saxifrage, pointed draba/rockcress draba, guardian buckwheat, Stanley whitlow-grass, Lemhi milkvetch, least moonwort, and Brewer's sedge, to contribute to their long-term viability of these species (Objective 0354).

- Propose establishing Railroad Ridge as a Botanical Special Interest Area or Research Natural Area (Objective 0352).

- Maintain habitat for White Cloud milkvetch by modifying livestock management in high-elevation areas over 9000 feet and portions of Railroad Ridge where land capability group 7 and cushion plant communities exist. (Objective 03108)

- Maintain soil and vegetation conditions that are functioning properly and restore those that are degraded in the alpine and subalpine communities of the Germania Creek drainage, particularly where sheep trail routes and bedding areas have occurred or are occurring (Objective 03107).

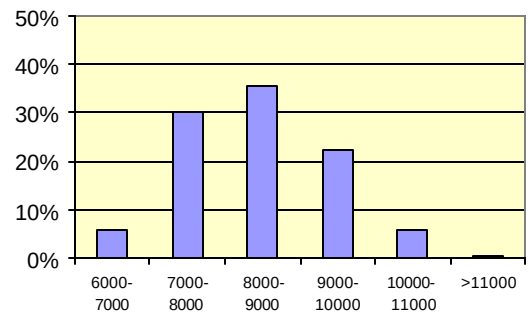
- Initiate restoration of Bowery and West Pass hot spring by installing a livestock barrier fence. (Objective 03144)

Fisheries & Hydrology

General Conditions

The Upper East Fork Allotment occupies the headwaters of the East Fork Salmon River. The Lower East Fork Allotment is located among a more diverse landscape within the western tributaries of the East Fork Salmon River, as well as portions of several tributaries draining north to the Salmon River. The allotment boundaries contain approximately 131,300 acres, where grazing occurs within the steep canyons and on high benches of the White Cloud and Boulder Mountains. Elevations within the allotments range from approximately 6,000 feet to over 11,000 feet at the highest peaks.

Figure III-1: *Elevations within the Upper and Lower East Fork Allotments*



Precipitation is assumed to be largely a function of these same topographic extremes. The Idaho State Climate Services estimates annual precipitation varies from approximately 10 inches in the lower extremes of the allotments to as high as 50 inches at the ridge crests (Molnau 2000). Most of this precipitation falls as winter snows, with typically dry summers, and occasional spring and fall rains.

The geology within the allotments is primarily a Tertiary volcanic strata known as the Challis Volcanics. The Challis Volcanics are chiefly composed of volcanic flows but are highly variable with interbedded flows of breccia, of primarily andesitic and rhyolitic composition (Rahm and Larson 1972). A moderately consolidated tuff underlies areas in the northern portions of the allotments, and a Paleozoic band of sedimentary rocks runs north-south through the center of the White Cloud Peaks to Slate Creek. A few large surficial glacial deposits occur in the Big Boulder and Little Boulder drainages, as well as along the bottom of the upper East Fork and Germania drainages (Emmett 1975).

The highest elevations, mostly above the allotments, have been shaped and modified by intense glaciation with cirques and sharp ridgelines. The mid-elevations are dominated by broad ridges on the north end of the allotments, and wide U-shaped glacial troughs on the south. The lowest

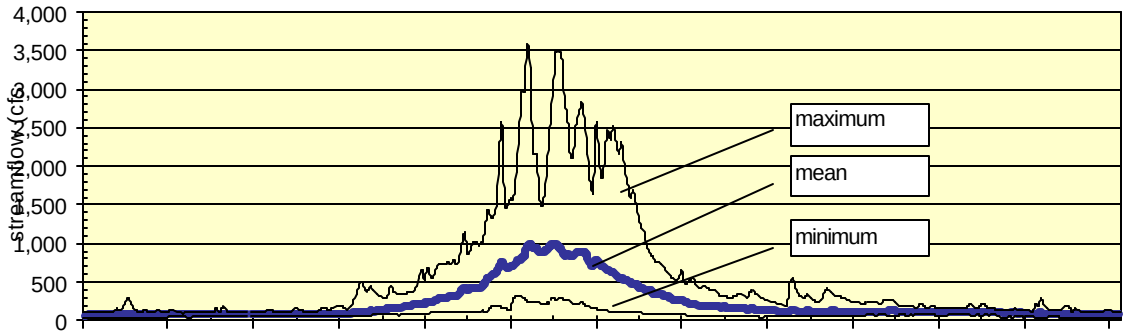
elevations within the allotments are typically the bottoms of narrow confined canyons resulting from erosional processes where water, rather than ice, has been the mechanism.

Together these geologic and topographic features have been evaluated and mapped as landtypes. Within the East Fork allotments Rahm and Larson (1972) mapped 24 distinctly different landtypes, containing over 100 map units. Characteristics of several of these landtypes were identified as highly erosive, and eight were recommended by Diem, et. al. (1999) as "not being included as capable rangeland". Forty-three percent of the land within the East Fork allotments is located within these eight highly erosive landtypes.

Figure III-2:
View from Bowery Creek towards Castle Peak through a central portion of the Upper and Lower East Fork Allotments

With most precipitation coming as snow, the hydrology is also characterized by a snow-melt dominated streamflow regime. Peak flows occur in late spring and early summer, quickly diminishing to baseflows through the fall and winter. There can be substantial year-to-year variability in streamflow quantity because of variability in precipitation and temperature. Twenty years of daily streamflows (1928-1939 and 1973-1981) were collected for the lower East Fork Salmon River downstream of the confluence with Spar Canyon. The mean daily streamflow values over this period depict a highly variable and flashy river system.

Figure III-3: Hydrograph of mean daily streamflow values – USGS 13298000 East Fork Salmon River Near Clayton, Idaho



Intensive summer thunderstorms are routine in central Idaho. When substantial and/or highly localized, the resulting debris torrents can greatly alter stream channels and even canyon bottoms. During the previous decade debris flows have occurred within several of the allotment drainages including Big Boulder 1994, Germania in 1998 and 2001 (Figure III-4), Slate Creek 1998, and tributaries of the upper East Fork also in 1998.

Figure III-4: Debris Flow in the Germania drainage, 2001

Streams

Stream channels in this area can be characterized into three generalized types: source, transport, and response. (See Figure III-5) Source channels are typically at high elevation, with high vertical relief, ephemeral, and often entrenched in steep mountain slopes. Most are straight, with little vegetation, and often shaped primarily by debris flows. Transport channels have moderate gradient, sinuosity, and entrenchment. They also typically have low to moderate width to depth ratios but moderate to high valley confinement. Energy is dissipated by turbulence, and so they are typically riffle dominated in narrow, moderately sloping, valleys. Their bottom substrate and banks are generally comprised of very course rock or bedrock, or large conifer (e.g. spruce). As such, their banks are usually stable and persistent.

Figure III-5: Examples of Source, Transport, and Response channel types (left to right) within the East Fork allotments

At segments within the allotments where a bedrock control or the pinching from a tributary fan creates a flat step in the valley floor upstream, response channels typically can be found. They are low gradient where energy is dissipated through meanders. Natural width to depth ratios are typically low to moderate, substrates are gravels and cobbles, and bank resistance is provided by vegetation. As such, their channels are naturally "dynamically stable" – that is, they migrate incrementally, and often imperceptibly across the valley floor over time. These channels also receive and integrate all upstream conditions within the watershed, and usually see a net increase of sediment deposited on their adjacent floodplains.

Rosgen (1996) uses slope as a key characteristic in his stream type classification system. Stream gradients of greater than 4 percent are considered "steep", between 2 and 4 percent "moderate", and less than 2 percent "low gradient. Steep perennial channels typically function as transport channels. Low gradient types are classic response channels, while moderate gradient types may have characteristics of either transport or response channels.

The broad, flat, and moist conditions adjacent to response reaches are routinely an attraction for human use and/or development. They also typically produce abundant forage resulting in a focus of ungulate grazing. However, within the mountainous areas of the East Fork allotments, such features are fairly uncommon. Analysis of topography on standard 7.5 minute USGS quadrangles indicates less than 17 percent of the approximately 200 miles of identified perennial streams within the allotments are low to moderate gradient stream channels.

Gradient of Perennial	Total length in miles	Percent of Total
steep	171	84
moderate	23	11
low	11	5
	205	100

Water Quality

The Clean Water Act requires the State of Idaho to identify water quality limited surface waters and develop a plan to restore beneficial use support to these waters. In 1998, IDEQ published the most recent list which included 11 water bodies in the Upper Salmon subbasin. EPA approved

the list in May 2000. One of these 11 is the "Salmon River, Redfish Lake Creek to East Fork Salmon River", which lies to the north of the Lower East Fork Allotment. Pollutants for this segment were listed as sediment and temperature. In 2002 IDEQ released their draft subbasin assessment which further described the current status of each of the waterbodies, and, where necessary, prescribed a Total Maximum Daily Load (TMDL) for the listed pollutants. For this designated segment of the Salmon River, the assessment concluded that beneficial uses were currently fully supported and that "a TMDL for this reach is not warranted" (Herron, Shumar, and Reaney 2002). On March 19, 2003 EPA approved IDEQ's recommendation.

Using their Beneficial Use Reconnaissance Program procedures, the IDEQ has continued to collect and evaluate surface water quality on a number of tributaries that include segments within the East Fork allotments. Data from each of these sites has been evaluated using their Water Body Assessment Guidance to determine if it meets water quality standards and supports beneficial uses. These assessments are currently in draft, but were provided through personal communication (Mike Edmondson, IDEQ) for this analysis. Where beneficial uses are shown "not supporting", specific pollutants were not available at this time.

Table III-2a: Results of recent IDEQ water quality assessments on tributaries with segments within the East Fork allotments .

Stream	Sites	Beneficial Use Support
Slate Creek	2	not supporting (upper) fully supporting (lower)
Holman Creek	1	fully supporting
Big Lake Creek	2	fully supporting (upper) not supporting (lower)
Big Boulder Creek	2	fully supporting
Little Boulder Creek	1	fully supporting
Wickiup Creek	1	not supporting
Deer Creek	1	not supporting
Germania Creek	3	fully supporting
West Pass Creek	2	fully supporting
East Fork Salmon River (upper)	2	fully supporting (upper) not supporting (below Germania)

IDEQ will continue to monitor water bodies determined to be supporting beneficial uses. Those not meeting water quality standards, and published in an IDEQ Integrated Report, will require a pollution management plan, or Total Maximum Daily Load (TMDL).

Sediment and temperature are water quality parameters that have been affected by management activities within the analysis area. Grazing has occurred in many of the streams within the allotment boundaries for decades. Subsequent increases in sediment and/or temperature may have altered natural conditions. However, given the high elevation source of the drainages within the East Fork allotments, water temperatures are cold and generally remain so despite these changes. Much of the sediment has likely been derived from physical changes in the stream channel or the landscape. Small channels, with their small energies, are often the most susceptible to changes in the sediment supply. Typically these changes represent a reduction in functionality. Therefore, it is also assumed, that as stream function improves, so does water quality.

No direct quantitative water quality data have been collected for nutrients within the allotments. This analysis assumes that, when compared to background levels, nutrient and bacteria levels are periodically higher due to the presence of livestock.

Riparian

Wetland habitat types are uncommon overall within the East Fork allotments, but are distributed throughout. Wetlands include areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Within the East Fork allotments wetlands include wet areas adjacent to streams, lakes, seeps, and springs, as well as the occasional isolated wet topographic depression. The term "riparian" is a general term used widely, but not necessarily consistently. "Riparian" is more or less a subset of wetlands and is typically used to describe habitats adjacent to flowing water where vegetation communities are strongly influenced by the persistent presence of water. By their very nature, they are transitional areas between the aquatic environments within the stream and the upland conditions on the slopes above.

An estimated 3,800 acres, or only 3 percent of the land base within the East Fork allotments is wetland-riparian types. The vast majority of these are located adjacent to the perennial streams. In central Idaho, riparian communities can typically be described into one of three general groups: tree dominated (e.g. spruce, cottonwood), shrub dominated (e.g. willow, alder), and graminoid dominated (sedge, grass). All three are known to exist within the allotments.

Continuous interactions occur between aquatic, riparian, and adjacent terrestrial ecosystems through exchanges of energy, nutrients, and species (Mosley et. al. 1997). Typically they are a minor portion of the landscape, but ecologically serve a much larger role, such as filtering and incorporating sediments from flood waters or upland sources, binding streambanks, and providing foraging habitat, or security or thermal cover, for a majority aquatic and terrestrial species. Riparian vegetation produces the bulk of detritus that provides as much as 90 percent of the organic matter and 99 percent of the energy necessary to support headwater aquatic communities.

Fish

Six native salmonids occupy the upper Salmon River. Four of these species are listed for protection under the Endangered Species Act, and one is consider a "sensitive species" by the Intermountain Regional Forester. On November 20, 1991, Snake River sockeye salmon were listed as "endangered" under the Endangered Species Act (ESA) of 1973. Listings of Snake River spring/summer chinook, Snake River steelhead, and Columbia River bull trout shortly followed as "threatened" over the next six years, as summarized in Table III-2. In 1999 westslope cutthroat trout were petitioned for listing, but determined "not warranted" in 2000, and again when reconsidered in 2003. Cutthroat remains a "sensitive species". All of these fish currently occupy or historically occupied habitats within the Salmon River or the East Fork Salmon River. Critical habitat has been designated for Snake River sockeye, chinook, and steelhead. Critical habitat has been proposed for Columbia River bull trout.

Table III-2: Aquatic species listed or considered for protection under ESA.

Common Name	Species	Federal Register Listing	Current ESA Listed Status	Federal Register Critical Habitat Listing
Snake River sockeye salmon	*Oncorhynchus nerka*	11/20/1991 Vol. 56 FR 58619	endangered	12/28/1993 58 FR 68543
Snake River sp/su chinook salmon	*Oncorhynchus tshawytscha*	4/22/1992 Vol. 57 FR 14653	threatened	12/28/1993 58 FR 68543
Snake River steelhead	*Oncorhynchus mykiss*	8/18/1997 Vol. 62 FR 43937	threatened	2/16/2000 Vol. 65, No. 32, pages 7764-7786
Columbia River bull trout	*Salvelinus confluentus*	6/10/1998 Vol. 63, No. 111, pages 31647-31674	threatened	proposed rule 11/29/2002 Vol. 67, No. 230
westslope cutthroat trout	*Oncorhynchus clarki lewisi*	4/14/2000 Vol. 65, No. 73, pgs 20120-20123	not warranted	n/a

Sockeye

Within the SNRA, sockeye salmon (*Oncorhynchus nerka*) are believed to have spawned historically in Stanley, Alturas, Pettit, Yellowbelly, and Redfish Lakes in the upper Salmon watershed. Redfish Lake contains the only remaining wild population. Critical migratory habitat has been designated for sockeye within the Salmon River for their movement between the Pacific Ocean and these natal lakes upstream. The Salmon River is outside, to the north, of the Lower East Fork Allotment.

Chinook

Chinook salmon (*Oncorhynchus tshawytscha*) is an anadromous salmonid native to western North America and the Pacific Ocean. This species consists of spring, summer, and fall races depending on time of primary passage over Bonneville Dam (Mathews and Waples 1991). Only Snake River spring/summer chinook salmon occur within the SNRA, and only spring chinook is known to occur within the boundaries of the East Fork allotments.

Chinook salmon spend most of their adult lives in the ocean, but return inland to freshwater streams to spawn. Individuals that return to the SNRA swim 900 plus miles to reach their spawning habitats. Adult spring chinook that spawn within the SNRA initiate their migration in early spring and begin arriving at staging areas in late May and June. Spawning may occur from the first of August through mid-September. Adult chinook returning to their natal streams must reach spawning grounds at the proper time and with sufficient energy reserves to complete their life cycles (Bjornn and Reiser 1991). Feeding generally ends when chinook return to fresh water. Between their arrival and the spawning period, behavior is driven by the need to conserve energy, and adults hold up in low velocity deep pools, large wood, or bank and boulder cavities. As the spawning period nears, chinook begin to move, attracting and appraising potential mates, as well evaluating potential spawning habitats. Chinook instinctually evaluate a number of

natural conditions in selecting optimum spawning locations such as; substrate size and condition, water flow through the substrate, water depth and velocity, proximity to cover, and absence of perceived threats (Bjornn and Reiser, 1991).

Once a preferred spawning site is selected, and a mate attracted, the pair settle into the river current and excavation of the redd begins. Chinook typically spawn in water less than 0.3 m in depth and in substrate 1.3 to 10.2 cm in diameter (Bjornn and Reiser, 1991). Excavation is performed primarily by the female through numerous repeated sideways pulses of the tail against the substrate, requiring much of her remaining energy reserves. Meanwhile, the male attending the female, battles to defend his territory and mate from other males, quickly exhausting his energy reserves as well. Once the redd is sufficiently constructed, the female deposits eggs into the redd, which are fertilized immediately by the male. She buries these eggs and, at the same time, prepares another "pocket" for eggs just in front of the previous eggs. More eggs are deposited and this process moves upstream until she has deposited all her eggs, or has relocated to another location, or been compromised by some other condition or influence. With her remaining energy she will typically attend the redd until her death. The final redd may reach 10 m^2, and in the headwaters of the Salmon River, typically contain between 4,000 to 6,000 eggs (B. Snider, IDFG, per. comm.).

After the redds are complete and the adults have died, the eggs continue to incubate in the cold waters of the approaching winter. Alevins hatch in midwinter, but remain in the gravels until the yolk sack is absorbed in mid-spring. During this time they are immobile and subject to any change in their gravel environment, such as fine sediments plugging the gravel pores, ice scour, or trampling by animal or human. Fry emerge from March to May with most remaining in their natal streams until the fall, then migrate downstream to mainstems or large tributaries to overwinter. Generally transformation to smolts begins the following spring with seaward migration initiated in May.

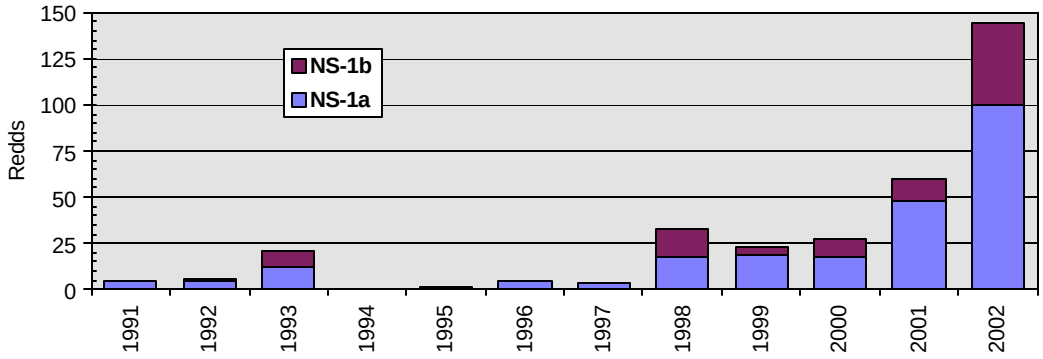
Habitat requirements for chinook salmon vary by life stage and season. Freshwater habitat variables that determine abundance and distribution are cover type, water temperature, substrate size and quality, channel morphology and stream size (Lee et al. 1997). Instream cover such as deep pools, wood, or undercut banks is important for adults prior to spawning. Temperature is important in determining when and where spawning occurs. Generally water temperatures must fall to approximately 16°C before spawning is initiated (Healey 1985). Clean gravel substrates are also required for spawning to occur. Survival and emergence of fry is influenced by temperature, fine sediment and flow (Chapman 1988). Egg and fry survival can be negatively influenced by redd disturbance, excavation, and bottom scour. When fry emerge from eggs they concentrate in shallow, slow water near stream margins (Hillman et al. 1989). They move to deeper pools with cover as they grow. During this rearing period suspended fine sediment can affect growth and survival (Williamson et al. 1995, Hicks et al. 1991). During the parr stage, chinook seek areas that are segregated from other salmonids, generally low gradient, meandering streams (Scully et al. 1990). Temperature is also important during this period with upper limits of 25 °C.

A combination of many factors have contributed to the decline of chinook salmon throughout its range in North America. NOAA Fisheries focuses on the "4 Hs": Hydropower, Habitat, Hatcheries, and Harvest. Land management agencies, such as the SNRA, are primarily

concerned with "Habitat". Habitat loss and degradation from land management practices can occur with overgrazing, mining, timber harvest, irrigation, and developments in riparian areas.

Figure III-6 displays aerial redd counts conducted in the Upper East Fork trend area by Idaho Department of Fish and Game (IDFG) since 1991. This trend area includes IDFG transects NS-1a through NS-1b – roughly the East Fork from 3.5 miles below Big Boulder Creek to the Bowery Guard Station. Results displayed for NS-1b are influenced by the IDFG use of a weir (the division between 1a and 1b) in spawning years 1991 to 2000, except 1998. Also note that this survey is conducted as an index only – that is, conducted for these specific reaches during a similar time period each year (first week of September). Additional redds can exist, unidentified, both temporally as well as spatially.

Figure III-6: IDFG Aerial Redd Counts for Upper East Fork Trend Area (Hassemer 1993, and IDFG, annually)



For Snake River spring/summer chinook, NOAA Fisheries designated critical habitat as essentially "all historically occupied". An estimate of these historically occupied reaches is shown in Figure III-8. The estimate is derived from available records and recent sightings considered against geomorphic valley bottom features depicted on 7.5 minute topographic maps. No comprehensive assessment/surveys are known for chinook. In 1978 chinook spawning surveys were conducted on the upper East Fork above the Bowery GS, including 2 miles of the South Fork, as well as on Germania Creek from the mouth to the falls. Spawning was observed throughout all of these reaches. However, since 1978 spawning in the upper East Fork, above the gorge near Bowery Creek, had not been documented. Yet, with the relatively large run in 2002, chinook spawning was again observed in the upper reach.

Steelhead

Steelhead (*Oncorhynchus mykiss*) are an anadromous form of rainbow/redband trout. Steelhead within the upper Salmon River watershed are summer-run, A-run, one year ocean steelhead from Hell's Canyon stock (Paul Valcarce, IDFG, pers. comm.). These fish return to fresh water during June through September, on their migration inland toward spawning areas. The adults overwinter in the larger rivers, and resume migration in early spring to natal, spawning streams. Spawning in the upper Salmon occurs during April and May. Unlike B-run steelhead which migrate downstream after spawning, A-run steelhead die. Incubation and emergence are dependent on temperature. Progeny emerge from redds in summer (Kent Ball, IDFG, per. comm.) as a function

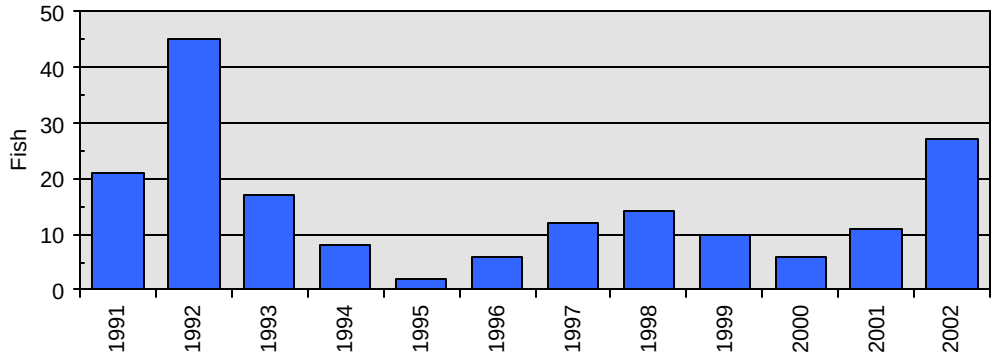
of water temperatures. Juveniles usually spend two to three years in freshwater before migrating to the ocean, where they spend up to four years before returning to spawn.

At the larger scale it is assumed steelhead were found in all accessible reaches of the Snake River below Shoshone Falls (Lee et. al. 1997). However, historic use by steelhead of the upper Salmon River is uncertain. Idaho Department of Fish and Game refers to all steelhead not originating from the Sawtooth Hatchery as "natural" but not "wild", due to extensive influence from steelhead management throughout the headwaters (Paul Valcarce, IDFG, pers. comm.). Undoubtedly, steelhead occupied habitats of the upper Salmon River, but their population size and extent relative to salmon is uncertain (Kent Ball, IDFG, per. comm.). Barriers, or cold water thresholds at high elevations, necessary for successful incubation, likely proved the upper limits for steelhead (Mullan et. al. 1992).

Much of the same effects as discussed with chinook have contributed to the decline of Snake River steelhead. However, hatchery influences occurred much earlier and to a greater extent than to chinook. By the late 1960's hatchery production of steelhead surpassed natural production in the Columbia River Basin (NWPPC 1986). Habitat requirements of steelhead vary by season and life stage. Spawning occurs in sorted gravels in both mainstream and tributary waters. Like other salmonids, they require cool water with silt-free gravel for spawning. Fry move to shallow, slow-moving channel edges for rearing and move to deeper swifter water as they grow. In winter juveniles select areas of low water velocity and seek concealment under cobbles.

Steelhead observations, although not common, have been documented within the East Fork. For several years the Shoshone-Bannock Tribes have supplemented steelhead production in Big Boulder and West Pass Creeks with hatch boxes. Juveniles have been observed during habitat surveys, but are indistinguishable from wild rainbow/redband. No spawning surveys for steelhead are conducted. As a general indicator of population trend, Figure III-7 displays "natural" steelhead returning to the East Fork Weir during the years 1991-2002.

Figure III-7: Naturally produced steelhead from hatchery stock returning to the East Fork Weir 1991-2002 (IDFG**).**



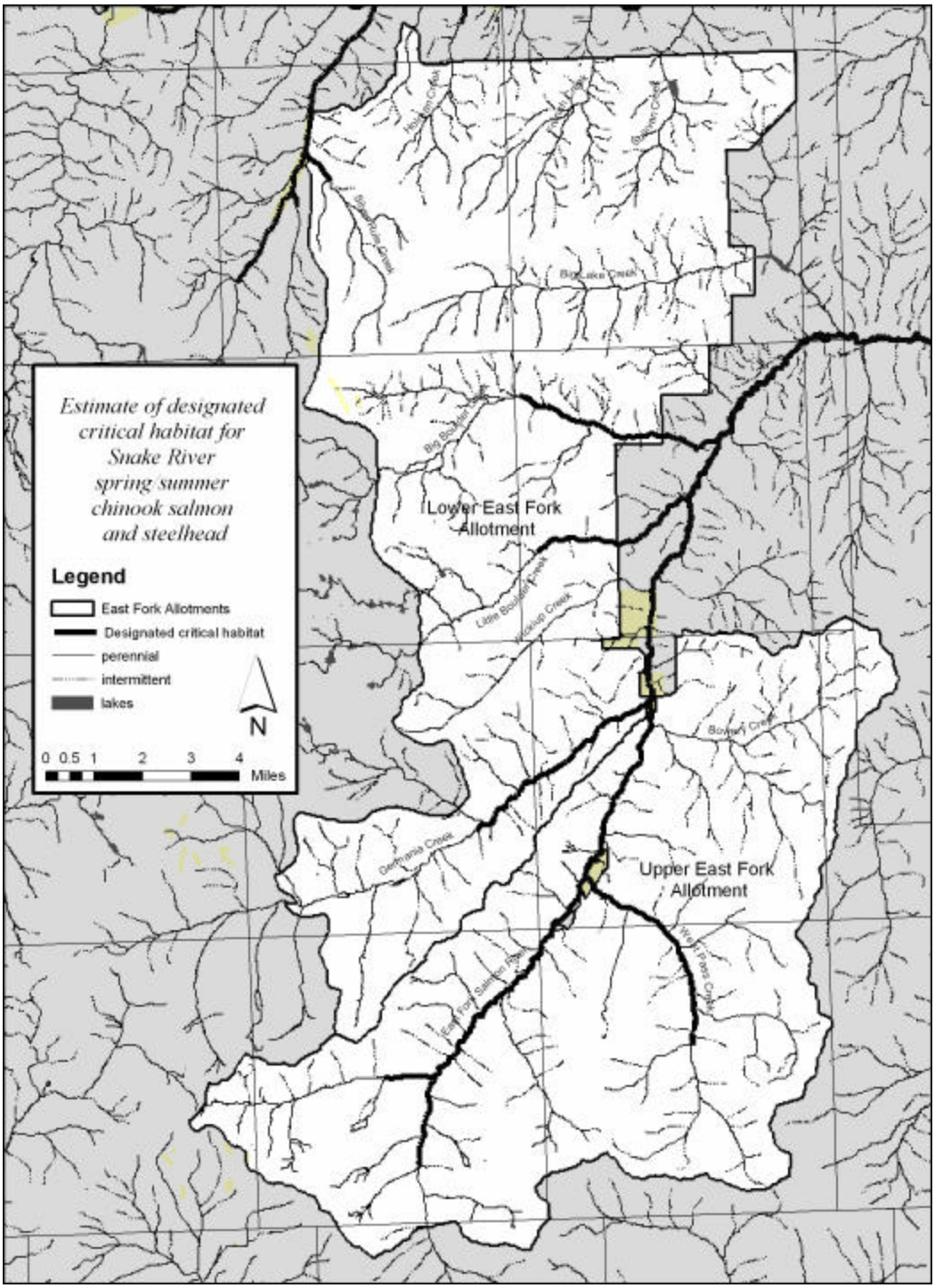
As with Snake River spring/summer chinook, NOAA Fisheries also designated critical habitat for Snake River steelhead as essentially "all historically occupied". Yet even less is known of

historic distribution of steelhead than is for chinook. However, due to steelhead's season of migration, and their greater swimming ability than chinook, their historic distribution is believed to be at least as extensive as chinook, if not greater. Therefore, Figure III-8 reflects the same estimate of designated critical habitat as for chinook.

Bull Trout

The general life history of bull trout (*Salvelinus confluentus*) is characteristic of chars. For years, the bull trout and Dolly Varden (*Salvelinus malma Girard*) were not taxonomically separate. In 1991, they were identified as two distinct species. The bull trout is one of four species of char native to western North America. Two distinct life-history forms, migratory and resident, occur throughout the range of bull trout (Pratt 1992; Rieman and McIntyre 1993). Migratory forms rear in natal tributaries before moving to larger rivers (fluvial form) or lakes (adfluvial form) or the ocean (anadromous) to mature. Migratory bull trout may use a wide range of habitats ranging from 2nd to 6th order streams and varying by season and life stage. Seasonal movements may range up to 300 km as migratory fish move from spawning and rearing areas into overwinter habitat in downstream reaches of large basins (Bjornn and Mallet 1964; Elle et al. 1994). The resident form may be restricted to headwater streams throughout life. Both forms are known to utilize habitats within the East Fork allotments.

Figure III-8: Estimate of designated critical habitat for Snake River spring/summer chinook salmon and steelhead



Within the Salmon River Basin, bull trout generally move into natal tributaries beginning in July and August. In some of the highest elevation tributaries spawning has been documented beginning in early August. However, within the East Fork spawning activity is thought to begin in mid-August and peak in late August and early September. Hatching may occurs in winter but alevins typically stay in the gravel for an extended period after yolk absorption before emergence (McPhail and Murray 1979). Growth, maturation, and longevity vary with environment with individuals living 10 or more years (Rieman and McIntyre 1993).

Bull trout appear to have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). Habitat characteristics including water temperature, stream size, substrate composition, cover and hydraulic complexity have been associated with the distribution and abundance (Jakober 1995; Rieman and McIntyre 1993).

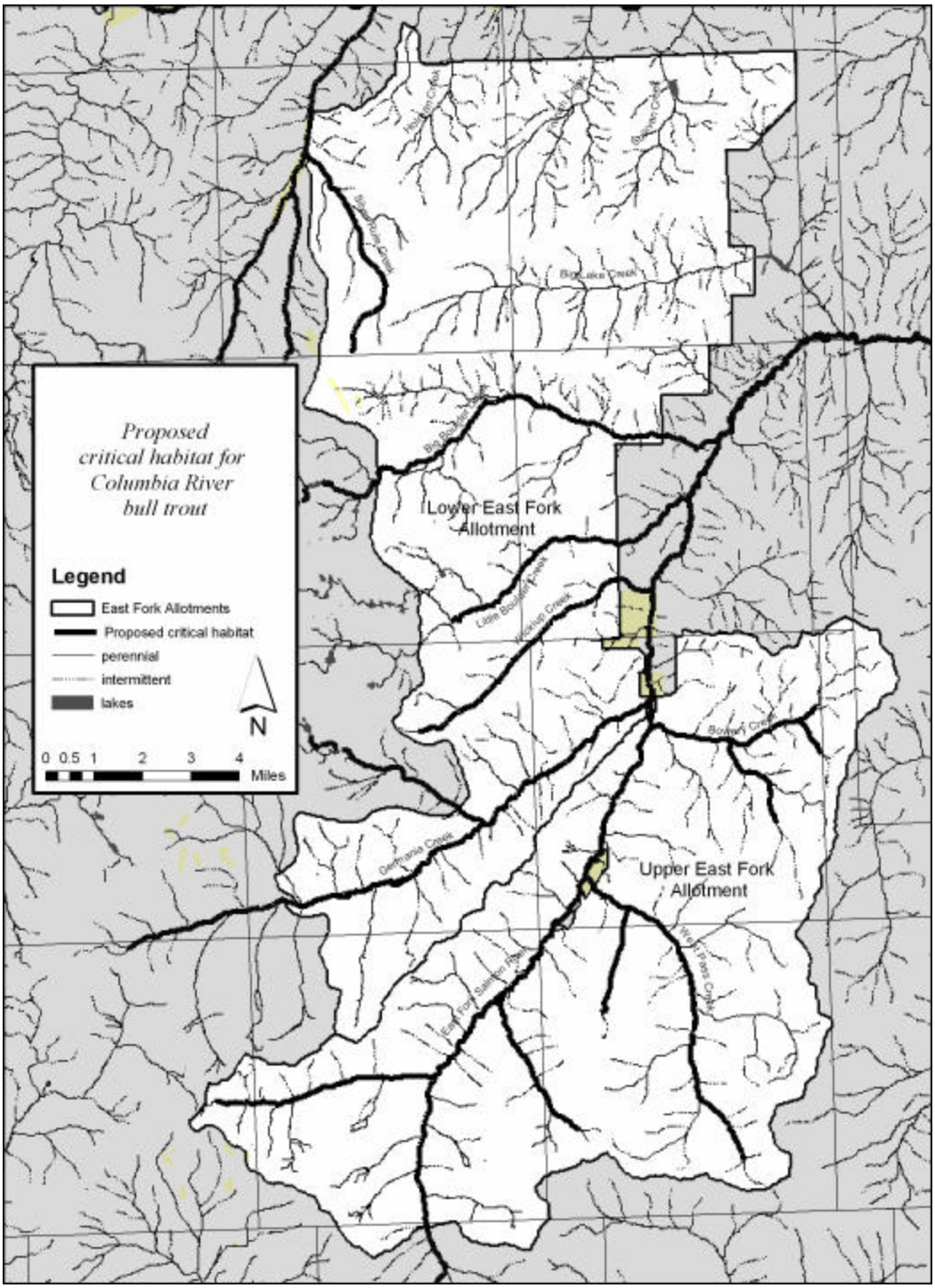
Stream temperatures and substrate composition may be particularly important characteristics of suitable habitats. Bull trout have repeatedly been associated with the coldest stream reaches within basins. Upper tolerance limits appear to be 12-15°C (Goetz 1994, Ratliff 1992). Temperature also appears to be a critical factor in the spawning and early life history of bull trout. Bull trout in Montana spawned when temperatures dropped below 9 to 10°C (Fraley and Shepard 1989). Survival of bull trout eggs varies with water temperature (McPhail and Murray 1979) with 4-6°C apparently optimum (Weaver and White 1985).

Bull trout are more strongly tied to the stream bottom and substrate than other salmonids (Pratt 1992). Substrate composition has repeatedly been correlated with the occurrence and abundance of juvenile bull trout (Rieman and McIntyre 1993) and spawning site selection by adults (Graham et al. 1981; McPhail and Murray 1979). Fine sediments can influence incubation survival and emergence success (Weaver and White 1985), but might also limit access to substrate interstices that are important cover during rearing and overwintering (Goetz 1994; Jakober 1995).

Changes in sediment delivery, aggradation and scour, woody debris, riparian canopy and shading or other factors influencing stream temperatures, and the hydrologic regime are all likely to affect populations. Lee and others (1997) concluded significant long-term changes in any of these characteristics or processes represent important risks for many remaining bull trout populations, and that populations are likely to be most sensitive to changes that occur in headwater areas encompassing critical spawning and rearing habitat and remnant resident populations.

Introduced species are another important consideration influencing bull trout persistence. More than 30 introduced species occur within the present distribution of bull trout. Brook trout are seen as an especially important problem (Leary et al. 1993) and may progressively displace bull trout through hybridization and higher reproductive potential (Leary et al. 1993). Brook trout are known to occur within the East Fork allotments, but at substantially lower numbers than in other areas of the SNRA.

Figure III-9: *Proposed critical habitat for Columbia River bull trout*



Isolation and fragmentation can also affect bull trout populations. Where irrigation diversions, culverts, or degraded mainstems habitats have eliminated or seriously depressed migratory life histories, resident populations become effectively isolated in headwater tributaries (Brown 1992; Ratliff and Howell 1992; Rieman and McIntyre 1993). The likelihood of effective dispersal can

also be reduced when watershed disturbance increases the distance between good or refuge habitats (Frissel et al. 1993).

In November 2002 the US Fish and Wildlife Service proposed critical habitat for Columbia River bull trout. The proposal is reach specific and includes stream and reaches within the East Fork allotments.

The revised FLRMP (2003) identified bull trout as one of three Management Indicator Species (MIS) because their populations are believed to indicate the effects of management activities. By monitoring and assessing bull trout populations, managers can estimate effects on other species within similar habitats. No MIS monitoring of bull trout with objectives from the revised FLRMP has yet begun. The anticipated monitoring objectives will assess trends in relative abundance of bull trout spawning populations and their spatial distribution within metapopulation core areas. Improving watershed conditions would be expected to result in larger and more resilient bull trout populations that disperse to recolonize former habitats. Declining conditions would be reflected by shrinking patches of bull trout, with fewer individuals, which would be more susceptible to stochastic events.

Westslope Cutthroat

The westslope cutthroat trout (*Oncorhynchus clarki lewisi*) is one of thirteen subspecies of cutthroat trout native to the inland western United States. This subspecies was first recorded by the Lewis and Clark expedition in 1805 (Behnke 1992). Like bull trout, three life-history forms are identified for westslope cutthroat including adfluvial, fluvial, and resident. Spawning generally occurs in late spring or early summer depending on elevation and temperature. Migratory forms may travel 25-50 miles to spawn in tributary streams. Juveniles spend 1-4 years in their natal tributaries before migrating downstream. Maturity occurs at 4-6 years.

Westslope cutthroat trout eat mainly invertebrates and are not as piscivorous as other salmonids. Behnke (1992) speculates that this feeding strategy is a niche separation resulting from coevolution with bull trout, which are highly piscivorous. Westslope cutthroat trout occur in relatively cold and nutrient poor waters (Liknes and Graham 1988). Substrate composition has a strong influence on survival. Negative relationships have been demonstrated between high embeddedness and emergence success, embryo survival, and juvenile abundance (Iriving and Bjornn 1984, Thurow 1987). The distribution and abundance of larger westslope cutthroat is associated with high quality and quantity of pools. Pools are important for winter habitat. Other types of instream cover are important habitat features year round.

Competition with and predation from non-native fish species have had a widespread negative effect on westslope cutthroat trout. Brook trout are thought to have replaced westslope cutthroat in some headwater streams (Behnke 1992). The mechanism is thought to be that brook trout displace westslope cutthroat or take over when cutthroat have declined from some other cause. Also drainages occupied by both westslope cutthroat and nonnative rainbow may be segregated with cutthroat confined to the upper reaches of the drainage. However, cutthroat/rainbow hybrids have been observed within the SNRA.

On April 5, 2000, the United States Fish and Wildlife Service announced their 12-month finding regarding the petition it had received to list the westslope cutthroat trout as threatened throughout

its range under the Endangered Species Act. The service concluded after review of all available scientific and commercial information, that the listing of westslope cutthroat trout was not warranted.

Both resident and fluvial forms of westslope cutthroat trout are thought to occupy habitats within the East Fork allotments. Limited surveys within the East Fork suggests that bull trout are generally much more abundant than cutthroat. However, cutthroat are typically the most common species observed within the minor tributaries draining directly into the Salmon River within the canyon, such as those on the north side of the Lower East Fork Allotment.

Redband (*aka. rainbow*)

Rainbow trout are a widely distributed salmonid in western North America. Rainbow trout have been segregated into three forms. Although the taxonomic classification is cloudy, the form occupying the interior Columbia River is typically referred to as "redband trout" (Behnke 1992). Redband trout were once the most widely distributed salmonid within the basin. Introgressed forms of redband trout, as well as hybrids from over a century of widespread stocking of non-native rainbow or cutthroat trout, may be replacing native redband trout today. Redband have two district life histories, anadromous (i.e. steelhead, discussed separately), and non-anadromous. Morphologically, anadromous and non-anadromous forms are indistinguishable. The non-anadromous (hereafter referred to as "redband") can be further divided into those that are sympatric with steelhead, and those allopatric that evolved separate from steelhead. Allopatric redband in small isolated patches of habitat above migration barriers have been shown to persist with minimal movements (Thurow 1987). Both forms may exist within the East Fork allotments. And, as with other salmonids, redband trout also exhibit a resident, fluvial, and adfluvial life histories. All three of these life histories are thought to utilize habitats within the East Fork allotments.

The possibility that sympatric redband trout may be able to refound anadromous runs has importance for aiding recovery of lost or diminished populations of steelhead. It is possible that anadromous steelhead, isolated above barriers, may adopt a non-anadromous life history yet retain the potential for anadromy (Moffit and Bjornn 1984).

Redband trout are primarily spring spawners (March-June), and spawn exclusively in flowing waters. Migration to spawn is likely triggered by water temperature and flow (Thurow 1990). Fry emerge from redds in summer as a function of water temperature. Juveniles typically move downstream after one to three years, with maturity occurring at three to five years.

Little is known about the interaction of redband trout with other species, or their foraging habits. Where redband trout and westslope cutthroat trout occupy the same waters, the two species appear to evolved segregative strategies (Rieman and Apperson 1989). It is generally assumed that redband trout rely heavily on aquatic and terrestrial invertebrates, but adfluvial populations are known to adopt piscivorous habits.

Redband trout often occupy habitats with greater extremes than other salmonids such as warmer water. However, in warmer and dryer environments the loss of riparian cover has been associated with reduced numbers of redband trout (Li et. al. 1994). Thurow (1988) found redband trout most abundant in pool habitats and in association with cover components such as undercut

banks, large wood debris, and overhanging vegetation. It is generally noted that redband trout, like steelhead, are often observed in riffles and higher gradient channels, although less specific than other salmonids. Their apparent persistence even in some heavily disturbed basins suggests they are less strongly influenced by habitat disruption than other salmonids (Lee et. al. 1997).

Existing Conditions

Table III-3 displays a summary of characteristics of streams within the major hydrologic drainages that have all or a portion of their watersheds within the East Fork allotments.

Table III-3: Characteristics of streams within the major hydrologic drainages of the East Fork allotments.

Drainage	total stream miles within the drainage	stream miles within the allotments					
		total	estimate of critical habitat for chinook and steelhead	proposed critical habitat for bull trout	perennial streams with <4% gradient	generally accessible to cattle	with streamside areas not moving towards vegetation management objectives
Slate	76.5	18.4	1.5	5.9	1.0	11.6	2.2
Mill	5.0	4.1	0	0	0	3.9	0.5
Holman	15.5	12.4	0	0	0	9.6	2.3
French	33.1	28.7	0	0	0.3	23.8	7.1
Sullivan	27.4	19.5	0	0	0.5	14.3	6.6
Big Lake	65.0	46.1	0	0	2.0	37.0	16.7
Big Boulder	58.8	45.9	3.5	7.7	3.8	27.4	5.1
Little Boulder	26.2	14.6	1.9	4.5	2.5	13.1	3.2
Wickiup	12.0	11.2	0.0	5.5	0.0	7.4	0.6
Germania	93.3	45.3	5.0	10.7	8.6	18.3	0.0
Bowery	39.5	39.5	0.0	7.1	0.0	27.4	5.5
West Pass	46.7	45.9	4.8	10.0	3.4	15.5	1.4
East Fork	102.8	83.9	12.8	21.6	11.8	36.1	6.9
TOTAL	**602**	**416**	**30**	**73**	**34**	**245**	**58**

Current stream habitat conditions vary greatly within the SNRA, on both public and private land, and within the East Fork allotments. Table III-4 displays information available for some streams within or near the project areas. Methods used to collect the information vary, as do sample sizes, and observer variability. As such, the results are presented here as general indications of stream health, rather than absolute condition status. Also, since high gradient transport channels typically derive their stability from structural features such as bedrock or boulders, the summaries below present only the low and moderate gradient “response” reaches who’s stability is typically dependant on the integrity of adjacent riparian habitats. These moderate (2-4%) and low (0-2%) gradient streams are referred to here as Rosgen Channel Types “B” and “C” respectively.

Table III-4: Summary of available stream habitat conditions for low and moderate gradient reaches of streams within the East Fork allotments.

Stream	Reach	Rosgen Channel Type	Forested	Width (m)	Pools per 100m	Woody Debris per 100m	Width to Depth	Percent Stable Bank	Percent Undercut Bank	Percent Surface Fines
Big Lake Creek 1999[2]	1	B	N	4	2.6	6.8	22.6	99.2	ND	17.2
	3	B	N	2.2	3.6	2.3	15	91	ND	18.9
	5	B	N	2	3.0	6.3	14.9	91.7	ND	30.4
Big Boulder Creek 2000[2]	3	C	N	4.9	1.3	5.5	37.8	70.3	ND	5
	5	C	N	4.6	1.9	8.1	31	95.1	ND	5.7
	7	B	Y	3.8	1.2	5.0	28.6	95	ND	5.5
	9	C	N	7.6	1.1	3.8	23.8	90.7	ND	47.5
Germania Creek 1992[1,3]	2	C	Y	4.3	1.0	2.6	24.4	70.8	12.2	10.3
	3	B	Y	5.3	0.7	2.1	33.4	75.9	4.3	3.7
	5	C	N	5.4	1.0	2.5	30.8	75.6	13.9	6.2
	6	B	Y	5.2	0.4	4.2	26.7	74	16.7	3.4
	7	C	Y	5.9	1.1	0.3	25.1	84.1	22.8	6.5
	8	B	Y	5.7	2.7	13.2	30	93.7	11.4	19.9
	9	B	Y	5.7	1.7	19.0	28.7	93.3	8.3	16.8
	10	B	Y	4.6	2.6	28.3	33.8	94.8	7.53	19.2
	12	C	N	2.8	1.9	2.4	20.3	89.9	30.8	9.7
	13	B	Y	1.9	0.7	2.0	16.8	93.7	37.5	3
	14	C	N	1.6	0.3	0.3	13.6	90.9	33.4	2.3
	15	B	Y	1.6	0.4	1.4	17.4	89.5	35.2	2.7
West Pass Creek 2000[2]	1	B	N	5.8	1.7	11.3	38.8	87	ND	18.2
	2	B	Y	7.9	0.9	9.7	57.9	84.3	ND	16.5
	4	B	Y	6.2	1.3	8.5	43.5	89.4	ND	12.9
	5	B	Y	6	3.5	6.4	34.2	93.4	ND	7.8
	6	B	Y	4.7	1.3	3.9	35	80	ND	8.2
East Fork Salmon River 2002[2]	1	C	N	14	0.1	1.6	39.1	88.9	ND	7.5
	2	C	Y	12.2	0.5	0.4	42.6	100	ND	9.4
	3	B	Y	11.7	0.6	1.7	47.3	90	ND	6.9
	4	C	Y	11	0.2	0.6	41	73.2	ND	8.8
	5	B	N	9.1	0.1	0.0	35.9	73.2	ND	3.3
	6	B	N	9.2	0.3	1.1	37.5	100	ND	10
	7	C	Y	9.1	0.1	1.5	37.4	77.1	ND	5.7
	8	B	Y	8.5	0.3	1.8	36.2	83.9	ND	17.1
	9	C	N	8.8	0.1	2.4	38.8	97.9	ND	15
	11	C	N	7.1	0.2	5.0	33.1	79.8	ND	7
	13	B	N	7.1	0.5	5.8	32.9	92.2	ND	16.7

1 R1/R4 Habitat Survey Method, version 1
2 R1/R4 Habitat Survey Method, version 2
3 Reach 2 begins at the falls, and reaches >9 are upstream of the Lower East Fork Allotment
ND no data

Overton et al (1995) analyzed and summarized conditions in relatively undisturbed watersheds within the Salmon River Basin. Their results are stratified by geologic setting, and, for some parameters, by Rosgen Channel Type (Rosgen 1996), and stream width. Table III-5 displays these natural conditions.

Table III-5: Natural Conditions of Stream Habitats

	Rosgen Channel Type	Width in meters	Pools per 100m[1,5]	Woody Debris per 100m[1,2,5]	Width to Depth[3,6]	Percent Stable Bank[6]	Undercut Bank[6,7]	Percent Surface Fines[6]
Natural Conditions Dataset (Overton et. al. 1995)[4]	B	1.5-3 3-4.7 4.7-6 6-7.6 7.6-9.2 9.2-10.7 10.7-12.2	1.75 (3) 3.68 (4) 1.92 (6) 1.35 (11) 1.3 (13) 0.92 (4) 0.73 (5)	4.2 (3) 12.2 (4) 12.8 (6) 2.9 (11) 3.9 (13) 3.4 (4) 4.0 (5)	27 (3,299)	82 (3,332)	~	27 (2,347)
	C	1.5-3 3-4.7 4.7-6 6-7.6 7.6-9.2 9.2-10.7 10.7-12.2	0.38 (1) 1.16 (1) 1.52 (1) 1.38 (3) 2.14 (3) 4.6 (1) ~	0.38 (1) 1.16 (1) 1.52 (1) 1.38 (3) 2.14 (3) 4.6 (1) ~	28 (523)	88 (518)	11 (223)	17 (348)

1 Varies by stream type and width for the Natural Conditions Dataset
2 Applicable to forested systems only
3 Naturally increases with stream size (width), but not stratified/summarized as such in Overton et. al.
4 All parameters selected for "volcanic" geologic type
5 Number in parenthesis indicates the number of stream reaches included by Overton et. al. in the average
6 Number in parenthesis indicates the number o f individual habitat units included by Overton et. al. in the average
7 Analyzed and summarized only for "C" types in Overton et. al.

Comparing these objectives and natural conditions to the results of habitat inventories within the allotments can provide an indication of stream health. However, again, the objectives are generalized, the datasets limited, and the methods subject to the inherent variability of attempting to characterize natural systems in uncontrolled settings. As such the comparative results should be treated as indicators of stream health and not as absolute measures of conditions. Also note that, to date, most of these condition inventories have been conducted on the mainstems of the primary tributaries. The nature and condition of these larger channels can be quite different than their headwater sources. For example, nonforested headwater tributaries within the East Fork allotments are often associated with graminoid streamside habitats, whereas the larger tributaries are more often associated with shrub or tree habitats. The resiliency of tree/shrub habitats to both stream and ungulate alteration can be much greater than that provided by graminoids. A discussion of riparian and aquatic habitat conditions within each of the major drainages within the allotments follows.

Slate Creek/Silver Rule

Only a small portion (23 percent) of streams within the Slate Creek drainage lie within the Lower East Fork Allotment. The majority of these lie within the Silver Rule drainage, although a small segment of Slate Creek is included within the allotment. Approximately 65 percent of these are generally accessible to cattle. Slate Creek may have historically provided limited spawning and rearing habitat for chinook and steelhead. As such, the lower reaches of Silver Rule would have served as quality rearing habitat. The USFWS has also proposed the mainstems of Slate and Silver Rule Creeks as critical habitat for bull trout. Cutthroat, redband, and bull trout have all been observed within Silver Rule or Slate Creeks.

Only a short segment of Slate Creek lies within the allotment as it flows north along the east side of private land downstream of the confluence with Silver Rule Creek. The private fenceline roughly follows the meanderings of Slate Creek on the west, resulting in ¾ mile of Slate Creek being accessible to grazing livestock on the east within the allotment.

Silver Rule Creek is steep and tightly confined between forested slopes through the mid reaches. Shrub and graminoid dominated riparian segments are located near the mouth and along narrow reaches and small stringer and pocket meadows that become more frequent in the headwaters. These areas are also the focus of ungulate grazing and conditions are likewise distinct. Observations suggest the forested reaches are in near natural condition, while the integrity of the meadow areas has been compromised. Streamside areas associated with 12 percent of these streams within the allotment are classified by vegetation specialists as not moving toward Forest Plan vegetation management objectives. These riparian areas have been altered and productivity diminished through compaction, pedestal formation, excessive browse. Stream conditions have been altered through bank chiseling and, in some cases, entrenchment. (See Figure III-10)

Other impacts within the watershed include past mining and associated road building. This development, and the associated habitat effects, exists in the lower half of the Silver Rule watershed with a concentration in the Carbonate Creek tributary. Although unassessed, these developments have likely resulted in a substantial increase in watershed erosion and fine sediments delivered to the streams. No valid claims remain and rehabilitation efforts were partially completed in 1998. Most roads within the watershed were re-contoured and rehabilitated except a few miles remaining below the millsite. These efforts were abandoned after the 1998 Labor Day flood in Slate Creek, which prevented continued access. Rehabilitation of the millsite and the remaining road awaits resolution of the access situation.

IDEQ has collected and evaluated water quality at two sites within Slate Creek. Unpublished results currently conclude the upper site is not supporting beneficial uses (M. Edmondson, IDEQ, per. com.). The extreme debris flows associated with the 1998 Labor Day Flood likely contributes substaintially to this lingering condition.

Figure III-10: Conditions within the Silver Rule Creek drainage

Lower Silver Rule Creek September 2001

Meadow in upper Silver Rule Creek September 2001

Holman/Mill

Eighty percent of mapped stream miles within the Holman Creek drainage lie within the Lower East Fork Allotment. The remaining portion, downstream, is included within the Salmon River Spring Unit Allotment. Approximately 75 percent of these stream miles within the Lower East Fork Allotment are generally accessible to cattle. No use of the upper reaches of Holman Creek by chinook or steelhead is thought to have occurred historically, although some rearing habitat was likely provided in the lowest reaches adjacent to the Salmon River. The USFWS has also not proposed any critical habitat for bull trout within the Holman Creek drainage. Westslope cutthroat have been observed within Holman Creek and are believed to be the dominate, if not exclusive, salmonid currently within the drainage.

Mill Creek is a small tributary of the Salmon River west of Holman Creek. Although perennial water can be found in headwaters of this small drainage, it does not carry to the Salmon River. Approximately 95 percent of streams in the Mill Creek drainage are generally accessible to cattle. Like Holman Creek the lower portion of Mill Creek is within the Salmon River Spring Unit Allotment. Both Holman and Mill Creeks are generally steep and confined, passing between sideslopes of conifer and open sage. However, where alluvium has accumulated, small meadows can be found, particularly in the mid to upper portions of both drainages. These meadow areas have also been the focus of ungulate grazing and their integrity has been compromised. Within Holman Creek, streamside areas associated with 19 percent of the total streams (or 25% of those generally accessible to cattle) within the allotment are classified by vegetation specialists as not moving toward Forest Plan vegetation management objectives. Fourteen percent of Mill Creek is in a similar condition. These riparian areas have been altered and productivity diminished through compaction, pedestal formation, and excessive browse. Stream conditions have been altered from bank chiseling and, in some cases, entrenchment. (Figure III-11) Mill Creek in some segments is entrenched several feet. This severe entrenchment was treated with structures in 1970s, but has proved unsuccessful.

Downstream, on the Salmon River Spring Unit Allotment, conditions have been diminished from grazing, but less severely, and are characterized as meeting or moving toward objectives. Holman Creek near the mouth has several other compromising conditions. Five units within the Holman Creek Campground lie adjacent to Holman Creek and their use has trampled and altered habitats to an unacceptable condition. A decision to remove these units was made in 1996 within the Salmon River Corridor ROD but has not yet been implemented. Until recently, just downstream of the Holman Creek Campground, Holman Creek was diverted to supplement a main diversion of the Salmon River (S38) passing nearby. In 1997, use of S38 ditch was abandoned and the Holman Creek diversion was closed and rehabilitated. Nevertheless, an upstream fish migration barrier persists in the same location as a result of the Highway 75 crossing.

IDEQ has collected and evaluated water quality within Holman Creek. Unpublished results currently conclude the stream is fully supporting beneficial uses (M. Edmondson, IDEQ, per. com.).

Figure III-11: Conditions within the Holman and Mill Creek drainages

Holman Creek, July 2000

Mill Creek, September 1996

French Creek

Of the 28.7 miles of streams within the French Creek drainage, 87 percent lie within the Lower East Fork Allotment. The remaining segments flow through adjacent BLM and private lands downstream. Approximately 85 percent of the stream lengths on National Forest are generally accessible to cattle. No use of the upper reaches of French Creek by chinook or steelhead is thought to have occurred historically although some habitat may have been provided in the lowest reaches adjacent to the Salmon River. The USFWS has also not proposed any critical habitat for bull trout within the French Creek drainage. The FLRMP identifies the French Creek as an ACS priority subwatershed. As typical with small tributaries within the Canyon, westslope cutthroat would be expected to be the dominate fish species in French Creek, although unconfirmed observations of redband are also known.

The French Creek watershed is the largest of the southern tributaries between Slate Creek and the East Fork. Although the gradient is moderate below the Forest, it quickly climbs once on the Forest, where it is generally moderately confined, passing between sideslopes of mostly open sage but with some conifer. Shrub and conifer dominated riparian bottoms are both common, with comparable proportions. French Creek originates in several headwater basins where the topography is less defined. In these headwater areas, long linear riparian areas are easily accessible to cattle and typically a focus of grazing. Within French Creek on National Forest, streamside areas associated with 24 percent of the streams (or 30% of those generally accessible to cattle) are classified by vegetation specialists as not moving toward Forest Plan vegetation management objectives. These riparian areas have been altered and productivity diminished through compaction, pedestal formation, and excessive browse. Stream conditions have been altered from bank trampling, chiseling and, in some cases, entrenchment. Where streams are tightly confined, and sideslopes steep, cattle tailing has also altered these narrow habitats, with increased inputs of fine sediment. (Figure III-12)

Until recently a four wheel drive road routed down the length of French Creek from Railroad Ridge to Highway 75. It has since been closed, but continues to be used as a trail for both cattle and recreationists. Downstream, on BLM and private lands, French Creek is dewatered through

the use of irrigation diversions during many summers (Montoya, Forester, and Moulton 1999). Although unassessed, other alterations and diminished conditions would be expected to French Creek as it passes through private lands near the mouth. An upstream fish migration barrier persists at the mouth where French Creek passes under Highway 75.

Figure III-12: Conditions within the French Creek drainage

French Creek near the National Forest boundary, September 2001

Coal Camp Creek, September 2001

Sullivan Creek

There is an estimated 19.5 miles of streams within the National Forest portions of the Sullivan drainage, which is 71 percent of the total within the drainage. The remaining lower segments flow through adjacent BLM and private lands. Approximately 75 percent of the stream lengths on National Forest are generally accessible to cattle. No use of the upper reaches of Sullivan Creek by chinook or steelhead occurred. Some rearing habitat may have been provided in the lowest reaches adjacent to the Salmon River historically. The USFWS has not proposed any critical habitat for bull trout within the Sullivan drainage. Salmonids have been observed in Sullivan Creek. Westslope cutthroat would also be expected to be the most common species in the creek.

Except near the Lake, streams within the Sullivan drainage are steep, with 97 percent of mapped streams on National Forest having over 4 percent gradient. Sullivan is much like the French Creek drainage with open but steep slopes in the lower reaches, and headwater basins of mixed conifer and sage. From the riparian areas surrounding the lake to the long linear riparian areas in the headwaters, cattle have easy access to such areas, and have routinely grazed them intensively. Within the Sullivan drainage on National Forest, streamside areas associated with 34 percent of the stream miles (or 45% of those generally accessible to cattle) are classified by vegetation specialists as not moving toward Forest Plan vegetation management objectives. This consists of nearly every segment of perennial stream within the drainage. These riparian areas have been altered and productivity diminished through compaction, pedestal formation, and excessive browse. Stream conditions have been altered from bank chiseling and entrenchment, particularly within the fine textured soils near the Lake. Where streams are tightly confined, and sideslopes steep, cattle tailing has also altered these narrow habitats, with increased inputs of fine sediment. (Figure III-13)

Downstream, on BLM and private lands, Sullivan Creek is dewatered through the use of irrigation diversions during many summers. (Montoya, Forester, and Moulton 1999) Although unassessed, other alterations and diminished conditions are apparent to Sullivan Creek on private lands near the mouth. The BLM also permits cattle and horse grazing on lands within the Sullivan drainage. An upstream fish migration barrier may also exist at the mouth where Sullivan Creek passes under Highway 75.

Figure III-13: Conditions within the Sullivan Creek drainage

Sullivan Creek near Lake, August 1999

Sullivan Creek headwater, August 1997

Big Lake Creek

Big Lake Creek extends from high on Railroad Ridge to the East Fork Salmon River. Near the National Forest boundary Big Lake Creek enters Jimmy Smith Lake, where Corral Creek, and Jimmy Smith Creek also join from the north. Corral Creek heads on National Forest, but primarily drains adjacent BLM public lands. From Jimmy Smith Lake, Big Lake Creek flows another 2 miles through BLM and private lands to the East Fork. Of the estimated 65 miles of streams within the drainage 71 percent are within the Lower East Fork Allotment.

The outlet of Jimmy Smith Lake is thought to be a barrier to most fish migration. Neither chinook, steelhead, nor bull trout are known to occupy the drainage above the lake, and no designated or proposed critical habitat is present. Extensive snorkel surveys in the mid and lower reaches of Big Lake Creek in 1999 above the lake observed redband trout, both resident and adfluvial, as the exclusive species present. Spawning redband were observed on July 13, 1999 on National Forest.

Stream reaches of Big Lake Creek alternate between moderate and high gradient for much of their length. The tributaries are all high gradient, and overall, 96 percent of streams in the drainage are over 4 percent gradient as displayed on topographic maps. The adjoining landscape is steep near the lake, but moderates considerably upstream, where eighty percent of total stream miles within the allotment are generally accessible to livestock. The adjacent riparian habitats have typically been grazed intensively. Within the Big Lake Creek drainage on National Forest, streamside areas associated with 36 percent of all stream miles (or 45% of those generally

accessible to cattle) are classified by vegetation specialists as not moving toward Forest Plan vegetation management objectives. This consists of many of the perennial stream segments within the drainage. These riparian areas have been altered and productivity diminished through compaction, pedestal formation, and excessive browse. Stream conditions have been altered from bank chiseling and entrenchment. A reach through fine textured soils immediately upstream of the "lava flow" is particularly entrenched – up to 10 feet in some segments.

Nevertheless, the mainstem of Big Lake Creek, particularly the lower half (below the "lava flow"), passes through dense stands of mature willow and alder. These dense stands typically preclude immediate cattle access to the stream except at recurrent crossings or watering locations. In 1999, 91 percent of streambanks within the moderate gradient reaches (3 and 5) of Big Lake Creek where determined to be stable and had width-to-depth (W/D) ratios comparable to natural conditions. In many of these reaches the dense mature shrubs along the water's edge continue to provide bank protection while adjacent riparian conditions have been altered. Nearly 100 percent of the riparian areas associated with these same stream reaches (3 and 5) are characterized as not moving toward Forest Plan vegetation management objectives.

Water temperatures appear to also be maintained by the tight streamside vegetation of Big Lake Creek. Temperatures monitored in Big Lake Creek above the lake on National Forest in August to mid September 1999, recorded temperatures less than 15° C. Macroinvertebrates assessed in the same area also appeared to support a reasonable level of taxa that are intolerant of impaired water quality (Henderson et. al. 2001). IDEQ has collected and evaluated water quality at two sites within Big Lake Creek. Unpublished results currently conclude the lower site is not supporting beneficial uses, while the upper site is fully supporting (M. Edmondson, IDEQ, per. com.). The location of these sites was not identified, and one, or even both could located, below Jimmy Smith Lake.

Figure III-14: Conditions within the Big Lake Creek drainage

Big Lake Creek in lower end, September 1996

Burnt Hollow, September 2000

The headwaters and tributaries of Big Lake Creek, including their source seeps and springs, are typically not associated with riparian shrub habitats, and have experienced the greatest change. Trampling, chiseling, and soil puddling have substantially altered many of these fragile, accessible habitats. Where riparian shrub communities do exist, they are typically mature and decadent. At one site assessed at the mouth of Burnt Creek, the ratio of sprout and young willow

to mature and decadent plants was zero (Henderson et. al. 2001). Also, where upstream segments are tightly confined between steep sideslopes cattle tailing has also altered and damaged these narrow habitats and increased fine sediments.

Big Boulder Creek

Big Boulder Creek begins in the high glaciated basins of the White Cloud Mountains and flows through several valley steps of meadows and canyons before joining the East Fork Salmon River approximately 12 miles downstream. Ninety-five percent of the 59 miles of stream within the Big Boulder drainage is within the National Forest, and 78 percent is within the Lower East Fork Allotment. Several high cascades accumulate and enter the allotment in Quicksand Meadows at over 8,000 feet. At mid-drainage Jim Creek joins Big Boulder. At 1½ miles from the mouth, Big Boulder leaves the National Forest and the allotment and passes through adjacent BLM and private lands. As might be expected, most streams within the drainage are steep and tightly confined, however, 8 percent of perennial stream miles within the allotment flow through low to moderate gradient response reaches, primarily on the mainstem.

Several substantial cascades exist within the topographic steps of the Big Boulder drainage. Not until a series of vertical falls within a lengthy gorge in the upper watershed (NENE, Sec 15) are these believed to be an upstream migration barrier to all fish species. Historically chinook and steelhead may have reached the big meadow below the Livingston Mill. As such, 8 percent of the stream miles within the allotment would be considered designated critical habitat for chinook and steelhead. Seventeen percent are currently proposed by USFWS as critical habitat for bull trout, although it is unlikely they occupy habitat above the falls. Extensive snorkel surveys of the moderate and low gradient stream reaches of Big Boulder Creek in 2000 observed steelhead/redband trout, bull trout, cutthroat, and brook trout below the falls, and redband and cutthroat above the falls. Below the falls, both resident and fluvial bull trout were observed.

Along the mainstem of Big Boulder Creek, grazing by cattle focuses in four general areas: the big meadow below Livingston Mill, an intermediate meadow near the trail junction to Little Redfish, a large meadow complex above the falls, and at Quicksand Meadows at the base of the peaks. Outside of these areas grazing is concentrated primarily on the south along the small tributaries and pocket meadows of Red Ridge, and, to the north, on Railroad Ridge. Sixty percent of mapped streams within the allotment are generally accessible to livestock. Of these, the most intensive grazing has occurred within the tributaries. Riparian conditions adjacent to eleven percent of the stream miles within the allotment (or 19% of those generally accessible to cattle) are classified by vegetation specialists as not moving toward Forest Plan vegetation management objectives. These riparian areas have been altered and their productivity and integrity diminished through compaction, pedestal formation, and excessive browse.

A small intermittent tributary, approximately 1 mile upstream of the Livingston Mill, has a history of sizeable debris flows, originating on a high exposed face above. The condition is the first in a series of impacts downstream that have compromised habitat conditions over the last century. The Livingston Mill is currently a CERCLA site, with hazards being assessed and remediation needs determined. Several patented and unpatented claims remain within the Jim Creek drainage and on Railroad Ridge. A draft plan of operations is currently being considered by the Sawtooth NF for low scale operations at some of these claims.

In the 1960s Big Boulder Creek was diverted into a low sagebrush swale near the Mill to avoid growing conflicts with the tailings pile. The fine textured soils and shallow roots within the swale quickly gave way and an extensive blowout emerged and expanded over the following decades – up to 25 feet in depth, 250 feet across, and nearly ¼ mile in length. Tens of thousands of cubic yards of sediment buried downstream habitats and initiated similar channel responses. Efforts to prevent further expansion of the blowout and rehabilitate the area were attempted in 1994 and have been partially successful. Further downstream, in 1925 a power dam was constructed on the mainstem and operated until it was abandoned in 1941. The dam remained. Constructed of concrete, it was 15 feet high, 75 feet wide, and 1½ feet thick. It was an absolute upstream migration barrier to all fish species.

In 1991 a passable notch was cut in the dam, and the accumulated sediments upstream removed. Fluvial bull trout, most likely from river habitats downstream, have since been observed upstream of the dam. The Shoshone-Bannock Tribes annually supplement steelhead production with hatch boxes in Big Boulder Creek near the Mill. To date no natural adult steelhead, upstream of the former dam, have been confirmed (Kutchins, Shoshone-Bannock Tribes, per. com.).

The main access road from the East Fork to the Livingston Mill and beyond (#667) was constructed for mine operations in the middle of the last century. For much of its length, the road is cut into the steep slope sitting immediately above Big Boulder Creek. The road suffers chronic erosion problems brought on from this untenable location, and from inadequate surface, cut, and fill slope drainage. Finally, near the mouth on BLM and private lands, much of Big Boulder Creek is diverted for irrigation purposes before reaching the East Fork.

Figure III-15: Contrast of similar habitats in the relative presence and absence of livestock grazing

Grazed wet meadow near Little Redfish Lake, August 2001 (yr rested)

Reference wet meadow, 2 miles north-west, near falls, August 2001

When assessed in 2000, the habitats of Big Boulder Creek within the large meadow below Livingston Mill, appeared to be compromised. Approximately 30 percent of banks were unstable and few pools were observed. Stream habitats of Big Boulder Creek in meadow reaches upstream displayed better conditions with bank stability as high as 95 percent. Pools still appeared to be lacking and fine sediments spiked to nearly 50 percent in “Quicksand Meadows”. True to its name, the meadow is likely a former lakebed that continues to serve as the first low

gradient depositional area for natural watershed sediments transported through the high energy cascades upstream. Water temperatures monitored in the lower reaches of Big Boulder Creek from May to mid August 1994 recorded temperatures less than 16° C.IDEQ has collected and evaluated water quality at two sites within Big Boulder Creek. Unpublished results currently conclude that beneficial uses are fully supported (M. Edmondson, IDEQ, per. com.).

It is the smaller tributaries, including their source seeps and springs, as well as the numerous stringer and pocket meadows along Red Ridge (such as the Little Redfish area) that have experienced the greatest alteration. Trampling, chiseling, and soil puddling have substantially altered many of these accessible habitats. In some areas large patches vegetation are completely absent, and soils have subsequently slumped, or been lost. These wet meadows are distributed among conifer forests, and vary in size, shape, and slope, from large, wide, and flat, to small, narrow, and steep. The degree of alteration or damage varies accordingly, with the features of small, narrow, or steep typically displaying greater damage. A few locations have been identified where cattle access has been limited, and reference conditions can be observed. One such location is found on the far side (north) of the upper gorge. Conditions within this meadow distinctly contrast those in similar grazed areas, reflecting thick, productive, vegetation, no soil compaction or erosion, and a diversity of species (Figure III-15).

Figure III-16: Conditions within the Big Boulder Creek drainage

Big Boulder Creek downstream of Livingston Mill, August 2000

Big Boulder Creek within upper reach, August 2000

Little Boulder Creek

Little Boulder Creek also begins in the high glaciated basins of the White Cloud Mountains, but is roughly half the drainage size of Big Boulder Creek. Except for the absence of mining development and the associated effects, much similarity exists between Little and Big Boulder Creeks. Fifty-six percent of the 26 miles of stream within the Little Boulder drainage are within the Lower East Fork Allotment, with the rest primarily upstream of the allotment in the high basins. At 1½ miles from the mouth, Little Boulder leaves the National Forest and the allotment and passes through adjacent BLM and private lands where water is diverted for irrigation purposes. The headwaters are very steep, and much of the remaining drainage is likewise. However, 17 percent of perennial streams within the allotment flow through low to moderate gradient response reaches.

Little Boulder Creek also passes through several substantial topographic steps as it flows towards the East Fork. A nearly continuous cascade carries 2½ miles upstream from the mouth before giving way to the first response reach. It may be possible that historically chinook and/or steelhead could have reached this meadow. If so, 13 percent of the stream miles within the allotment would be considered designated critical habitat for chinook and steelhead. Thirty-one percent are currently proposed by USFWS as critical habitat for bull trout. Bull trout, both resident and fluvial, and cutthroat have been observed within the mainstem of Little Boulder Creek not far below the upper boundary of the allotment.

Along the mainstem of Little Boulder Creek, grazing by cattle focuses within the low/moderate gradient response reaches. Outside of these areas grazing is concentrated primarily on the north along the small tributaries and pocket meadows of Red Ridge, including the area around Frog Lake. Eighty-nine percent of mapped streams within the allotment are generally accessible to livestock. Of these, the most intensive grazing has occurred within the tributaries where riparian habitats have typically been substantially altered and their integrity compromised. Riparian conditions adjacent to twenty-two percent of the stream miles within the allotment (or 25% of those generally accessible to cattle) are classified by vegetation specialists as not moving toward Forest Plan vegetation management objectives. These riparian areas have been altered and productivity and integrity diminished through compaction, pedestal formation, and excessive browse.

Stream habitat conditions have not been assessed in Little Boulder Creek, but observations suggest conditions much like the upper reaches of Big Boulder Creek. Streambank and in-channel conditions are thought to be functioning, although adjacent riparian habitats may be somewhat diminished from grazing. Water temperatures monitored in the lower reach of Little Boulder Creek from May to August 1994 recorded temperatures less than 16° C. IDEQ has collected and evaluated water quality within Little Boulder Creek near the mouth. Unpublished results currently conclude that beneficial uses are fully supported (M. Edmondson, IDEQ, per. com.).

Figure III-17: Conditions within the Little Boulder Creek drainage

Adjacent to Little Boulder Creek, June 2000

Near Frog Lake, September 1996

As with Big Boulder, it is wet meadow conditions within the smaller tributaries draining from Red Ridge that have experienced the greatest alteration. This primarily includes the Frog Lake and Boulder Chain Lakes drainages, with their numerous source seeps and springs, and stringer and pocket meadows. Trampling, chiseling, and soil puddling have substantially altered many of these accessible habitats.

Wickiup Creek

The Wickiup drainage is a small direct tributary to the East Fork. Ninety-three percent of the 12 miles of stream within the Wickiup drainage are within the Lower East Fork Allotment, with the last ¾ mile at the mouth passing through adjacent BLM and private lands. A small diversion in this reach removes water for irrigation purposes. All perennial streams as shown on topographic maps within the drainage would be considered high gradient (> 4%), with the steepest segments in the headwaters. Due to the small and turbulent aquatic habitats it is unlikely that steelhead, or especially chinook, occupied Wickiup Creek historically. However, USFWS has proposed critical habitat for bull trout for the length of the mainstem, or 39 percent of all stream miles within the allotment. No observations of bull trout, or any salmonid, have yet been documented in the drainage, but habitats appear capable of supporting them.

Along the mainstem of Little Boulder Creek, grazing by cattle focuses within the small pocket and stringer meadows of shrub and graminoid riparian dominated types that frequent the drainage bottom. The remaining accessible forage lies in headwater basins and along the ridge separating the Wickiup and Little Boulder drainages. Many of the riparian habitats within these accessible areas are small and often tightly confined, and as such have been intensively grazed by livestock. As a result, observations of these habitats indicate that many have been substantially altered and their integrity compromised. Stream habitats have been altered through mechanisms such as bank trampling, and chiseling, and, with a reduction in integrity, channels have become entrenched. Along the mainstem these conditions are more extensive than in the

Figure III-18: Conditions within the Wickiup Creek drainage

Wickiup Creek, mid-drainage, September 2002

Wickiup headwater meadow at 9,200 feet, September 2002

similar, but much larger, drainages of Little and Big Boulder. The headwater pocket and stringer wet meadows are in similar conditions, with near all such areas accessible having been

physically damaged and productivity diminished through compaction, pedestal formation, soil puddling, and excessive browse.

IDEQ has collected and evaluated water quality within Wickiup Creek near the mouth. Unpublished results currently conclude that beneficial uses are not supported (M. Edmondson, IDEQ, per. com.).

Germania Creek

Germania Creek is the largest of the East Fork tributaries that originate from the SNRA, and serves to bisect the Whitecloud Mountains on the north, from the Boulder Mountains on the south. Roughly ½ of the 93 miles of mapped streams within the drainage lie within the allotment. The other half lies upstream in the many headwater tributaries of Germania Creek, except for the last few hundred feet at the mouth, which enter private land before joining the East Fork. A screened diversion in this segment removes water for irrigation purposes. Although the headwaters are steep, the mid and lower reaches of Germania Creek flow through a series of large topographic steps, with 19 percent of the mapped perennial stream miles within the allotment in low to moderate gradient response reaches.

Often separating the moderately confined response reaches are narrow gorges with high velocities and turbulent cascades. One of these, near the mouth of Chamberlain Creek, is topped by a 30-foot vertical falls, that results in an upstream migration barrier to all fish species. This falls is located roughly half way between the upper and lower boundaries of allotment on the mainstem. Historically, this falls would have precluded steelhead and chinook passage above. Spawning of chinook has been documented through the length of Germania Creek upstream to the falls. As such, 11 percent of the stream miles within the allotment would be considered designated critical habitat for chinook and steelhead. Bull trout have also been documented consistently below the falls, and, surprisingly, above the falls, perhaps having persisted in isolation since the formation of the falls millennia ago. The USFWS has proposed critical habitat for bull trout extending upstream to the headwaters of Germania and Chamberlain Creeks, which includes 24 percent of the stream length within the allotment.

Upstream of the Lower East Fork Allotment, the Salmon-Pole-Champion Sheep Allotment utilizes much of the remaining drainage. Patented mining claims also exist within Washington Basin, although none are currently active. Access to these claims in Washington Basin results in the only road in the drainage coming from the headwater downstream, then up the Washington Creek drainage. In 2001, a concentrated summer convective storm passed from south to north through the mid portions of the Germania drainage (Figure III-4). As a result, substantial debris flows burst from several tributaries on either side of the drainage dumping thousands of cubic yards of sediment and debris into Germania Creek. Most pools downstream of the event remained filled with sediment throughout the remainder of 2001. Much of the finest sediment was likely flushed downstream the following spring. However the more substantial sizes (sands to boulders) will likely influence stream dynamics and aquatic habitats for many years to come. However, an eventual benefit will be derived to aquatic habitats with the added complexity the debris has provided.

The south side of the drainage is predominantly conifer with patchy sage, while the north is the reverse, with mostly open sage. The generally accessible forge for cattle occurs on these high

north benches on the west and east ends of the allotment, which are connected via the narrow bottom of the Germania drainage. Forty percent of mapped streams within the allotment are within these generally accessible areas, with the majority of this being along the mainstem. Along the mainstem, the focus of cattle grazing is within the shrub and graminoid dominated riparian types typical of the low to moderate gradient reaches. Within the Germania drainage, these riparian habitats are large, mature, and often only moderately accessible to livestock. As such, changes as a result of grazing, such as compaction, pedestal formation, and excessive browse, have not uniformly occurred throughout such habitats, but are patchy. Where these changes have occurred at streamsides, added with streambank trampling and chiseling, the effects have been more continuous. When assessed in 1992, stable streambank in the response reaches, within the allotment, upstream of the falls, ranged between 71 and 93 percent, generally improving in reaches upstream. Pool frequency was also less than expected in most of these same reaches. Nevertheless, W/D, undercut bank, and the percent of fine sediment in potential spawning substrates, all appeared to be functioning within expected ranges in 1992.

Water temperatures monitored in the lower reach of Germania Creek from January to October, 1994 recorded temperatures less than 15° C. IDEQ has collected and evaluated water quality at three sites within Germania Creek. Unpublished results currently conclude that beneficial uses are fully supported (M. Edmondson, IDEQ, per. com.).

Figure III-19: Conditions within the Germania Creek drainage

Germania Creek, mid-drainage, August 1992

Germania Creek riparian interior, mid-drainage, July 2001

Germania Creek, lower-drainage, July 2001

Germania Creek, upper-drainage within allotment, July 2001

Bowery Creek

Bowery Creek is a moderate sized drainage flowing west from the high ridges flanking Bowery Peak. The entire drainage, including 40 miles of mapped streams, is contained within the Upper East Fork Allotment. A trail runs the length of the Bowery Creek drainage passing over a low divide into the East Pass drainage. A well-used outfitter camp is also located near the forks. At the mouth, just feet before joining the East Fork, a diversion removes water for irrigation purposes on nearby private land.

From topographic maps all streams within the drainage are shown to be high gradient (>4%), and in the lower reaches, typically tightly confined. This is generally true on the ground, except for occasional very small topographic steps where short response reaches have formed. The moderate stream size, steep condition, and high velocity dominated habitats, seem unlikely to have supported chinook or possibly steelhead historically. As such, no designated critical habitat for chinook or steelhead is estimated for Bowery Creek. However, in 1999, snorkeling surveys within the drainage observed redband juveniles. The USFWS has proposed critical habitat for bull trout for much of the drainage (18% of stream miles) including portions of Long Tom Creek and the North Fork. In 1999 bull trout were observed throughout the mainstem.

Water temperatures monitored at the mouth of Bowery Creek, August and September 1999, recorded temperatures, near optimum for bull trout, at less than 13° C. IDEQ has collected and evaluated water quality within Deer Creek, a small tributary of the East Fork just north of Bowery Creek. Unpublished results currently conclude that beneficial uses are not being supported (M. Edmondson, IDEQ, per. com.).

The mainstem of Bowery Creek is confined in a heavily vegetated inner gorge that precludes grazing in lengthy segments. The benches on either side of the gorge are accessible and used by livestock. The primary concentration of livestock in riparian areas within the Bowery drainage occurs in the wet stinger and pocket meadows of the headwaters. Like so many other places within the allotments, several of the headwaters originate in somewhat broad open basins, such as in the heads of Bowery Creek and Long Tom Creek. In these areas, riparian communities are dominated by graminoids and low shrub. Such forage has proved to be an attraction for grazing

cattle within the Bowery Creek drainage and most have been grazed intensively in the past. They are also fragile and susceptible to damage and reduced productivity through compaction, pedestal formation, soil puddling, and excessive browse. Streamside areas adjacent to fourteen percent of stream miles within the allotment are classified by vegetation specialists as not moving toward Forest Plan vegetation management objectives, including nearly all segments in the headwater areas.

Figure III-20: Conditions within the Bowery Creek drainage

Bowery Creek, mid-drainage, September 1999

Bowery Creek headwaters, September 1996

West Pass Creek

Forty-six miles of streams are mapped within the West Pass Creek drainage. All but the last quarter-mile is within the boundary of Upper East Fork Allotment. The drainage heads in some of the highest elevations contained within the allotment boundaries, approaching 12,000 feet. As a result, the headwater and tributaries of West Pass Creek are steep and generally turbulent. Not far upstream of the mouth, the mainstem of West Pass Creek also passes through a substantial high gradient segment. Above this reach, within the core of the West Pass Creek drainage, is a lengthy, moderate gradient, response reach.

Ample spawning habitat exists within the central response reach of West Pass Creek, and historically it may have been utilized by chinook and steelhead. As such, 10 percent of the stream miles within the allotment would be considered designated critical habitat for chinook and steelhead. The Shoshone-Bannock Tribes annually supplement steelhead production with hatch boxes in West Pass Creek within the central reach. To date, no natural adult steelhead have been confirmed returning (Kutchins, Shoshone-Bannock Tribes, per. com.). The USFWS has also proposed 10 miles of critical habitat for bull trout within the West Pass Creek drainage, including Roaring Creek, although it is unlikely they occupy habitat above the falls on Roaring Creek near the mouth. Extensive snorkel surveys in West Pass Creek in 2000 observed steelhead/redband trout, and resident and fluvial bull trout. Some have speculated in the past that the influence from hot springs near the mouth may result in a thermal barrier to salmonid migration. However, results of temperature monitoring above and below the hot springs shows only a small influence, and the presence of fluvial bull trout upstream appears to confirm adequate passage conditions.

Two valid mining claims remain in the head of the West Pass Creek drainage, although neither is currently active. A road access to the mine was constructed in the 1960s and remains. In 1995 the road was severely damaged during spring runoff in mid-drainage, and was subsequently closed above the damage until such time as transportation needs could be determined and sufficient capital made available for reconstruction if determined necessary. The segment remains closed and inaccessible to full size vehicles. In several locations where either the open or closed segments cross or are aligned adjacent to West Pass Creek or tributaries, erosion is evident and sediment quantities reaching aquatic habitats have been accelerated, in some locations substantially. Finally, near the mouth of West Pass Creek, on both public and private lands, three diversions remove water from West Pass Creek for irrigation of private pastures.

West Pass Creek displays a history of active channel and floodplain change. Large depositional features are consistent through much of the central response reach. The degree to which this condition is natural or influenced by human activities upstream is unknown. The areas thought generally accessible to cattle within the West Pass Creek drainage includes only a narrow band extending up the bottom of West Pass Creek, and even narrower strips following Crooked Canyon and Cougar Canyon, or roughly 34 percent of stream miles within the drainage. Along the mainstem, the focus of cattle grazing is within the shrub and graminoid dominated riparian types typical within the central response reach. Within the West Pass Creek drainage, these riparian habitats are generally large and mature. With the large cobble substrate and mature habitats, banks were generally identified as stable when assessed in 2000. However, W/D ratios consistently did not meet expected conditions. Pools were also less frequent than expected in some reaches. Riparian conditions adjacent to three percent of the stream miles within the allotment (or 9% of those generally accessible to cattle) are classified by vegetation specialists as not moving toward Forest Plan vegetation management objectives. These riparian areas have been altered and productivity diminished through compaction and excessive browse.

Figure III-21: Conditions within the West Pass Creek drainage

West Pass Creek, mid-drainage, August 2000

West Pass Creek, mid-drainage, September 2000

Water temperatures monitored in the lower reach of West Pass Creek, upstream of the hot springs and the uppermost diversion, from mid-June to mid-September 2002, recorded temperatures less than 15° C. IDEQ has collected and evaluated water quality at two sites within

West Pass Creek. Unpublished results currently conclude that beneficial uses are fully supported (M. Edmondson, IDEQ, per. com.).

East Fork Salmon River

The Upper East Fork Allotment contains the upper reaches of the East Fork Salmon River. The portion described and summarized here includes the watershed upstream of the confluence with Germania Creek excluding the Bowery and West Pass Creek drainages described earlier. Even without these two drainages, the watershed is the largest of the those described, with over 100 miles of mapped streams within the drainage, with 82 percent of these occurring within the boundary of the allotment. The remaining portion lies upstream of the allotment within the South Fork, except for a small segment within the private land near the confluence of West Pass Creek. The drainage also contains nearly 12 miles of low to moderate gradient response reaches – comparable only to Germania Creek in overall quantity. But unlike Germania Creek, nearly all is accessible to chinook and steelhead.

It is within these response reaches where the most productive aquatic habitats are located, and the vast majority of the suitable spawning habitats. Historically chinook and steelhead utilized these habitats up the length of the East Fork as well as segments in the West and South Forks. As such, 15 percent of the total stream miles within the allotment would be considered designated critical habitat. In 1978 chinook spawning activity was observed throughout the length of the East Fork up to, and including, areas within the South Fork. However, since then, with reduced runs, spawning had not been observed above the gorge near the confluence of Bowery Creek, many miles downstream. Finally, in 2002, with a relatively high number of chinook returning, spawning was again observed in several locations upstream of the gorge.

The USFWS has proposed critical habitat for bull trout within the mainstem, the South and West Forks, and Ibex Creek, or approximately 26 percent of the stream miles within the allotment. Snorkel surveys in 2002 observed chinook, steelhead/redband, and resident and fluvial bull trout present within the East Fork. Bull trout have also been observed in the South and West Forks. However, to date, no salmonids have been confirmed in Ibex Creek above the gorge, with only limited survey.

Use of pastures on private land near the confluence with West Pass Creek, including the intermittent use of a diversion for pasture irrigation (EF27), has altered riparian and aquatic habitats within. The main road (120) also extends through the lower watershed, leading to the private land, the Bowery Guard Station, trailheads, and the West Pass Creek Road (063). Although the location, use, and maintenance of this road downstream has had substantial influence on the river, within this upper segment, the road and river are typically topographically separated, likely resulting in only small indirect effects. Finally, dispersed recreation associated with such streamside activities as camping and trail crossings, have damaged habitats, but are isolated situations.

The East Fork Salmon River displays a history of active channel and floodplain adjustments. Large depositional and erosional features are consistent throughout its length. The degree to which this condition is natural, or influenced by human activities, such as the very intensive and pervasive sheep grazing in the early 1900s, is unknown. The fact that features like well

developed soils with indications of ground water influence (long-term processes) can still be found within such a dynamic floodplain suggests the condition may be a function of more recent times (i.e. decades/century).

In the lower end of the drainage cattle have general access throughout much of the open slopes on either side of valley to the high ridgelines above. Within these high slopes are many seeps and springs often leading off to narrow perennial and intermittent streams. Small topographic depressions, with wet meadow floors, are also common. These small wetland/riparian types are typically vegetated by mosses, graminoids, and/or low willows. The water, climate, and lush forge in such areas has proved to be an attraction for grazing cattle on these high slopes, and most have been grazed intensively in the past. However, they are also fragile and susceptible to damage and reduced productivity through compaction, pedestal formation, soil puddling, and excessive browse, and many have been altered accordingly. Nearly 5 miles of such areas adjacent to streams, have been identified by vegetation specialists as not moving toward Forest Plan vegetation management objectives.

In the upper portion of the allotment the upper slopes become very steep and, on the east, covered with dense conifer. As such, the area that is generally accessible to cattle includes only the valley bottom and the low, open slopes to the west. The focus of grazing during most years has been within the more productive riparian habitats adjacent to the river. Downstream of Ibex Creek the river resides in a generally low gradient condition with an overstory of cottonwood and conifer, and understory of willow. Upstream of Ibex, the river passes through 3 topographic steps, each topped with a short low gradient response reach vegetated with mature willow. Typical within all these response reaches, the mature willow communities are generally open and accessible to cattle. As such, grazing occurs uniformly from streamside to upland margin throughout these riparian bottoms. This access, and the intensity of the grazing in some years, has contributed to the volatile nature of the channel. When assessed in 2002, stable banks within these reaches ranged from 73 to 98 percent. Trampling and chiseling of streambanks from livestock is apparent. Pool frequency within these reaches was also less than expected, however fine sediments on the surface of potential spawning gravels remained low. Nearly 2½ miles of riparian communities within these reaches have also been identified by vegetation specialists as not moving toward Forest Plan vegetation management objectives.

East Fork water temperatures, monitored near the Bowery Guard Station in 1994, recorded temperatures in excess of 18°C in July and August. However, in 2002 water temperatures were again monitored just upstream, above the hot springs, where temperatures remained below 14°C during the same period. IDEQ has collected and evaluated water quality at two sites within East Fork Salmon River headwaters. Unpublished results currently conclude that, while the upper site is fully supporting beneficial uses, the lower site, downstream of the confluence with Germania Creek, is not supporting beneficial uses (M. Edmondson, IDEQ, per. com.).

Figure III-22: Conditions within the East Fork Salmon River headwaters drainage

Upper East Fork, September 1990

Upper East Fork, (same location as left) August 2001

Plunge in East Fork within gorge near Bowery confluence, 2002

Upper meadow adjacent to East Fork, August 2001

Typical substrate and streamside grazing, East Fork, August 2001

Typical grazed high tributary in lower drainage, September 2000

FLRMP Direction Applicable to Fisheries and Hydrology

The revised FLRMP (2003) provides programmatic direction for managing ecosystems within the Sawtooth National Forest. Below are listed some of the key elements of the plan applicable to fisheries and hydrology.

Desired Conditions:
Ecosystems on the Forest have ecological and watershed integrity, meaning they have a viable combination of all the diverse elements and processes needed to sustain the systems and to perform desired functions, and are dynamic in nature and resilient and resistant to natural and man-caused disturbances.

Soils retain all or most of their natural productivity and are in a condition that promotes vegetative growth, hydrologic function, long-term nutrient cycling, and erosional stability. Streams and lakes provide clean water, appropriate temperatures, and a variety of connected habitats to support native and desired non-native aquatic species. Air quality is occasionally affected by smoke from fire use and wildfire.

Standards:

FLRMP Direction	Comment
Design and implement projects to meet the terms of Forest Service approved portions of recovery plans. If a recovery plan does not yet exist, use the best information available (for example, BAs, BOs, letters of concurrence, Forest Service-approved portions of Conservation Strategies) until a recovery plan is written and approved. (TEST03)	No final recovery plans currently exist for ESA listed fish occupying habitats within the East Fork allotments. All alternatives included in this FEIS utilize, as sideboards, the general and specific direction resulting from numerous Section 7 consultations conducted since the first local ESA fish listing in the1991.
Management actions shall be designed to avoid or minimize adverse effects to listed species and their habitats. (TEST06)	
Mitigate, through avoidance, the adverse effects of livestock access or activities that may result in trampling of redds or disturbance of spawning or reproductive staging of ESA listed fish species. (TEST25)	All alternatives include seasonal constraints that remove livestock from potential spawning habitats prior to the spawning period.
Management actions shall be designed in a manner that maintains or restores water quality to fully support beneficial uses and native and desired non-native fish species and their habitat, except as allowed under Standard SWST04. (SWST01)	
Management activities that may affect soil detrimental disturbance (DD) shall meet the following requirements: In an activity area where existing conditions of DD are below 15 percent of the area, management activities shall leave the area in a condition of 15 percent or less detrimental disturbance following completion of the activities. In an activity area where existing conditions of DD exceed 15 percent of the area, management activities shall include mitigation and restoration so	DD includes soil displacement, compaction, and puddling. No comprehensive assessment of DD has been made for the vast East Fork allotments. In specific soil types, in some areas, the 15 percent threshold may be exceeded. For example, soils underlying seasonally wet meadows are particularly susceptible to compaction and puddling from livestock use.

that DD levels are moved back toward 15 percent or less following completion of the activities. (SWST02)	
Management actions will neither degrade nor retard attainment of properly functioning soil, water, riparian, and aquatic desired conditions, except: a) Where outweighed by demonstrable short- or long-term benefits to watershed resource conditions; or b) Where the Forest Service has limited authority (e.g., access roads, hydropower, etc.). In these cases, the Forest Service shall work with permittee(s) to minimize the degradation of watershed resource conditions. (SWST04)	The exceptions would not apply to the proposed grazing action. As described and defined in FLRMP, "retard attainment" compares the expected rate of recovery towards desired conditions of proposed management actions against the existing rate of recovery. Alternatives that would maintain or accelerate positive recovery trends would be considered consistent.
Within legal authorities, ensure that new proposed management activities within watersheds containing 303(d) listed water bodies improve or maintain overall progress toward beneficial use attainment for pollutants that led to the listing. (SWST07)	There are no 303(d) waterbodies currently within or downstream of the East Fork allotments. However, continued IDEQ assessments have identified some stream segments in the vicinity that could eventually receive such status.
Livestock trailing, bedding, watering, and other handling efforts shall be limited to those areas and times that maintain or allow for restoration of beneficial uses and native and desired non-native fish habitat. (RAST02)	This standard is intended primarily for the management of domestic sheep grazing. Cattle handling is infrequent in comparison. No conflicts with this standard are known or anticipated with any of the Alternatives.
New water developments, corrals, and other handling or loading facilities shall not be located within RCAs, unless it can be demonstrated that these facilities maintain or allow for restoration of beneficial uses and native and desired non-native fish habitat. (RAST03)	No new water developments are proposed with any alternative.
Livestock salting will be prohibited in RCAs. Sheep will be salted only at bed grounds. Salt will be placed in containers and moved with the sheep. (RAST04)	This is a best management practice included routinely in livestock grazing authorizations.
Forage utilization for riparian areas will not exceed 30 percent use of most palatable forage species, or must retain a minimum 6-inch stubble height of hydric greenline species. (03109)	Achieving these annual use standards would allow recovery of stream and streamside habitats under most circumstances (Clary and Webster 1989).
Manage both federal and private lands to ensure the preservation and protection of the natural, scenic, historic, pastoral, and fish and wildlife values and to provide for the enhancement of the associated recreational values in accordance with Public Law 92-400. (0301)	This standard does not apply to areas outside the designated Sawtooth NRA including roughly the Germania drainage below Chamberlain Creek, the East Fork drainage below West Pass Creek, and the entire Bowery Creek drainage.
Management, utilization, and disposal of natural resources on federally owned lands (such as timber, grazing, and mineral resources) shall be allowed only insofar as their utilization does not substantially impair achievement of the purposes for which the recreation area was established. "Substantial Impairment" is defined as that level of disturbance of the values of the SNRA that is incompatible with the standards and guidelines of the Forest Plan (contained in this document). The proposed activities shall be evaluated as to: 1) the period of impact; 2) the area affected; and	As per direction in the FLRMP, information supporting a determination regarding "substantial impairment" of fisheries values is contained within the matrix of effects contained within the separate Biological Assessment and in the effects analysis of this document.

3) the importance of the impact on the SNRA values. (0302)	
Within MPC 3.1, management actions, including salvage harvest, may only degrade aquatic, terrestrial, and watershed resource conditions in the temporary time period (up to 3 years), and must be designed to avoid resource degradation in the short term (3-15 years) and long term (greater than 15 years). (0317)	
Within MPC 3.2, management actions, including salvage harvest, may only degrade aquatic, terrestrial, and watershed resource conditions in the temporary (up to 3 years) or short-term (3-15 years) time periods, and must be designed to avoid degradation of existing conditions in the long-term (greater than 15 years). (0322)	
Goals and objectives included in the revised FLRMP are also applicable. See SWGO01-03, 06-08, 10, 11, 13, 14, as well as MA03 direction 0326, 0330, 0331, 0334, 0342, and 0343.	

Aquatic Conservation Strategy:

Included and integral with the FLRMP, the Aquatic Conservation Strategy (ACS) provides direction to maintain and restore characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats, in the long-term. The Strategy is incorporated into the direction of the FLRMP and serves as an interim recovery strategy until formal recovery plans are issued for listed fish species. Specific elements of the strategy are applicable here.

Component 3 instructs the identification of Riparian Conservation Areas (RCAs) with project implementation. Although the July 2003 release of the revised LRMP did not allow field delineation of RCAs along the many miles of streams within the East Fork allotments during this planning effort, the extent of actual riparian habitats was estimated for streams within the East Fork allotments as a function of channel gradient and stream order (size). The results spatially characterize the general extent, form, and pattern of riparian areas within the allotments.

Component 5, 6, and 7 describe the development of the Watershed and Aquatic Recovery Strategy (WARS). Through the FLRMP revision process, a multi-scale assessment was conducted to classify subbasins and subwatersheds into appropriate restoration focus and priorities. This assessment was driven by ratings of geomorphic, water quality, and aquatic integrity and their vulnerability. The results recommend restoration objectives within any given subwatershed to be active, passive, or conservation focused, and suggest a priority for restoration. “Passive” restoration typically relies on administrative actions to achieve desired conditions, while “active” restoration also includes objectives requiring capital investment.

The results of this assessment (i.e. WARS) recommended an active restoration strategy throughout all subwatersheds that include portions of the East Fork allotments, with roughly an equal mix of high and moderate priorities. Using this and many other considerations, the FLRMP assigned management prescriptions categories (MPC). Within these prescriptions, the bulk of the East Fork allotments is within MPC 1.2 (recommended wilderness), and 3.1 (passive restoration). Small ribbons of MPC 2.1 (wild and scenic rivers) align major streams, and,

likewise, corridors of 3.2 (active restoration) align classified roads. Therefore, restoration objectives within these areas will be achieved primarily through passive administrative controls.

Finally, the ACS concludes with overlying priority subwatersheds that have the highest emphasis for restoration, monitoring, and future multi-scale analysis. French Creek, Germania Creek, and the headwaters of the East Fork Salmon are identified as ACS priority watersheds.

Wildlife

Wildlife species abundance and distribution are mainly a function of climate, topography, and the vegetation that occurs in an area. Of these factors vegetation is most influenced by humans and will be discussed in relation to its condition and how that condition influences wildlife species.

Figure III-23. Wet meadow in the Upper East Fork Allotment meeting Forest Plan vegetation management objectives. High plant cover, proper species composition, and good vigor are in present. Taken 8/31/01.

Figure III-24. Wet meadow in the Upper East Fork Allotment not moving toward Forest Plan vegetation management objectives. High percent of bare ground, poor species composition, and soil compaction are present. Taken 8/31/01.

The allotments consist of nonforested areas of mainly sagebrush mixed with grass and forbs, with localized areas of bitterbrush, chokecherry, and other mountain shrub species where moisture and soil conditions are favorable. Riparian habitat is present and consists of willow, aspen, and cottonwood as the dominant overstory vegetation. The allotments also contain numerous springs, seeps, and wet meadow habitat. Deciduous forested areas of aspen occur in upland draws and springs. Coniferous forest of Douglas-fir, lodgepole pine, subalpine fir, and small areas of Engelmann spruce occur on most north and east aspects. Whitebark pine occurs at high elevation on these allotments.

Monitoring has shown that within the Lower East Fork Allotment, 36% of riparian reaches accessible to livestock are not moving toward Forest Plan vegetation management objectives. These objectives include restoring the early seral aspen component where appropriate (Obj. 0346), maintaining and restoring cottonwood regeneration and age class diversity (Obj. 0347), restoring willow composition, structure, and density (Obj. 0349), and maintaining and restoring aspen stands (Obj. 0350).

Figure III-25. Riparian area in the Lower East Fork Allotment meeting Forest Plan vegetation management objectives. Willows and herbaceous species present with good vigor. Taken 8/8/02.

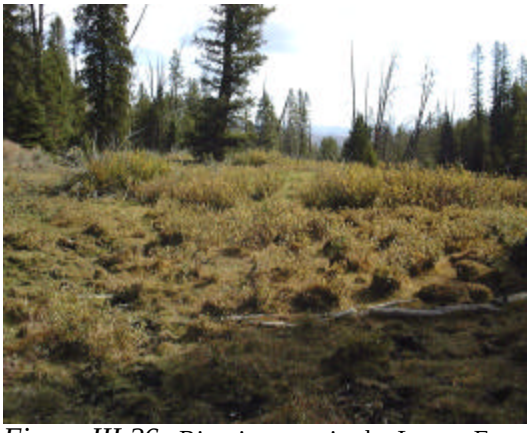


Figure III-26. Riparian area in the Lower East Fork Allotment not moving toward Forest Plan vegetation management objectives. Over use of willows, soil compaction, and pedestal formation are evident. Taken 9/18/01.

Riparian areas, associated with perennial streams and accessible to cattle, are not moving toward Forest Plan vegetative management objectives on 27% of the allotment. Areas with high percentages of impacted reaches include Sullivan Creek, Pistol Creek, French Creek, Coal Camp Creek, Holman Creek, Mill Creek, upper Silver Rule Creek, Carbonate Creek, upper Corral Creek, upper Big Lake Creek, Big Boulder Creek, upper Little Boulder Creek, and upper Wickiup Creek.

Figure III-27. Wet meadow in the Lower East Fork Allotment meeting Forest Plan vegetation management objectives. High plant cover, proper species composition, and good vigor are in present. Taken 8/8/02.

Figure III-28. Wet meadow in the Lower East Fork Allotment not moving toward Forest Plan vegetation management objectives. Bare ground, poor species composition, and soil compaction are evident. Taken 9/21/01.

Most springs, seeps, and wet meadows that are accessible to cattle are not moving toward Forest Plan vegetative management objectives. Condition of the uplands is not moving toward Forest Plan vegetation management objectives on an estimated 10% of the area. However, livestock grazing has affected upland aspen forests in many areas in the allotment. Specifically, regeneration and general understory condition of an estimated 75% of aspen forests on the allotment have been hampered by livestock use. Localized sagebrush areas have been affected by livestock as well, through reduction of vegetation in the understory.

Figure III-29. Spring in the Lower East Fork Allotment meeting Forest Plan vegetation management objectives. High plant cover, proper species composition, and good vigor are in present. Taken 9/28/01.

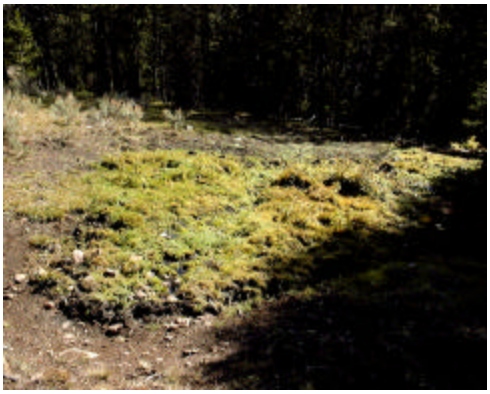


Figure III-30. Spring in the Lower East Fork Allotment not moving toward Forest Plan vegetation management objectives. High percent of bare ground, soil compaction, and pedestal formation are present. Taken 9/18/01

Within the Upper East Fork Allotment, 19% of riparian reaches that are accessible to livestock are not moving toward Forest Plan vegetative management objectives. Riparian areas, associated with perennial streams and accessible to cattle, are not moving toward Forest Plan vegetative management objectives on 19% of the allotment.

Figure III-31. Aspen stand in the Lower East Fork Allotment meeting Forest Plan vegetation management objectives. Abundant regeneration in the understory and periphery of the stand and trees of various ages are present. Taken 9/18/01.

Figure III-32. Aspen stand in the Lower East Fork Allotment not moving toward Forest Plan vegetation management objectives. Very little regeneration in or adjacent to the stand. Almost all trees are of older age. Taken 9/18/01.

Some of these areas include the drainage above Bowery Guard Station (nicknamed Cow Heaven), upper Bowery Creek, lower Fisher Creek, West Pass Creek, and several sites along the East Fork Salmon River.

Threatened and Endangered Species

Threatened and endangered terrestrial wildlife species with suitable habitat in the allotments include the endangered gray wolf, threatened bald eagle, and threatened Canada lynx. Additionally, suitable habitat for the recently de-listed peregrine falcon occurs in the allotments. The peregrine falcon was de-listed (removed from the Endangered Species List) on August 25, 1999. Federal agencies are required to monitor the species for five years after de-listing. In compliance with that requirement, effects to the species will continue to be disclosed in environmental documents.

Gray wolf - Suitable habitat for wolves exists within both allotments. Large ungulates occur in the allotments year round. During the winter, elk concentrate in riparian areas in the allotments, particularly during severe winters. The allotments are part of elk core winter range in the East Fork Salmon River watershed. Mule deer winter range also occurs within both allotments, concentrated in sagebrush and bitterbrush communities. Livestock grazing has affected these ranges, particularly in riparian areas and aspen forests by hampering regeneration of willow and aspen. The Lower East Fork provides winter range for bighorn sheep as well. Studies have indicated that cattle and bighorn sheep compete for bluebunch wheatgrass (Lauer and Peek 1976, Tilton and Willard 1981, Keating et al. 1985). During spring, summer, and fall, antelope provide prey opportunities for wolves in addition to elk, mule deer, and bighorn sheep.

In January of 1995, the U.S. Fish and Wildlife Service reintroduced 15 wolves into Central Idaho, under a Nonessential Experimental Population Rule (Federal Register, Vol. 59, No.224, p. 60266-60281, 1994). An additional 20 wolves were released in January of 1996. Subsequent to the releases, two packs, Stanley and White Clouds, established with all or part of their territories on the SNRA. The White Clouds pack concentrated their use in the East Fork of the Salmon River, and was frequently located within the East Fork Allotments. Denning occurred on the Upper East Fork Allotment in 1998. Another pack established in Copper Basin adjacent to the Ketchum Ranger District to the northeast on the Salmon-Challis National Forest. During the spring and summer of 2000, control action was taken on both the Stanley and White Clouds packs because of livestock depredation, and the integrity of the packs was destroyed. During the winter and spring of 2001 another pack, the Whitehawk Pack, moved into and established territory on the SNRA. This pack denned within the Sawtooth Valley. Control action was taken on this pack during the summer of 2001 and again during winter and spring of 2002. All members of this pack have been killed. In May of 2003 one new pack (Galena) located within the Sawtooth NRA, in the White Clouds west of the Lower East Fork Allotment. In June of 2003 a new pack (Castle Peak) was detected within the Lower East Fork Allotment. No livestock depredations have occurred on the allotments since elimination of these packs, though three wolves have been lethally controlled on the allotments due to depredations on private land within the East Fork of the Salmon River.

Canada lynx - The Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) provides direction for management of lynx habitat on federal lands. The conservation

measures discussed in the document are the basis for analysis of effects of projects on Canada lynx during consultations. This document also directs Forests to develop Lynx Analysis Units (LAU) and define foraging and denning habitat within each LAU. On the Sawtooth National Forest, LAUs were derived by aggregating 6th level Hydrologic Units and lynx habitat was derived using vegetation layers from satellite imagery and GIS mapping techniques. (For specific criteria used in developing lynx habitat maps see project file). Additionally, watershed biological assessments of the effects of ongoing projects to Canada lynx were completed in February 2003. As part of these analyses, baseline conditions for each LAU were described and evaluated as to their ability to conserve lynx. Effects of new projects will be evaluated in relation to these baseline conditions.

Predicted suitable habitat for Canada lynx has been identified within the allotments. The Upper East Fork Allotment is within the Upper East Fork Salmon LAU and approximately 12,750 acres of predicted lynx habitat are within the allotment, excluding Bowery Creek. This LAU contains 18% predicted denning habitat. Bowery Creek was not included in an LAU during the Salmon-Challis National Forest evaluation and mapping of lynx habitat due to the lack of a sufficient amount of habitat. The Lower East Fork allotment is within the Slate-Sullivan-Big Lake-Boulder and Pole-Germania LAUs and approximately 21,900 acres of predicted lynx habitat are within the allotment. Both of these LAUs contain 16% predicted denning habitat. Baseline conditions of these LAUs are described in the Biological Assessment of Effects of Ongoing Federal Actions to the threatened Canada lynx within the Canyon/East Fork Salmon River Watershed. Historical sightings of Canada lynx have been reported in the East Fork of the Salmon River in the White Clouds (Lewis and Wenger 1998). Prey species, such as snowshoe hare, grouse, and small mammals occur within the allotments.

Snowshoe hares rely heavily on woody browse for winter forage. Their habitat use is highly correlated with high horizontal cover from 1-3 meters above ground (Hodges 1999) and hare abundance has been shown to be positively correlated with density of understory vegetation (Livaitis et al. 1985). Both high elevation willow riparian areas and aspen forests provide winter forage and cover for hares, and livestock grazing has removed cover within much of this habitat. Livestock grazing in aspen forest has been shown to be negatively correlated with snowshoe hare abundance (Weatherill and Keith 1969). Much of the riparian areas used by prey species of the lynx are generally in low seral condition, which does not provide adequate habitat for snowshoe hare. Many aspen forests, which are used by snowshoe hare, are in poor condition with regeneration and understory vigor hampered by livestock grazing. Voles and other litter-dwelling small mammal prey species require litter and residual vegetation for food, cover which provides protection from predators allowing for more activity during the day, maintenance of favorable microclimate, and more hospitable subnivean space where residual vegetation prevents hard packing of snow (Birney et al. 1976). Livestock grazing has reduced residual vegetation throughout the allotments, particularly in shrub and cottonwood riparian areas.

Bald eagles - Bald eagles may occur within the Lower East Fork allotment during fall, winter, and spring especially near Jimmy Smith Lake and Sullivan Lake. Riparian and lakeshore areas around these lakes have been heavily grazed and trampled by livestock, particularly Sullivan Lake. Cover for waterfowl prey species of eagles has been removed

due to livestock grazing and trampling. No suitable habitat exists in the Upper East Fork Allotment.

Peregrine falcons - No known peregrine falcon eyries occur within the allotment though suitable foraging habitat exists. One known eyrie exists within the East Fork Salmon River Watershed and is located within an estimated five miles of the Lower East Fork Allotment. Two eyries are known to occur on the NRA, however these eyries are greater than 10 miles (distance peregrines will forage from eyrie site) from the allotment. No surveys have been conducted in the allotments though suitable habitat exists in both. Livestock grazing has altered foraging habitat, mainly riparian, wetland, and spring areas by reducing food and cover for prey species.

Forest Service Sensitive Species

Forest Service sensitive species with suitable habitat in the allotments include spotted bat, Townsend's big-eared bat, wolverine, fisher, northern goshawk, boreal owl, flammulated owl, northern three-toed woodpecker, and Columbia spotted frog. No surveys have been conducted for the sensitive species within the allotments with the exception of northern goshawk and Columbia spotted frog, and population trends are unknown. Estimated amount of habitat for sensitive species within the allotments is listed in Table III-6.

Spotted Bat -Spotted bats forage nocturnally, and feed mainly on moths in open ponderosa pine stands, marshy areas and open pastures. They roost in rock crevices on steep cliff faces (Watkins 1977, Wai-Ping and Fenton 1989). Spotted bats hibernate during the winter and emerge in spring, generally March or April depending on daytime temperatures during those months. There are no documented sightings of the spotted bat within the allotments, though suitable habitat is present. Spotted bats have been detected on the Middle Fork of the Salmon River. Livestock grazing has altered foraging habitat within the allotments, which consists primarily of riparian, wetland, and spring areas. Vegetation has been reduced in many spring/seep areas from livestock grazing and trampling.

Townsend's Big-eared Bat -Townsend's big-eared bats are nocturnal insectivores feeding primarily on moths along forest edges. They roost in crevices of rocky outcrops, caves, old mines or buildings. Unlike many species that seek refuge in crevices, Townsend's big-eared bat forms highly visible clusters on open surfaces making them extremely vulnerable to disturbance (Christy and West 1993). Townsend's big-eared bats hibernate during the winter and emerge in spring, generally March or April depending on daytime temperatures during those months. There are no documented sightings of Townsend's big-eared bats within the allotments, though suitable habitat is present. Townsend's big-eared bats have been found in the Warm Springs drainage on the Ketchum Ranger District. Livestock grazing has altered foraging habitat within the allotments, which consists primarily of riparian, wetland, and spring areas. Vegetation has been reduced in many spring/seep areas from livestock grazing and trampling.

Wolverine - Wolverines are primarily scavengers and forage on carcasses of ungulates such as elk, deer, mountain goats, and bighorn sheep. They also may hunt for snowshoe hares, marmots, mice, voles, ground squirrels, and grouse but will also eat fruits, berries, and insects when other prey is unavailable (Hash 1987).

Home range sizes of wolverines are highly influenced by prey remains and other food sources. Individual animals generally have very large ranges and can cover large distances in very little time. In central Idaho, home ranges average 384 square kilometers (148 square miles) for females and 1,582 square km (582 square miles) for males and may have overlapping ranges. They use several habitats and have been located in low-elevation, forested drainage bottoms to high-elevation, sparsely-timbered cirque basins. Two natal den sites were located in subalpine cirque areas on north-facing slopes suggesting that this type of habitat is critical to wolverines in central Idaho (Copeland 1996).

Female wolverines are very sensitive to disturbance during mid-February through May while they are searching for, establishing, and occupying their reproductive dens. Detecting people near an existing den was enough disturbance to cause a female wolverine to move her kits to a different site. During this time females are lactating, and disturbance, which leads to increased energy expenditure, can be very detrimental. It is a critical time for females because they must maintain energy levels in order to properly nourish their kits during a time when food is scarce (Copeland 1996).

A study of wolverines in central Idaho was conducted from 1992-1995 by the Idaho Department of Fish and Game. The study area contained much of the SNRA. During this study, wolverines were documented in many locations in the SNRA. The allotments provide suitable habitat for wolverine including predicted reproductive denning habitat in the cirque basins of the Boulder and White Cloud Mountains, though very little of this habitat is accessible to cattle. Foraging habitat occurs throughout the allotments and livestock grazing has mainly affected this habitat by reducing cover for some prey species of wolverine such as snowshoe hares, pikas, voles, marmots, and other litter-dwelling small mammal species.

Fisher - Fishers are found in mature to old-growth forests with high canopy closure and generally avoid large openings. They are associated with mesic forest conditions and forested riparian areas. They eat small mammals, birds, fish, amphibians, insects, carrion, fruits, nuts, and berries (Douglas and Strickland 1987).

No sightings of fisher have been reported within the allotments, though suitable habitat exists. There are trapping records of fisher from the early 1980's west of the project area on the west side of the Sawtooth Wilderness in the South Fork Payette and North Fork Boise drainages, one record in Stanley Basin, and a recent sighting approximately 10 miles north of the Lower East Fork Allotment. Potential habitat exists within the allotments, which consists of older forested areas with high canopy closure. Fisher tend to avoid large openings, but where livestock grazing has occurred in aspen forests and small riparian meadows within forest stands (such as Sullivan Creek, upper Silver Rule Creek, upper Coal Camp Creek, and upper Big Lake Creek), foraging habitat quality for some prey species of fisher, such as snowshoe hares, voles and other litter-dwelling small mammal species, has been affected. Livestock grazing has reduced cover and food sources for these prey species.

Northern Goshawk - Goshawk home ranges in mixed conifers forests have been described as 6,000 acres in size and comprised of a nest area (approximately 30 acres), a post fledging-family area or PFA (approximately 420 acres), and a foraging area (approximately 5,400 acres) (Reynolds et al. 1992). Nest areas generally have high tree canopy cover (50-60%) and a high density of large trees (average 20" dbh). However, data from nests on the SNRA

show that goshawks will successfully nest in smaller trees and lower canopy closure than has been generally reported (11 inch average dbh of nest tree, 23% average canopy closure of nest tree area). The PFA provides cover and prey for the fledglings while developing their flying and hunting skills. These areas should have canopy cover of greater than 50% with well-developed understories. Goshawks prey on a wide variety of forest-dwelling birds and mammals such as grouse, woodpeckers, squirrels, and rabbits. Goshawks tend to use mature forests (and forest edges) for foraging, but also need other habitat elements which provide the necessary requirements for their prey such as snags, downed logs, small openings, herbaceous and shrubby understories (Reynolds et al. 1992). Goshawks do not necessarily migrate long distances, but may move off their breeding territories during winter in order to find food. They tend to move to lower elevations with less snow cover during the winter, and return to breeding territories in March or April.

One documented territory exists within the Lower East Fork Allotment, and suitable nesting habitat exists throughout both allotments. Livestock grazing has negatively affected foraging habitat for some prey species of the goshawk such as snowshoe hares, mountain cottontail, golden-mantled ground squirrel, woodpeckers, and grouse (Weatherill and Keith 1969). Large, mature aspen trees may be used as nest trees and several prey species use aspen for part of their life history such as blue grouse, northern flicker, hairy woodpecker, and red-naped sapsuckers. Many aspen forests within the allotments are in poor condition with regeneration and understory vigor hampered by livestock grazing.

Boreal Owl - Boreal owls are known to occur in spruce-fir, Douglas-fir, and mixed conifer forests above 5,000 feet elevation. They are cavity-dependent and generally use old woodpecker cavities for their nest sites. They feed on forest dwelling small mammals such as voles and shrews (Johnsgard 1988). Boreal owls depend on woodpecker cavities, which usually occur in dead trees for their nest sites. Males arrive at potential breeding territories in late winter (mid-February) and begin calling to attract females by late February or early March. Both allotments provide suitable nesting and foraging habitat. Livestock grazing has affected foraging habitat for some prey species of boreal owls such as voles and shrews by reducing residual vegetative cover. Boreal owls may use aspen for nesting (Hayward et al. 1993). Additionally, red-backed vole abundance has been shown to be negatively correlated with grazing in aspen forests (Weatherill and Keith 1969). Many aspen forests within the allotments are in poor condition with regeneration and understory vigor hampered by livestock grazing.

Flammulated Owl - Flammulated owls are known to occur in mature ponderosa pine and mature Douglas-fir forests with an abundance of snags or live trees with cavities for nesting. Flammulated owls eat mainly invertebrates such as moths, grasshoppers, and spiders. Prey is more abundant and accessible in open forest stands with grass and shrub understories (Johnsgard 1988). Roosting occurs in coniferous forest stands with dense vegetation (McCallum 1994). This species is truly migratory and does not arrive on its breeding territories until May in Central Idaho. Both allotments provide suitable nesting and foraging habitat. Livestock grazing has likely had little affect on habitat of flammulated owls.

Northern Three-toed Woodpecker - Three-toed woodpeckers are found in northern coniferous forests, primarily associated with mature forests with outbreaks of bark beetles. They forage mainly in dead trees and a large percentage of their diet are wood-boring insect

larvae. They excavate cavities in snags or occasionally live trees (Short 1982). This species may make small movements off its breeding territory in the winter to find food, but is generally a resident. Breeding begins in May in Central Idaho. Suitable habitat is present within both allotments. This species nests, roosts, and forages in coniferous forests and does not require a well-developed forest understory. Livestock grazing in these allotments has had little effect on three-toed woodpecker habitat.

Columbia Spotted Frog – Spotted frogs are found in areas where permanent water is present such as marshes, ponds, or riparian areas. They may move considerable distances from water following the breeding season, often frequenting mixed conifer and subalpine forests, grasslands, and brushlands of sage and rabbit brush if puddles, seeps or other water is available. Adult spotted frogs feed on invertebrates, generally within one-half meter of shore on dry days. During and after rains, they may move away from permanent water to feed in wet vegetation or ephemeral puddles (Licht 1986). Spotted frogs hibernate during winter and emerge when open water becomes available, generally during spring thaw. Spotted frogs breed from late February to early July. A water temperature of 40 degrees Fahrenheit seems to be the critical temperature for emergence from hibernation (Morris and Tanner 1969), which may occur as early as the first part of April.

Habitat exists within both allotments. Surveys were conducted in 2002 and 2003 at 14 sites within the Lower East Fork Allotment, and spotted frogs were detected at nine of these. One site was surveyed in the Upper East Fork Allotment in 2003 and no amphibians were detected. Spotted frogs have been found to be highly associated with presence of willows, which they use for cover, and submerged vegetation (Munger et al. 1998). Livestock grazing has, in many areas within both allotments, degraded or eliminated willows. A total of 23% of riparian areas within the allotments have been classified as not moving toward Forest Plan vegetation management objectives. Additionally, a majority of the spring and wet meadow areas that are accessible to cattle are not moving toward Forest Plan vegetation management objectives. Frog Lake, Little Frog Lake, and the meadows surrounding these lakes are important spotted frog habitat that have shown a reduction in riparian vegetation, trampling, and soil compaction as a result of cattle grazing. Sullivan Lake is another site with suitable habitat that has experienced similar effects from livestock grazing. Frogs were not detected at this site in 2002.

Management Indicator Species

Management indicator species (MIS) are identified in the Forest Plan. MIS are intended to represent certain habitat characteristics and are used to monitor wildlife habitat condition. Estimated amount of habitat for MIS species within the allotments is listed in Table III-7.

Greater sage-grouse – Brood-rearing habitat for greater sage-grouse occurs in the Lower East Fork Allotment in the form of sagebrush and wet meadow areas. Sage grouse depend on sagebrush for both nesting successfully (Klebenow 1969, Wakkinen 1990, Connelly et al. 1991) and winter survival (Braun et al. 1977, Remington and Braun 1985, Welch et al. 1991). During summer females generally move to areas where succulent forbs are available (Klebenow 1969, Dunn and Braun 1986) in order to obtain sufficient food for brood rearing. Sage grouse require insects during their first summer of life in order to obtain sufficient protein to grow rapidly. (Klebenow 1969, Wakkinen 1990.) Often this movement is to areas of higher elevation or wet meadows.

An estimated 840 acres of mesic meadow type areas available to sage grouse occur in the allotment. There is some evidence to suggest that chick (hatching to brood breakup) survival may be limiting some sage grouse populations in Idaho, indicating that this is a particularly important habitat for sage-grouse. Most wet meadows within the allotment that are accessible to cattle have been classified as not moving toward Forest Plan vegetation management objectives. Suitable brood rearing habitat in wet meadow areas within Big Lake Creek, French Creek, and Coal Camp Creek show effects from livestock use. Both structure and species composition of the vegetation in these areas has been simplified, resulting in a reduction of the quantity and quality of forbs available for attracting insects for sage grouse hens and their broods, and by reducing the amount of cover for escaping from predators. Additionally, water developments (16 troughs and 25 ponds) have the potential to cause wet meadows and springs they are associated with to dry up sooner in the season than if no developments existed. Population trends of this species in the project area and on the Sawtooth Forest are unknown, though sage grouse have been documented to be declining rangewide, and data from IDFG also show declines in sage-grouse numbers across the state. Additionally, Breeding Bird Survey Data for Idaho show a declining trend over the past 20 years (-4.5%/year), though the sample size for this species is very small in Idaho (Sauer et al. 2001).

Pileated woodpecker - Suitable habitat for pileated woodpeckers exists in the allotments. Pileated woodpeckers use large diameter snags (>20") in relatively closed-canopy (>50%) forests for nesting (Bull et al. 1986) and dense canopy cover for roosting (>60%) (Bull et al. 1992). They also use larger diameter (>20") trees for foraging and will forage frequently on insects found in downed logs greater than 10" in diameter. On the Sawtooth Forest, this species has often been found nesting in mature aspen stands and observed foraging in cottonwood trees. Pileated woodpeckers feed on insects, which inhabit trees, both live and dead. Carpenter ants and bark beetles are commonly foraged upon (Bull et al. 1986). Although pileated woodpeckers use coniferous forests, which are generally not affected from livestock use in these allotments, they also readily use aspen and cottonwood for both nesting and foraging. Livestock use of aspen forests has resulted in poor condition of many stands within the allotments. Population trends of this species in the project area and on the Sawtooth Forest are unknown. Breeding Bird Survey Data for Idaho show an increasing trend over the past 20 years (2.6 %/year), though the sample size for this species is very small in Idaho (Sauer et al. 2001).

Ungulate Habitats

Elk, bighorn sheep, mountain goats, and mule deer have key ranges that overlap in either time and/or space with the grazing allotments and will be discussed in this document.

Elk - Elk use mid to late seral range vegetation for forage and mature forest for thermal and security cover. The allotments are within Idaho Department of Fish and Game (IDFG) Hunt Unit 36A. According to IDFG total elk numbers in this Unit have increased over the past 10 years, though the bull:cow ratio has decreased. Year round range for elk occurs within both allotments. Competition between cattle and elk for both forage and space has been documented, and elk tend to avoid areas that have been recently grazed by cattle (Mackie 1970, Lonner and Mackie 1983). Elk use riparian areas in these allotments during the winter, particularly during severe winters, as well as aspen forests. These allotments are part of the

core winter range in this area. Winter survival is most likely the limiting factor for elk populations in this area, and these allotments are part of the core winter range in this area. Livestock grazing has affected these ranges, particularly in riparian areas and aspen forests by hampering regeneration of willow and aspen.

Bighorn Sheep - Winter range, transitional (spring/fall) range, and a small area of summer range for bighorn sheep occur on the Lower East Fork Allotment. Transitional range occurs along Railroad Ridge and along the ridge to the north of Big Lake Creek. Bighorn sheep numbers in this Hunt Unit (36A) have declined over the past 10 years according to data from IDFG. This herd is limited by lamb survival through late summer and both adult and lamb winter survival. A study of the bighorn sheep herd in this area in the mid 1970's found that during winter the animals rely heavily on bluebunch wheatgrass for forage, and that forage competition with cattle was likely occurring in the Wyoming big sagebrush/bluebunch wheatgrass community on slopes below 30% (Lauer and Peek 1976). Other studies of bighorn sheep have shown a high proportion of bluebunch wheatgrass in their winter diets as well (Tilton and Willard 1981, Keating et al. 1985), indicating the potential for competition with cattle.

Mountain goat - On the Sawtooth Forest mountain goats occur in subalpine and alpine habitat above approximately 7500 to 8000' elevation. They are associated with rocky terrain and cliffs adjacent to grass, forb, and shrub areas. They tend to stay within 0.25 miles of escape terrain which is defined as rocky cliff and bluff areas (Haynes 1992, Chadwick 1983). Mountain goats occur within both allotments. The most current data from IDFG on this population shows a decline in numbers between 1973 and 2002. Cattle grazing occurs within mountain goat habitat in both allotments, though only within a small area due to the inaccessiblity of much of this type of habitat to cattle. Winter range for mountain goats occurs on both allotments. During winter, mountain goats do not necessarily move down in elevation as other ungulates in Central Idaho do. They restrict their activities to south-facing slopes, steep cliffs, and windblown ridges where snow accumulation is lower than in other parts of their range (Fox 1983, Chadwick 1983). This population is most likely limited by winter survival. Bluebunch wheatgrass is an important forage species for mountain goats (Brandborg 1955) suggesting that competition with cattle can exist. Additionally, high elevation cirques where mountain goats frequently forage are fragile, easily- damaged, and slow-to-recover habitats. Livestock grazing has affected these habitats in parts of both allotments through removing and trampling vegetation and compacting soils. These effects are evident in the upper West Fork of the East Fork within the Upper East Fork Allotment and in most headwater areas in the Lower East Fork Allotment.

Mule Deer - Mule deer forage on mid to late seral range vegetation with higher use in later seral stages where browse is dominant. Mule deer numbers have remained stable in Hunt Unit 36A over the past 10 years according to IDFG. Both allotments provide spring, summer, and fall range for mule deer. The allotments contain winter range for mule deer as well, concentrated in sagebrush and bitterbrush communities. Cattle grazing occurs within mule deer winter range within both allotments. A study (Lauer and Peek 1976) of the mule deer herd in this area in the mid 1970's found that during winter the animals rely on sagebrush and bitterbrush. Cattle grazing, especially during late summer when browse use by cattle is most likely to occur, can result in forage competition.

Neotropical Migratory Birds

Executive Order (EO) 13186, signed January 10, 2001, lists several responsibilities of federal agencies to protect migratory birds, among them: (1) support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.

Additional direction comes from the Memorandum of Understanding (MOU) between USDA Forest Service and USDI Fish and Wildlife Service, signed January 17, 2001. The purpose of this MOU is to strengthen migratory bird conservation through enhanced collaboration between the Forest Service and Fish and Wildlife Service, in coordination with state, tribal and local governments. The MOU identifies specific activities for bird conservation, pursuant to EO 13186 including: 2) Strive to protect, restore, enhance, and manage habitat of migratory birds, and prevent the further loss or degradation of remaining habitats on National Forest System lands. This includes: a) Identifying management practices that impact populations of high priority migratory bird species, including nesting, migration, or over-wintering habitats, on National Forest System lands, and developing management objectives or recommendations that avoid or minimize these impacts. This will help inform future specific protocols called for in an MOU implementing the Executive Order.

Neotropical migratory birds (NTMB) use all habitats of both allotments during the breeding season when cattle are present. A list of NTMB with suitable nesting habitat in the allotments is present in the project file. Priority species identified in the Idaho Bird Conservation Plan (Idaho Partners in Flight 2000) are listed in Species Priority Table IV-2. Population trends for the priority species have been calculated from data from the Breeding Bird Survey. No monitoring of species numbers or diversity has been conducted on the allotments, therefore local population trends are unknown.

Riparian areas, wet meadows, spring areas, and aspen forests are habitats within the allotments that show considerable alteration from livestock grazing. These habitats are also high priority habitats identified in the Idaho Bird Conservation Plan (Idaho Partners in Flight 2000). Livestock grazing has resulted in decreased diversity of the structure and composition of these plant communities as well as decreased reproduction in willow and aspen communities. This most likely has decreased the abundance of some species of NTMB. The distribution and diversity of birds is highly associated with vegetation structural diversity (MacArthur and MacArthur 1961). It has been shown in many studies that where grazing simplifies vegetation structure or maintains vegetation in early seral condition, bird diversity and abundance generally decreases (Wiens and Dyer 1975, Taylor 1986, Knopf et al. 1988, Scott et al. 2003), particularly in the subcanopy (Knopf 1992). This result may benefit some species that use more open and simplified habitats such as mountain bluebird, robin, and brown-headed cowbird (Bock et al. 1992, Goguen and Mathews 2000), though generally species responding positively to livestock grazing effects are not high priority species and their viability is not of concern. In the case of the brown-headed cowbird, its range expansion and increase in population over the last century has negatively affected other species of songbirds through its practice of nest parasitism. Species requiring heavy shrub or herbaceous ground cover in riparian areas for nesting and/or foraging include yellow warbler and, MacGillivray's warbler (Saab 1999), which are high priority species. Species such as Wilson's warbler, common yellowthroat, savannah sparrow, and Lincoln's sparrow also

require heavy shrub or herbaceous ground cover in riparian areas and show negative responses to livestock grazing (Sedgwick and Knopf 1987, Schultz and Leininger 1991). Amount of riparian and aspen habitats within the allotments is listed in Habitat Table.

Water troughs located throughout the allotments have caused mortality of some species of birds from drowning. Though escape ramps are required in the FRLMP standards, they don't exist or are not maintained on all 26 troughs within the two allotments.

Small Mammals, Reptiles, Amphibians, and Predators

The allotments contain a variety of habitats supporting a diversity of vertebrate species (See table, project file). No monitoring of species numbers or diversity has been conducted on the allotments, therefore population trends are unknown. Amphibian presence/absence surveys were conducted at three sites in the lower East Fork allotment during the summer of 2002 including Sullivan Lake, Frog Lake and vicinity, and Little Redfish Lake and vicinity. In general, livestock grazing has decreased vegetative structural diversity in portions of the allotments particularly those riparian, spring, and aspen areas in unsatisfactory condition. A decrease in vegetative structural diversity results in a decrease in wildlife diversity. Livestock grazing tends to influence ecological succession generally by maintaining early seral stages over large areas (Fleischner 1994). The following sections discuss general grazing effects to small mammals, reptiles, amphibians, and predators.

Small mammals – Responses of small mammals to livestock grazing can vary depending on the species. Some studies have shown overall small mammal abundance to be higher in areas ungrazed by livestock compared to areas grazed by livestock (Grant et al. 1982, Bock et al. 1984, Medin and Clary 1989), while others have shown higher abundance in grazed areas or no differences (Medin and Clary 1990, Oldemeyer and Allen-Johnson 1988). Species such as western jumping mouse, redback vole, and mountain vole can be eliminated from an area with livestock use (Grant et al. 1982). Other species such as shrews, which are insectivorous, and montane voles have been documented to be more abundant in ungrazed areas compared to grazed areas (Medin and Clary 1990, Douglass and Frisina 1993). Conversely, deer mice can greatly increase in density with grazing (Grant et al. 1982) and generally this species accounts for the high number of small mammals observed in grazed areas. Species negatively affected by livestock grazing are generally those that require residual vegetation and litter. These conditions provide for food, cover which provides protection from predators allowing for more activity during the day, maintenance of favorable microclimate, and more hospitable subnivean space where residual vegetation prevents hard packing of snow (Birney et al. 1976). Water troughs located throughout the allotments have caused mortality of some species of small mammals from drowning. Though escape ramps are required, they don't exist or are not maintained on all 26 troughs within the two allotments.

Livestock grazing can affect foraging habitat of bats. Most species of bats forage for insects in riparian areas and wetlands. Yuma myotis and little brown myotis are particularly associated with this habitat for foraging (NatureServe Explorer 2001). Many riparian areas, wetlands, and springs within the allotments show reduced vegetative cover, soil compaction, and pedestal formation from livestock use.

Reptiles – Some species of reptiles can be sensitive to structural changes in vegetation. As structural diversity is decreased reptile abundance and species diversity is decreased (Jones

1981). Habitat components such as small size class of trees and shrubs and surface litter are important for maintaining abundance and diversity of reptiles and amphibians (Jones 1988). Species, such as the western skink, require cover of perennial grasses to maintain microenvironmental conditions at the surface in order to maintain a favorable body temperature while foraging. Livestock grazing tends to reduce this vegetative cover (Jones 1981). Wandering garter snakes are also sensitive to livestock grazing that results in loss of vegetation for cover, particularly within riparian areas. An abundance of residual vegetation, which forms piles of organic debris, provides both escape and thermal cover for snakes (Szaro et al. 1985).

Amphibians – Amphibians depend on water sources and riparian areas for all or part of their life cycle, and are sensitive to alterations in this habitat. Surface litter or residual vegetation is an important habitat component for many species (Jones 1988). Livestock grazing within both allotments has resulted in degradation of water quality, reduction or elimination of willow cover, and trampling of vegetation used for hiding cover in areas that are not moving toward Forest Plan vegetation management objectives.

Predators - Predators, including raptors, mustelids, canids, felids, and black bears, are mainly affected by livestock grazing through effects to habitat of their prey such as small mammals, birds, reptiles, and amphibians. Direct mortality as a result of livestock grazing also occurs from predator control efforts by livestock grazing permittees and the federal government, particularly to coyotes, wolves, mountain lions, and black bears.

Pollinators

It has long been recognized and well documented that many flowering plant species rely on insects for pollination (Darwin, 1859; Kearns and Inouye, 1997; Tepedino et al., 1997; Cane and Tepedino, 2001;). Various species of bees, flies, butterflies, beetles, and moths are needed by these flowering plants to reproduce viable offspring. Many plant species have evolved self-incompatibility mechanisms making it a requirement that a pollinator be involved for a for seed production and population expansion. Indeed, two of the TEPCS plants species with occupied or potential habitat within the East Fork Allotments require pollinators for reproduction. Silvery/Jones' primrose and Ute ladies'-tresses orchid (described above) require a pollinator for seed production because they are not capable of self-fertilization. In turn, flowering plants provide much needed nectar and pollen for insect survival. Patterns of plant diversification are strongly associated with pollinator diversity (Heithaus, 1974; Tepedino, 1979). Most flowering plants depend upon pollinators for survival.

Recent evidence suggests that many species of insect pollinators may be in decline (Cane and Tepedino, 2001). Many factors have been identified globally that contribute to decline, including habitat alteration and fragmentation, pesticides, and competition from nonnative species (Buchmann and Nabhan 1996, Kearns et al. 1997, Allen-Wardell et al. 1998). No use of pesticides has been documented within these allotments. Livestock grazing can also alter habitat conditions in ways that negatively affect insect pollinators. Direct and indirect effects of livestock grazing can include altering plant composition and/or reducing plant species (pollen or nectar sources) needed by certain pollinators, trampling of vegetation, and nest destruction of ground-nesting species through conversion of seeps and springs to livestock troughs. Grazing and associated activities may also affect pollinators by decreasing

water availability. Most pollinators species cannot collect water needed for nest construction or survival from livestock troughs due to steep sides and water depth (Kearns et al. 1997).

Factors that may affect pollinator decline have been documented within the Upper and Lower East Fork allotments. Vegetation composition of much of the allotments' upland and riparian areas has been altered. In some areas, a conversion from a diversity of native sedges and forbs to mainly bluegrass and weedy species has occurred. Plant species can be benefited by a phenomenon know as facilitation. In facilitation, early flowering species support pollinators throughout the growing season so that they will be available for later flowering species. The conversion of flowering forbs to graminoid species has likely resulted in a negative affect to diversity and/or abundance of insect pollinators. For example, Söderström et al. (2001) documented that species richness of butterflies and bumblebees were negatively associated with grazing intensity. Loss of nectar sources due to species conversion in heavily grazed pastures was the likely cause. Additionally, bumblebees due to their high metabolic demands for nectar are known to spend more time at perennial plants than with less robust pioneer species such as annual forbs (Fussell and Corbet 1992). Concentrations of cattle, particularly in riparian areas and upland slopes, increase the likelihood of nest trampling and the potential for disruption of reproduction. The allotments have 26 water troughs that have negatively affected springs associated with them.

Additional indirect effects to pollinators from livestock grazing include habitat fragmentation and reduced plant attractiveness. Larger populations of flowering plants tend to attract a higher diversity of insect pollinators than smaller populations (Mustäjarvi et al. 2001; Steffan-Dewenter and Tscharntke 2002). This is known as "collective lure" in which several flowering species may be able to support more pollinators than any one species can. It has been documented that small plant populations can be limited further due to poor seed set caused by insufficient pollination because pollinators are less likely to visit small patches of flowering plants (Agren 1996, Goverde et al. 2002). Drought within the allotments and surrounding areas may be responsible for decreased vigor of forbs and decreased reproductive effort (i.e. less flower production). Leaf damage and loss from herbivory can both decrease pollen production and negatively influence flower size making a plant less attractive to pollinators and limiting the collective lure within an upland area (Delph et al. 1997, Strauss 1997).

While the exact pollination ecology for most of the TEPSC plant species with occupied habitat within the two allotments are unknown, it is important to note that most likely require pollinators for seed production and long-term population viability. Previous studies of *Spiranthes diluvialis*, a species with potential habitat in the East Fork Allotments, have shown that this threatened species is dependent upon insect pollinators for sexual reproduction (Sipes and Tepedino 1995; Pierson and Tepedino, 2000). Flowers are not capable of automatic self-pollination or capable of asexual seed set. The primary pollinators of *S. diluvialis* have been identified as bumblebees (*Bombus* sp.) and solitary bees of the genus *Anthophora* (Pierson and Tepedino, 2000). Additionally, given the "pin and thrum" morphology of primrose flowers, silvery/Jones's primrose (occurs within the allotments) likely requires a pollinator for seed production and survival. For conservation efforts for these rare species to be successful, management plans must also acknowledge their pollinators and the habitat needs of these important insect species (Tepedino et al., 1997).

Very little information on insect pollinator species occurrence in the East Fork of the Salmon River is available and population trends are unknown. Butterfly surveys were conducted during the summer of 2002 within both allotments. (Project Record) No other insects surveys have been conducted within the allotments at this time. Tepedino (2001) suggest that the following species are most likely present given the climate and plant communities present within the allotments. These include species of bees within the families Apidae (bumblebees) Colletidae, Andrenidae, Halictidae (solitary bees), Megachilidae (leafcutting bees), Anthophoridae (digger bees and carpenter bees) and many species within the Order Diptera (flies) (Tepedino 2001). Several species moths occur in the East Fork Salmon River and contribute to pollination services as well.

FLRMP objectives and standards applicable to wildlife and wildlife habitat include:

Forestwide

- Management actions shall be designed to avoid or minimize adverse effects to listed species and their habitats. For listed fish species, use Appendix B for determining compliance with this standard. (TEST06)

- Mitigate, through avoidance or minimization, management actions within known nest or denning sites of TEPC species if those actions would disrupt reproductive success during the nesting or denning period. During project planning, determine sites, periods, and appropriate mitigation measures to avoid or minimize effects. (TEST12)

- Mitigate, through avoidance or minimization, management actions within known winter roosting sites of TEPC species if those actions would adversely affect the survival of wintering or roosting populations. During project planning, determine sites, periods, and appropriate mitigation measures to avoid or minimize effects. (TEST13)

- Design and implement projects within occupied habitats of Sensitive species to help prevent them from becoming listed. Use Forest Service-approved portions of Conservation Strategies and Agreements, as appropriate, in the management of Sensitive species habitat to keep management actions from contributing to a trend toward listing for these species. (WIST02)

- Mitigate management actions within known nesting or denning sites of MIS or Sensitive species if those actions would disrupt the reproductive success of those sites during the nesting or denning period. Sites, periods, and mitigation measures shall be determined during project planning. (WIST03)

- Mitigate management actions within known winter roosting sites or hibernacula (bats) of Sensitive species if those actions would measurably reduce the survival of wintering or roosting populations. Sites, periods, and mitigation measures will be determined during project planning. (WIST04)

- Big game requirements for space and forage have priority in the management of winter range used in common by livestock and big game. (WIST07)

- Maximum forage utilization of representative areas within each pasture shall not exceed the values shown at the end of growing season. Variation in utilization standards in order to achieve specific vegetative management objectives shall occur with a site-specific or project-level decision according to direction in FSM 1922.5.
    a) Riparian Areas: Maximum 45 percent use or retain a minimum 4-inch stubble height of hydric greenline species, whichever occurs first.
    b) Upland Vegetative Cover Types: Early season or season long pastures – 40 percent use. Vegetative slow growth, after seed ripe conditions, or late season pastures – 50 percent use. (RAST01)

- New, reconstructed, or replaced livestock water developments must provide access and escape to and from water for all types of wildlife. (RAST09)

Management Area 3 - East Fork Salmon River/White Clouds

- Restore the early seral aspen component in the Warm Dry Subalpine Fir and Cool Dry Douglas-Fir potential vegetation groups to desired conditions, as described in Appendix A, to improve visual quality and wildlife habitat. (0346)

- Maintain and restore cottonwood regeneration and age class diversity in East Fork Salmon River, French Creek, Sullivan Creek, Big Boulder Creek, Germania Creek, and West Pass Creek. (0347)

- Restore the Montane Shrub and Mountain Big Sage vegetation groups in the lower elevations of the East Fork Salmon River, Sullivan Creek, French Creek, Big Boulder Creek, Little Boulder Creek, and Big Lake Creek drainages, where these groups have been altered by the exclusion of fire and livestock use. (0348)

- Restore willow composition, structure, and density, and hydric forbs and grasses in riparian areas in East Fork Salmon River, Big Boulder Creek, Little Boulder Creek, West Pass Creek, Big Lake Creek, Sullivan Creek, and French Creek drainages by reducing impacts from livestock grazing. (0349)

- Maintain or restore aspen stands. Give priority to stands in wildlife wintering areas. (0350)

- Maintain or restore ungulate winter range within the East Fork Salmon River Watershed. (0358)

- Provide high-quality mountain goat forage by reducing summer and fall forage competition between domestic livestock where allotments overlap mountain goat habitat. (0359)

- Forage utilization for riparian areas will not exceed 30 percent use of most palatable forage species, or must retain a minimum 6-inch stubble height of hydric greenline species. (03109)

- Livestock fences must provide for big-game passage. (03110)

Table III-6. Estimated acres of sensitive species habitat in the Upper and Lower East Fork Allotments potentially affected by livestock grazing.

Species Habitat		Upper East Fork			Lower East Fork		
		Alt. 1	Alt. 2	Percent change[i]	Alt. 1	Alt. 2	Percent change[i]
Spotted bat[a]	Total[h]	1,740	1,230	-30	2,090	580	-70
	Accessible	1,280	980	-20	1,640	490	-70
Townsend's big-eared bat[a]	Total	1,740	1,230	-30	2,090	580	-70
	Accessible	1,280	980	-20	1,640	490	-70
Wolverine reproductive denning[b]	Total	2,600	1,500	-40	300	0	-100
	Accessible	10	0	-100	100	0	-100
Fisher[c]	Total	10,300	6,300	-40	15,500	6,900	-55
	Accessible	2,500	1,400	-45	6,600	3,800	-40
Northern goshawk[d]	Total	11,500	7,300	-35	20,600	9,600	-55
	Accessible	3,300	1,900	-40	9,700	5,600	-40
Boreal owl[e]	Total	16,000	9,200	-45	20,800	7,700	-65
	Accessible	2,700	1,200	-55	9,600	5,400	-45
Flammulated owl[f]	Total	7,100	4,500	-35	11,300	4,500	-60
	Accessible	1,300	790	-40	4,500	2,600	-40
Northern three-toed woodpecker[g]	Total	12,100	7,500	-40	19,900	9,200	-55
	Accessible	3,100	1,700	-45	9,500	5,300	-45
Columbia spotted frog[a]	Total	1,740	1,230	-30	2,090	580	-70
	Accessible	1,280	980	-20	1,640	490	-70

[a]Based on riparian acres estimated as a function of channel gradient and size of perennial streams.

[b]From wolverine reproductive denning model.

[c]Based on covertypes of aspen, lodgepole, Douglas-fir, Douglas-fir/lodgepole pine, subalpine fir forest, mixed subalpine fir forest, mixed broadleaf and conifer forest, conifer dominated riparian, broadleaf dominated riparian, conifer and broadleaf dominated riparian all $\geq$ 5"dbh and all > 40% canopy closure

[d]Based on covertypes of aspen, lodgepole, Douglas-fir, Douglas-fir/lodgepole pine, subalpine fir forest, mixed subalpine fir forest, mixed broadleaf and conifer forest, conifer dominated riparian, broadleaf dominated riparian, conifer and broadleaf dominated riparian all $\geq$ 5"dbh and below 9000 feet.

[e]Based on covertypes of aspen, Douglas-fir, Douglas-fir/lodgepole pine, mixed whitebark pine forest, mixed subalpine fir forest, mixed broadleaf and conifer forest, conifer dominated riparian, broadleaf dominated riparian, conifer and broadleaf dominated riparian all $\geq$ 5"dbh.

[f] Based on covertypes of Douglas-fir, Douglas-fir/lodgepole pine, mixed subalpine fir forest, mixed broadleaf and conifer forest all $\geq$ 5"dbh.

[g]Based on covertypes of lodgepole pine, Douglas-fir/lodgepole pine, and mixed subalpine fir forest all $\geq$ 5"dbh.

[h]Total refers to the total amount of habitat that is within the allotment. Accessible refers to the areas that are estimated to be accessible to cattle based on topography and forest/ non-forest areas.

[i]Change in amount of habitat within the allotment boundary between alternative 1 and alternative 2.

Table III-7. Estimated acres of MIS and ungulate habitat in the Upper and Lower East Fork Allotments potentially affected by livestock grazing.

Species Habitat		Upper East Fork			Lower East Fork		
		Alt. 1	Alt. 2	Percent change[i]	Alt. 1	Alt. 2	Percent change[i]
Greater sage-grouse[a]	Total[h]	NA	NA	NA	5,700	4,800	-15
	Accessible	NA	NA	NA	4,700	4,000	-15
Pileated woodpecker breeding[b]	Total	7,100	4,500	-35	11,300	4,500	-60
	Accessible	1,300	800	-40	4,500	2,600	-40
Elk winter range[c]	Total	8,300	8,300	0	9,400	6,300	-35
	Accessible	4,700	4,700	0	6,100	4,300	-30
Mule deer winter range[d]	Total	1,300	1,300	0	10,400	3,300	-70
	Accessible	800	800	0	5,200	2,300	-55
Mountain goat year round range[e]	Total	22,100	13,800	-40	5,200	0	-100
	Accessible	300	0	-100	500	0	-100
Bighorn sheep summer range[f]	Total	NA	NA	NA	120	0	-100
	Accessible	NA	NA	NA	100	0	-100
Bighorn sheep winter range[g]	Total	NA	NA	NA	4,500	4,500	0
	Accessible	NA	NA	NA	2,800	2,800	0

[a] Based on covertypes of sagebrush and mesic montane parklands and subalpine meadows north of Big Boulder Creek below 8,000 feet'.

[b] Based on covertypes of aspen, Douglas-fir, Douglas-fir/lodgepole pine, mixed subalpine fir, mixed broadleaf and conifer forest, conifer dominated riparian, broadleaf dominated riparian, conifer and broadleaf dominated riparian all $\geq$ 5"dbh.

[c] Based on range maps prepared by Rocky Mountain Elk Foundation (1999).

[d] Based on range map prepared by Ed Lindquist (1977).

[e] Based on Idaho Department of Fish and Game maps.

[f] Based on data from East Fork Salmon River Rocky Mountain Bighorn Sheep Habitat Management Plan 1977.

[g] Based on data from East Fork Salmon River Rocky Mountain Bighorn Sheep Habitat Management Plan 1977, modified by the addition of Bluett Creek.

[h] Total refers to the total amount of habitat that is within the allotment. Accessible refers to the areas that are estimated to be accessible to cattle based on topography and forest/ non-forest areas.

[i] Change in amount of habitat within the allotment boundary between alternative 1 and alternative 2.

Table III-8. Partners in Flight priority bird species by habitat within East Fork Allotments potentially affected by livestock grazing. Idaho Bird Conservation Plan (Idaho Partners in Flight 2000)

Habitat	Species[a]	Idaho BBS Trend[b] 1966-2000 %/yr	Western Region BBS Trend[b] 1966-2000 %/yr
Riparian	**Blue grouse**	15.1	**-2.9**
	Calliope hummingbird	3.1	-0.2
	Rufous hummingbird	10.9	**-2.5**
	Willow flycatcher	**-5.3**	**-1.5**
	Dusky flycatcher	01.3	-1.0
	Black-billed magpie	-1.1	-0.6
	American dipper	3.5	-1.6
	Yellow warbler	**-2.3**	0.2
	MacGillivray's warbler	1.9	-0.3
Low-elevation mixed conifer	**Sharp-shinned hawk**	NA	**21.6**
	Northern goshawk	NA	0.9
	Lewis' woodpecker	-5.1	1.4
	Williamson's sapsucker	NA	0.4
	Black-backed woodpecker	NA	-0.1
	Brown creeper	-5.5	-0.5
	Townsend's warbler	4.4	0.5
	Western tanager	-0.5	0.5
Wetlands	**Cinnamon teal**	**-8.0**	-0.6
	Killdeer	**-5.3**	**-2.3**
Sagebrush	Swainson's hawk	8.0	-0.1
	Greater sage-grouse	-14.5	0.6
	Short-eared owl	-2.9	-7.2
	Loggerhead shrike	-6.6	**-4.0**
	Rock wren	-1.2	**-1.7**
	Sage thrasher	-0.9	0.0
	Brewer's sparrow	**-5.1**	**-3.0**
	Lark sparrow	-2.2	**-1.1**
High elevation mixed conifer	**Olive -sided flycatcher**	-3.3	**-3.5**
	Hammond's flycatcher	-1.5	4.1
Aspen	**Ruffed grouse**	14.1	**-4.2**
Cliff, rock outcrop, talus	Golden eagle	-4.2	0.6
	Prairie falcon	-4.7	3.4
Alpine	Black rosy-finch	NA	NA

[a]Species in italic type are high priority and species in regular type are moderate priority for conservation and monitoring as determined by Idaho Partners in Flight. See Idaho Bird Conservation Plan, page 12 for an explanation of the method and criteria used in determining priority species.

[b]Numbers in bold indicate that the % change is significantly different from zero at $P < 0.05$ (P of less than 0.05 means that there is 5% chance or less that the % change is not different from zero, i.e. there is a 95% or greater chance that the trend is real).

Table III-9. Estimated acres of key habitats affected by livestock grazing within the Upper and Lower East Fork Allotments

Habitat[a]		Upper East Fork			Lower East Fork		
		Alt. 1	Alt. 2	Percent change[c]	Alt. 1	Alt. 2	Percent change[b]
aspen	Total[b]	460	400	-15	820	400	-50
	Accessible	300	280	-5	430	230	-45
aspen/conifer	Total	420	270	-35	1270	320	-75
	Accessible	230	100	-55	980	290	-70
riparian	Total	1,740	1,230	-30	2,090	580	-70
	Accessible	1,280	980	-25	1,640	490	-70
Riparian not moving toward FP objectives	Accessible	240	210	-10	450	230	-50

[a] All covertype calculations except riparian determined using ArcView GIS 3.2 and the vegetation classification by Univ. of Montana: Covertypes from: Redmond, R.L., T.P. Tady, F.B. Fisher, M. Thornton, and J.C. White. 1997. Landsat Vegetation Mapping of the Southwest and central Idaho Ecogroups, Final Report, Contract # 53-0261-6-25. Wildlife Spatial Analysis Lab, Montana Coop. Wildlife Research Unit, Univ. of Montana, Missoula, MT. Riparian area acres were estimated as a function of channel gradient and size of perennial streams.

[b] Total refers to the total amount of habitat that is within the allotment. Accessible refers to the areas that are estimated to be accessible to cattle based on topography and forest/ non-forest areas.

[c] Change in amount of habitat within the allotment boundary between alternative 1 and alternative 2.

Recreation and Aesthetic Values

The East Fork Salmon River country has long been a popular recreation destination. Nationally noted for their stunning high peaks, alpine lakes, and extensive trail system, the Boulder and White Cloud Mountains, in which the Upper and Lower East Fork Allotments are enclosed, contain some of Idaho's most recognizable landmarks, including Castle and David O. Lee Peaks in the White Clouds, and Galena Peak, in the Boulders.

PL 92-400, the Act that established the SNRA in 1972, represented a compromise between those who wanted to see the area remain as a unit of the National Forest System, retaining primary emphasis on multiple-use resource management, and those who wanted to emphasize recreation and environmental preservation by designating the area as a National Park. As a result, PL 92-400 requires the Forest Service to ensure "the preservation and protection of the natural, scenic, historic, pastoral, and fish and wildlife values, and to provide for the enhancement of recreational values associated therewith Sec. 2." Timber, grazing and mineral resource uses are authorized "insofar as their utilization will not substantially impair the purposes for which the recreation area is established", (sec. 2).

The revised 2003 Forest Plan (FLRMP) established Management Area designations for the entire Forest. The Upper and Lower East Fork Allotments are included in the East Fork Salmon River/White Clouds Management Area. Management Prescription Categories within the Management Area include 1.2, Recommended Wilderness, 2.1, Wild and Scenic Rivers and Their Corridors, 3.1, Passive Restoration and Maintenance of Aquatic, Terrestrial, and

Hydrologic Resources, and 3.2, Active Restoration and Maintenance of Aquatic, Terrestrial, and Hydrologic Resources.

The FLRMP provides the following direction for managing grazing and recreation conflicts within the SNRA and the Management Area:

- Manage, operate, and maintain a year-round recreation program that offers a broad range of developed and dispersed recreation opportunities and experiences in a range of settings as reflected by the Recreation Opportunity Spectrum (REGO01).
- Provide for livestock forage within existing open allotments, in a manner that is consistent with other resource management direction and uses (RAGO01).
- Coordinate livestock grazing to address conflicts with other resource uses in a manner that is consistent with Forest Plan management direction (RAGO06).
- When management actions are proposed that may compromise the outstandingly remarkable value, classification, or free-flowing character of an eligible river segment, a suitability study must be completed for that eligible river segment prior to initiating the actions (WSST01).
- Mitigate degradation to Forest System trails from other resource management activities, including fire suppression, and special use activities (REOB19).
- All projects shall be designed to meet the adopted Visual Quality Objectives (VQOs) as displayed on the Forest VQO map (SCST01).
- Changes to existing recreational settings (mapped ROS classes) are limited to only those that maintain or restore wilderness characteristics (WRST01).
- All projects and activities should maintain or enhance the adopted ROS classes as displayed on the Forest ROS strategy maps (REGU08).
- Commercial livestock grazing should be avoided in developed recreation sites. Fence developed recreation sites within range allotments if necessary (REGU17).
- Damage to or loss of Forest System trails from timber harvest, livestock grazing, road construction, mining, special uses, and prescribed fire activities should be repaired or mitigated by the appropriate party (REGU22).
- Protection measures for National Forest System trails should be included in all timber sale contracts, annual operating plans for grazing, mining, and special use authorizations, and prescribed fire implementation documents (REGU24).
- Provide for consumptive uses of resources including removal of trees, grazing and extraction of minerals so long as these uses do not substantially impair the recreational and associated values for which the SNRA was established (SNOB04).
- Manage both federal and private lands to ensure the preservation and protection of the natural, scenic, historic, pastoral, and fish and wildlife values and to provide for the enhancement of the associated recreational values in accordance with Public Law 92-400 (0301).
- Manage federal and private lands to retain a pastoral or natural-appearing landscape consistent with the scenic values for which the SNRA was established (0384).
- Maintain or restore soil, water, aquatic, and recreation resources in the Bowery, Big Lake, Sullivan, French Creek, Little Boulder [the 1987 FLRMP specifically states that Frog Lake, located in the Little Boulder Creek drainage, should be closed to livestock grazing during the “managed recreation season”], Big Boulder [the 1987 FLRMP specifically states that Little Redfish Lake. Located in the Big Boulder Creek

drainage, should be closed to livestock grazing during the "managed recreation season"], Big Lake Creeks, and Upper East Fork drainages through improved management and adjustments to livestock grazing capacities as necessary (03106).

- Management activities on National Forest System lands should meet desired recreation settings. Impairment of the recreation values may occur when an action creates a change in the desired recreation setting by one ROS class of any area on the SNRA and occurs over a time period of greater than six months cumulatively. Substantial impairment of the recreation values may occur when an action creates a long term or permanent change in the desired recreation setting by one or more ROS class and that effects 2 percent or more of the acreage in that individual ROS zone. Substantial impairment may also occur when cumulatively an ROS classification across the entire SNRA is altered by more than 1 percent as a result of smaller changes within individual ROS zone designations (0381).

In addition to the FLRMP direction listed above, the following allotment management objectives from the 1987 Forest Plan are intended to reduce livestock/recreation conflict and meet the standards found in the revised FLRMP:

- Limit grazing where there is high recreation value or where recreation use is high or concentrated.
- Prohibit livestock grazing around shorelines of all high mountain lakes where conflicts with recreation activities and/or lakeshore damage is occurring.
- Close Frog and Little Redfish Lake areas to permitted livestock grazing during the managed recreation season.
- Annual Operating Instructions will be designed to eliminate or minimize areas of potential conflict.

All lands within the East Fork Allotments have been inventoried and mapped, using the National Forest – Visual Management System. Areas within the Forest Service recommended wilderness boundary and stream segments nominated as "eligible" for Wild and Scenic River designation have been classified as Preservation Visual Quality Objective (VQO). This VQO allows ecological changes only. Management activities, except for very low visual impact recreation facilities, are prohibited. The remainder of the allotments are comprised of a small portion designated Retention, and almost equal portions designated with Partial Retention and Modification VQOs. These VQO's would prescribe management activities ranging from: *"not visually evident"* to *"management activities which may visually dominate the original characteristic landscape"*.

The Visual Management System is derived by combining the scenic value of natural landscape features and viewer sensitivity, or peoples' concern for scenic quality. This landscape inventory and resulting management objectives are used in formulating Recreation Opportunity Spectrum (ROS) classifications.

The FLRMP assigns Recreation Opportunity Spectrum (ROS) class goals to each management area on the Forest. The ROS system provides a way to help managers and recreation users understand what recreation experiences to expect on any specific area of the Forest. The system is applied in combination with other management direction from the

Forest Plan to provide Forest managers with direction for managing recreation activities and settings on the Forest. As currently mapped the East Fork allotments include three ROS classes: 81% of the allotments are classed in one of the Semi-Primitive classes; 62% (74,000 acres) is in Semi-Primitive Non-Motorized (SPNM) and 19% (22,000 acres) is in Semi-Primitive Motorized (SPM). Semi-Primitive ROS areas are characterized by a predominately natural appearing landscape character with minimal rustic improvements provided for resource protection as opposed to visitor convenience. The rest of the allotment, 19% or 22,000 acres, is classed as Roaded Natural (RN). RN areas are characterized by a predominately natural appearing and developed natural appearing landscape character with nodes and/or corridors of development such as campgrounds, trailheads, and recreation or administrative buildings. Current management and conditions of the East Fork Allotments are not preventing the achievement of this desired mix of ROS experiences.

The area covered by the Upper and Lower East Fork Allotments is popular for dispersed (undeveloped) recreation. The majority of the recreation use occurs in the Lower East Fork Allotment, primarily due to presence of high-mountain lakes both within the allotment and beyond the allotment boundary. Access to the lakes is by foot, horse, mountain bike, or motorbike. There are well-maintained roads along the East Fork Salmon River all the way to Bowery Guard Station and to the Big Boulder Trailhead, along which are several popular dispersed campsites. Additional road-accessed dispersed camping occurs on the low standard roads on Railroad Ridge, and in the West Pass Creek drainage.

Most use occurs from mid-June through mid-September, which coincides with the grazing season. The highest use period is from the Fourth of July through Labor Day. Use increases again during hunting season for elk and deer, with October and November being the busiest periods. Hunting use is heavy along the road corridors with light to moderate use in some backcountry areas.

There are five recreation Concentrated Use Areas (CUAs) identified within the Upper East Fork Allotment, and ten within the Lower East Fork Allotment. A CUA is defined as an area containing at least three undeveloped sites where management time or dollars is expended because recreation use leaves evident impacts such as litter, vandalism, or soil compaction, or it is an assigned outfitter camp.

There are three outfitter and guide operations permitted within the Lower East Fork Allotment, and one in the Upper East Fork Allotment. Most of the outfitted use in the Lower East Fork Allotment is from one outfitter, who has three assigned camps within the allotment boundary. The outfitter is not authorized to graze and is required to pack in all feed for his pack and saddle stock. Temporary corrals are required at the camps to prevent grazing. Very little outfitted use occurs in the Lower East Fork from the other two operations and they must pack all feed also. The sole outfitter operation in the Upper East Fork Allotment is authorized in Bowery Creek for hunting only and is permitted to graze 16 head of livestock from August 20, to October 30.

Most camping occurs at the lakes, and along the East Fork Road, except during hunting season when camps spring up at locations convenient to favorite hunting spots. The road-accessed CUAs include the Big Boulder Trailhead, Germania Creek Trailhead, the East Fork dispersed camping area, West Pass Hot Springs, West Pass Creek Meadows, and Bowery Creek Trailhead. Some of the CUAs, such as West Pass Creek Meadows and Bowery Creek Trailhead, receive most of their use during hunting season, when most of the cows are off the allotments. The Big Boulder trailhead and the East Fork dispersed site contain Forest Service installed toilet facilities. All are popular with campers seeking a less-developed car-camping experience than found in fee campgrounds in the Salmon River Corridor. More lightly used road-accessed camping opportunities occur at other locations on the East Fork Road and on the above-mentioned low-grade roads. Visitors to these sites are often seeking more solitude and a more natural experience than on the more heavily traveled roads. The presence of cattle or the negative effects of past cattle use may be magnified for these users. In the East Fork Salmon River Canyon, there is currently no opportunity for road-accessed dispersed camping in locations that are not grazed at least part of the high-use season.

Frog Lake Shoreline Figure III-33

FLRMP direction that may not be achieved under current management in the East Fork allotments include:

- " Provide for livestock forage within existing open allotments, in a manner that is consistent with other resource management direction and uses (RAGO01),"
- "Coordinate livestock grazing to address conflicts with other resource uses in a manner that is consistent with Forest Plan management direction (RAGO06),"
- "Maintain or restore soil, water, aquatic, and recreation resources in the Bowery, Big Lake, Sullivan, French Creek, Little Boulder, Big Boulder, Big Lake Creeks, and Upper East Fork drainages through improved management and adjustments to livestock grazing capacities as necessary (03106)."
- "All projects shall be designed to meet the adopted Visual Quality Objectives (VQOs) as displayed on the Forest VQO map (SCST01),"
- "All projects and activities should maintain or enhance the adopted ROS classes as displayed on the Forest ROS strategy maps (REGU08),"

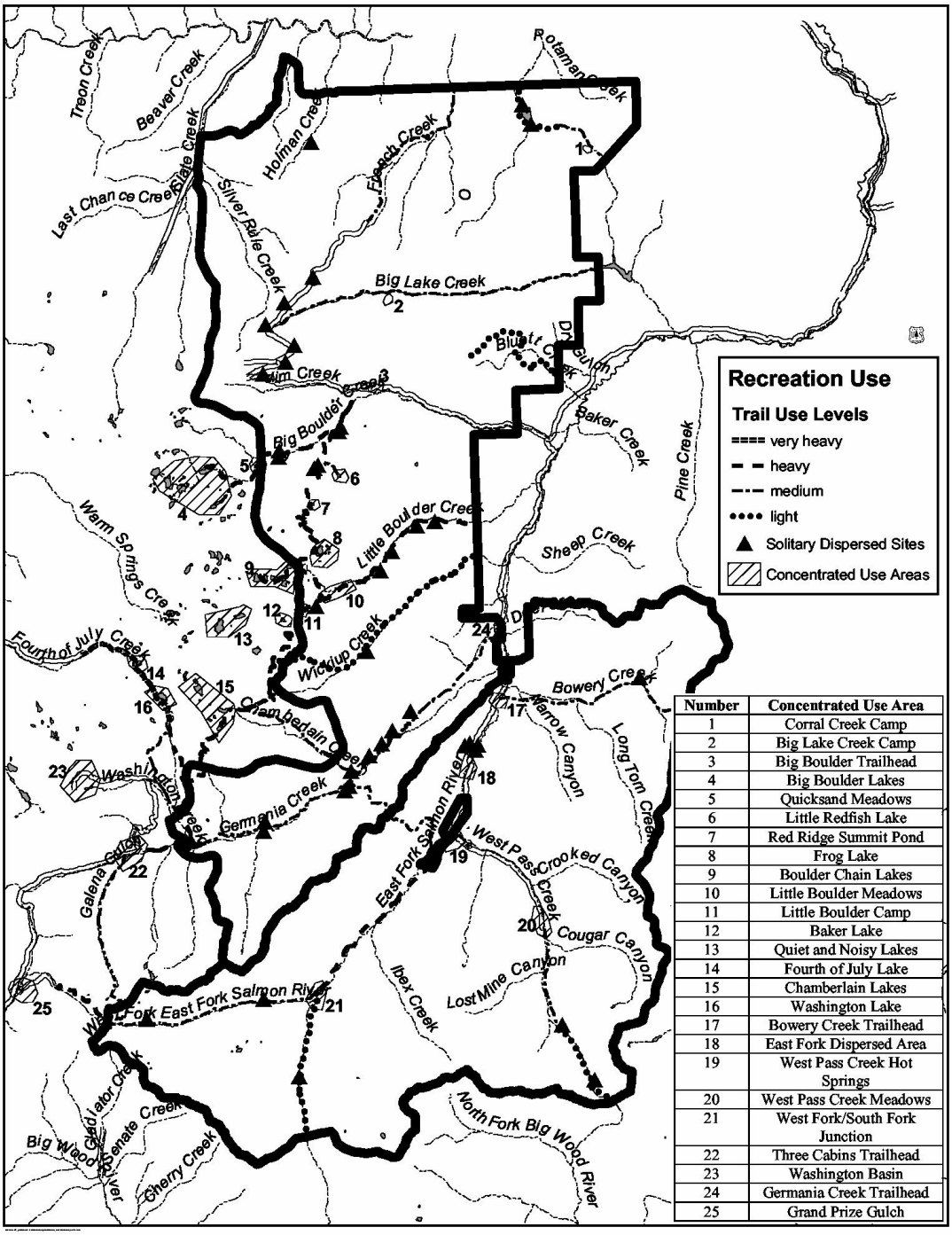
- "Manage both federal and private lands to ensure the preservation and protection of the natural, scenic, historic, pastoral, and fish and wildlife values and to provide for the enhancement of the associated recreational values in accordance with Public Law 92-400 (0301)."

The allotment management objective that calls for limiting grazing in high recreation use areas is not being met under current management.

Backcountry camping areas within the allotments that meet the definition of Concentrated Use Areas are Frog Lake, Little Redfish Lake, Red Ridge Summit Pond, Quicksand Meadows, Little Boulder Creek Meadows, West Fork/South Fork Junction, and outfitter assigned camps in Corral, Big Lake, and Little Boulder Creeks. The Corral and Big Lake Creek sites are used only during hunting season, and the Little Boulder site is used for hunting as well as the summer season. The West Fork/South Fork Junction is likewise most heavily used during hunting season. Use records indicate that in the 2002 summer season, over 425 people recreated at Frog Lake, and almost 500 visited the Big Boulder Creek drainage. Other user-established campsites are scattered throughout both allotments. There are approximately 10 solitary dispersed sites in the Upper East Fork Allotment, and 31 in the Lower East Fork Allotment (see Figure III-34, below).

Concentrated Use Areas that are outside the allotment boundaries but in locations where users must cross through the allotments to access include the lakes in the upper Big Boulder Creek drainage, Boulder Chain Lakes, Baker Lake, Quiet and Noisy Lakes. There are several off-trail areas that receive sporadic use throughout the summer that also are accessed through the allotments. Cows are frequently observed outside the allotment boundaries at other popular CUAs including Chamberlain Lakes, Washington and Fourth of July Lakes, Grand Prize Gulch and Trailhead, Washington Basin, Three Cabins Trailhead (see Figure III-34).

Recreation Affected Environment



Number	Concentrated Use Area
1	Corral Creek Camp
2	Big Lake Creek Camp
3	Big Boulder Trailhead
4	Big Boulder Lakes
5	Quicksand Meadows
6	Little Redfish Lake
7	Red Ridge Summit Pond
8	Frog Lake
9	Boulder Chain Lakes
10	Little Boulder Meadows
11	Little Boulder Camp
12	Baker Lake
13	Quiet and Noisy Lakes
14	Fourth of July Lake
15	Chamberlain Lakes
16	Washington Lake
17	Bowery Creek Trailhead
18	East Fork Dispersed Area
19	West Pass Creek Hot Springs
20	West Pass Creek Meadows
21	West Fork/South Fork Junction
22	Three Cabins Trailhead
23	Washington Basin
24	Germania Creek Trailhead
25	Grand Prize Gulch

Figure III-34

Annual Operating Instructions for the Lower East Fork Allotment have required the permittee to avoid grazing the Frog and Little Redfish Lake areas until the week before Labor Day to avoid conflict with recreationists. Since 1999, cows on the bulk of the allotment have been required to come off by August 15 for bull trout spawning mitigation. These actions combined should have the effect of making Frog and Little Redfish Lakes off-limits to grazing. However, both areas continue to be frequented by cows from the East Fork Allotments throughout much of the season. (Figure III-35) A survey of Little Redfish Lake in early September 2002, found large quantities of fresh cow manure in campsites around the lake.

Figure III-35. Campsite at Frog Lake

Cows, recreational pack and saddle stock, and campers all have impacts on campsites in these areas, especially the CUA's within the allotment boundaries. Numerous campsites exist at most destinations, with vegetation loss and soil compaction resulting from livestock and recreational use. At many sites, recreational pack and saddle stock have historically been tied to trees causing soil dishing around the tree bases and damage to the tree trunk.

Grazing by non-outfitted recreational packstock occurs in some areas, such as Frog Lake, Little Boulder Meadows, Quicksand Meadows, and Bowery Creek. In 2002, an estimated 100 head of recreational pack and saddle stock visited the Big and Little Boulder Drainages for an average stay of four days. Based on registration sheet information, it is estimated that over half of this use occurred in CUAs beyond the allotment boundaries, such as the Boulder Chain and Big Boulder Lakes. Of the remainder, Frog Lake was the primary destination. Bowery Creek, on the Challis National Forest but part of the Upper East Fork Allotment, is used primarily during hunting season. Grazing associated with hunting camps can be relatively heavy, but is localized and limited in scope (personal conversation - Renee Catherin, Forest Service 3/25/03). Overall, recreational packstock use is a small portion of grazing use within the two allotments.

In 1996, regulations were implemented to reduce the impacts to the SNRA portion of the allotments from recreation including:

- prohibiting grazing pack and saddle stock within 200 yards of lakes.
- limiting group size to 20 people and/or 25 head of stock per group .

- prohibiting tethering pack and saddle stock within 100 feet of springs, lakes, or streams.
- prohibiting tying pack and saddle stock to trees for more than one hour.
- prohibiting short-cutting trail switchbacks on foot or with pack and saddle stock.
- closing several high lakes to campfires.

In addition, intensive education efforts aimed at backcountry horse users and hikers have helped gain high levels of compliance with these regulations and to reduce additional damage to vegetation and campsites from recreational pack and saddle stock. Damage continues to occur from cattle that utilize recreation sites in ways recreationists are prohibited from doing.

Cattle damage campsites by shading up and loafing under trees near the succulent forage on the lakeshores and meadows that are also attractive to recreationists, causing dishing, root exposure, and soil compaction. (Jay Dorr, SNRA 2003 memo) Both backcountry and road-accessed campsites are often littered with cow manure making it more difficult for recreationists to find a desirable location, and presenting campers with an unpleasant odor. Recreationists are forced to remove cow manure from campsites before the site can be utilized. Cows have caused damage to camping equipment. A 2002 survey found evidence of cattle, mainly manure, in 17 of 20 identified campsites at Frog Lake. Campsites at the East Fork dispersed camping area appear to be favored shading and loafing areas for cows, which causes conflict with campers wishing to use the same locations. When cattle actually occupy a popular camping area, they may hinder recreationists' use of the area and reduce the quality of the backcountry experience. Cattle intimidate some recreationists.

Braided trails in Little Boulder Creek Note system trail in upper left hand corner. Figure III-36

Recreation use figures for trails in the area are compiled from voluntary registration boxes placed at most major trailheads. A comparison of those figures shows a 30% increase in overall use in the White Clouds over the 10-year span between 1993 and 2002. During the same time period, the increase on the Big and Little Boulder Creek trails increased only 15%, which may indicate that recreationists are being displaced by the negative effects of cattle grazing in the area.

There is an extensive and heavily used recreational trail system within the allotments. Most of the trails are well maintained, but are negatively affected by livestock movement. Cattle often use the recreation trails to move between foraging areas and, if they are concentrated in one area for a long period, can cause substantial impact to the trail tread and drainage

structures, increasing erosion. Cow manure on the trail can reduce the quality of the recreational experience, especially for mountain and motorbikes. In some locations, such as Little Boulder Meadows, cows have created braided trails that may cause recreationists to stray from the recreational trail, exacerbating this condition. (Figure III-37) On the upper, steeper portion of the Bowery Cut-off Trail, persistent use by cows has caused the trail to become entrenched so is hard for recreationists to negotiate without leaving the existing tread. This causes new routes to be established parallel to the original trail, increasing erosion and impacts the scenic quality of the area.

There are 59 miles of National Forest System trails in the Lower East Fork Allotment. Approximately 16.6 miles receive heavy use, or more than 300 users per season, 25 miles receive medium use, or between 30 and 300 users per season, and 17.5 miles receive light use, or less than 30 users per season (Sawtooth FLRMP IV-25). The Upper East Fork Allotment contains 21.8 miles of system trails. Approximately 4.5 of those miles receive heavy use, 12 receive medium use, and 5.3 receive light use (see Figure III-34).

In some areas, including Frog Lake, Little Redfish Lake, Little Boulder Meadows, the main East Fork Salmon River above Bowery Guard Station, Railroad Ridge, and French Creek, grazing impacts are severe enough to produce a number of discordant situations on the landscape. Hummocking, bare soil, manure piles, and braided trails in meadows and around lakeshores are evident where cows frequently congregate causing degradation to the scenic quality of a world-class, high-country environment.

Figure III-37. Livestock impacts in Little Boulder Meadows

Forest Plan direction that current management may not be be achieving within the allotments include:

- "Mitigate degradation to Forest System trails from other resource management activities, including fire suppression and special use activities (REOB19),"
- "Damage to or loss of Forest System trails from timber harvest, livestock grazing, road construction, mining, special uses, and prescribed fire activities should be repaired or mitigated by the appropriate party (REGU22),"

- "Manage federal and private lands to retain a pastoral or natural-appearing landscape consistent with the scenic values for which the SNRA was established."

The allotment management objectives requiring that livestock grazing around shorelines of high mountain lakes be prohibited, and that Frog and Little Redfish Lakes be closed to grazing during the high recreation use season are not being effectively met under current management.

Some recreationists may feel the presence of cows enhances their recreation experience. Cattle are often associated with scenes typifying the old west and may provide that element to some visitors.

There are eight eligible Wild and Scenic River segments within the allotment boundaries. In the Lower East Fork Allotment, 1.24 miles of Boulder Chain Lakes Creek, and 6.3 miles of Little Boulder Creek are eligible for designation as a Wild stream under the Wild and Scenic Rivers Act. In the Upper East Fork allotment, 5.76 miles of the main East Fork downstream from Bowery Guard Station are eligible for Recreational status, 6.25 miles of West Pass Creek are eligible for Scenic, 4.13 miles of the main East Fork upstream from Bowery Guard Station, 10.14 miles of Germania Creek, 3.56 miles of the South Fork East Fork, and 5.42 miles of the West Fork East Fork are eligible for Wild designation.

Social & Economic

County Overview:
The East Fork Allotments are located within Custer County and are administered by the Sawtooth National Forest. Over 94% of the land base of the county is controlled by the Bureau of Land Management, Forest Service and the State of Idaho. Governmental decisions about resource management (grazing, mining, timber and recreation) greatly influence the social and economic conditions.

Agriculture and related activities provide one of the major economic bases for Custer County. Specific agricultural activities associated with ranching and farming are considered by many of the local people as the economic mainstay of the County.

The supplemental draft environmental impact statement (FDEIS) for the Interior Columbia Basin Ecosystem Management Plan (ICBEMP), released in March 2000, recognized that small rural communities, as a whole, are more subject to potential effects from external forces such as changing technology, population fluxes, or changes in historical land use policies (USDA Forest Service/USDI BLM 2000). These communities do not have ready access to a range of employment opportunities. Therefore, if specific firms or business sectors experience downturns, small rural communities tend to have low economic resiliency (Quigley et al, 1996).

Based on employment diversity data, ICBEMP resilience rating for Custer County was determined to be low. One of the primary contributors to the low resiliency is the dependence on the importance of timber and livestock forage produced on Federal land.

Table 10 displays the acres and percent of land ownership in Custer County.

Table III-10. Acres and Percent of Land Ownership in Custer County

County	Unit of Measure	Federal Land Ownership			Other Land Ownership			Total
		BLM	National Forest	Other Federal	State	Private	City & County	
Custer	Acres	813,041	2,123,657	27	53,805	159,549	2,305	3,152,384
	Percent	93.2			1.7	5.0	0.1	100.0

Source: Acreage percentage figures are from "County Profiles of Idaho, 1996," published by the Idaho Department of Commerce

Cattle grazing on federal land is an important component of Southeast Idaho ranching operations. Over time, ranching operations have developed production processes that include federal lands as an important part of the total operation. A federal HM (or the previous unit of measure, AUM) then becomes responsible for a component of total production.

Community Overview:
Challis, a community of about 1,000 people located in the northern end of Custer County, economically dominates all of northern Custer County including a collection of small hamlets – Clayton, May, Ellis and the surrounding countryside.

Mining has dramatically affected the economy of Challis over time. The Thompson Creek Cyprus Mine, was Challis's leading source of outside income. Employment at the Thompson Creek Molybdenum Project (Cyprus Mine) west of Challis has fluctuated widely since the beginning of the operation. The mine had employed approximately 400 people at one point, with major layoffs dropping employment to as low as approximately 20 people.

The southwestern part of Custer County is dependent on recreation-oriented resources of the SNRA. Recreationists contribute significantly to the economic stability of Stanley and surrounding communities.

Community Profiles - As part of the Southwest Idaho Ecogroup Forest Plan revision process, an in-depth assessment of local communities potentially affected by changes in National Forest management was completed. The communities of Challis and Stanley were included in this analysis. The analysis completed for the revision effort is relevant to this project as it addressed community dependency on Forest management activities such as permitted livestock grazing. Specific information as to how the profiles were derived as well as the complete profiles can be found in the Sawtooth Forest Plan Revision project record.

For each community, an economic profile was developed for 2000, the most recent year for which relatively current data are available. Each community's economic profile provides a snapshot of jobs and income. The labor income and jobs information provides industry detail to roughly the Standard Industrial Classification (SIC) 2-digit level. Baseline projections

were also developed for the years 2005 and 2010, respectively.

Table III-11 shows population changes in Challis and Stanley for the period 1980-2000. While Challis saw an overall population reduction, Stanley experienced a significant increase in population.

Table III-11. Community Populations: 1980 - 2000

County	Community	1980	1990	2000	1990-2000 Change
Custer	Challis	758	1,073	909	-15%
	Stanley	99	71	100	41%

Source: For 1980 and 1990 data for Idaho, "County Profiles of Idaho, 1996" (Idaho Department of Commerce, 1996). For 1980 data for the Treasure Valley (see footnote below), source was telephone conversation with Alan Porter, Idaho Department of Commerce; May 9, 2001.

Each of the communities is profiled by briefly describing the community's origin, demographics and economic base. The "community character" is also depicted, as derived from its self-assessment carried out as part of the 1996 Harris study, and interviews with county and community leaders conducted in 1998, as applicable. Professional knowledge of Forest Service employees who live in and adjacent to the communities was also used to describe community character.

In general, each community profile is organized to briefly describe:

- The community's location and major access routes;
- Its origin and the source of its name;
- Major services and employers;
- Its community self-assessment;
- The community's economic profile; and
- Observations of local county commissioners and/or mayors.

Community economic profiles and projections appear with three sub-tables. The first table shows what is termed the "Community Income Account." This table shows the total income of community residents (residents' income) divided according to source, inside or outside the community. Inside sources include labor and property income, while outside sources include property income and transfer payments. Where out-commuting is significant, an entry to capture this appears as outside labor income. The second sub-table shows jobs by industry, with industry detail at roughly the Standard Industrial Classification (SIC) 2-digit level. The final sub-table shows the labor income counterpart to the jobs sub-table. The total of labor income at the bottom of this table matches the same as shown in the inside income portion of the community income account.

Challis

The community of Challis adjoins U.S. Highway 93, a primary access route from southern Idaho to northeastern Idaho and Montana. With a 2000 population of 909, Challis is the

county seat of Custer County. The community lies about 60 miles south of Salmon, and about 55 miles northeast of Stanley.

Challis was founded in 1878 and became a trading center for miners in the Stanley Basin, Yankee Fork, Loon Creek, and Bayhorse. Connected to Custer by a toll road, the town was named for Alvan P. Challis, surveyor of the town site.

Today, Challis is served by a small airport, a general clinic, and school district. The community's largest employers are Hecla Mining and Thompson Creek Mining, followed by Challis Schools and the Forest Service.

In the 1996 Harris community self-assessment, Challis participants rated their community as high in regional attractiveness (6.14 on a 1 - 7 scale) but quite low in orientation towards the future (2.29).

The EMSI economic profile of Challis includes Challis and nearby Clayton. This profile shows a total workforce in 2000 of 1,220 persons and labor income of $31,521,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Table III-12. Economic Profile of Challis: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	31,521	34,661	37,790
Property income	2,602	2,861	3,119
Outside Income ($1,000)			
Property income	7,311	8,040	8,765
Transfer payments	8,501	9,348	10,192
Total Residents' Income ($1,000)	49,935	54,910	59,866
Jobs by Industry (Top 5 Sectors)			
Mining/sand and gravel	217	217	215
Agriculture and agricultural services	190	190	190
Federal government	116	132	147
Construction	107	117	127
Trade	98	106	114
Total Jobs in Community	1,220	1,278	1,350
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Mining/sand and gravel	8,690	9,424	9,755
Agriculture and agricultural services	4,305	4,580	4,871
Federal government	4,129	4,858	5,626
Construction	2,293	2,585	2,894
Public utilities	2,064	2,181	2,232
Total Labor Income by Industry ($1,000)	31,521	34,661	37,790

Source: Community profile information is derived from a community self-assessment carried out as part of the 1996 Harris study, interviews with county and community leaders in 1998, and professional knowledge of Forest Service employees who live in and adjacent to the communities – Volume 3, FEIS Southwest Idaho Ecogroup Lands and Resource Management Plans (July 2003)

Four permittees rely on the Lower East Fork Allotment and one permittee relies on the Upper East Fork Allotment for summer grazing. Grazing a maximum of 1,993 HMs is authorized by Term Grazing Permit for the Lower East Fork and a maximum of 1,016 HMs are authorized by permit on the Upper East Fork. In order to meet all terms, conditions and regulation associated with grazing National Forest system lands, approximately half that amount has been grazed during the years 2000, 2001 and 2002.

All of the ranchers holding grazing permits on the Upper and Lower East Fork Allotments live in the Challis area. They play an important role in the economy of Challis. The permittees' dependency on the grazing capacity of the Upper and Lower East Fork Allotments varies according to the percentage of the permittee's total livestock that use the allotment.

In recent years, Forest Service requirements to meet allowable use standards and mitigation measures for Threatened, Endangered and sensitive fish species have added to the economic burden of grazing on these allotments. Family resources have been taxed, necessitating the hiring of riders. The haying season is a particularly difficult time, often requiring more intensive management of the allotments at a time when family labor is occupied with the hay harvest.

Stanley

The community of Stanley is located near the intersection of State Highway 21, a major northeast route from Boise and the Treasure Valley to central Idaho, and State Highway 75, which accesses central Idaho from Twin Falls and other southern Idaho cities. With a 2000 year-round population of 100, the community is located in Custer County, about 130 miles northeast of Boise, nearly 140 miles north of Twin Falls, and about 55 miles southwest of Challis.

Stanley was named for John Stanley, the oldest man in an 1863 prospecting party. A post office was established in 1892.

Stanley today is served by a small airport and part-time medical clinic. The community provides primary access to the Sawtooth National Recreation Area.

In the 1996 Harris community self-assessment, Stanley participants rated their community high in mean quality of life (6.67 on a 1.00 - 7.00 scale) but low in business attractiveness (2.67).

The EMSI economic profile of Stanley includes the nearby communities of Sunbeam and Obsidian, as well as Stanley. This profile shows a total workforce in 2000 of 256 persons and labor income of $4,538,000. Summaries of the Community Income Account and the community's major industrial sectors are shown below.

Custer County Commissioners of 2000 Melodie Baker, Ted Strickler, and Lin Hintze believed that while recreation increases have helped by providing some jobs, they have also "provided pressures on the county to provide more services in law enforcement, emergency services, and more pressure on how the public lands are used and by whom." (Baker et al. 1998)

Table III-13. Economic Profile of Stanley: 2000 – 2010

Community Income Account	2000	2005	2010
Inside Income ($1,000)			
Labor income	4,538	5,246	5,977
Property income	698	806	919
Outside Income ($1,000)			
Property income	905	1,046	1,192
Transfer payments	1,195	1,382	1,575
Total Residents' Income ($1,000)	7,336	8,479	9,662
Jobs by Industry (Top 5 Sectors)			
Motels/eating, drinking	88	100	110
Amusement and recreation	47	55	63
State and local government	31	35	39
Trade	30	32	34
Federal government	24	27	30
Total Jobs in Community	256	288	318
Labor Income by Industry ($1,000) (Top 5 Sectors)			
Federal government	1,595	1,877	2,174
Trade	897	982	1,077
Motels/eating, drinking	669	792	903
State and local government	477	563	654
Transportation	396	433	475
Total Labor Income by Industry ($1,000)	4,538	5,246	5,977

Source: Community profile information is derived from a community self-assessment carried out as part of the 1996 Harris study, interviews with county and community leaders in 1998, and professional knowledge of Forest Service employees who live in and adjacent to the communities – Volume 3, FEIS Southwest Idaho Ecogroup Lands and Resource Management Plans (July 2003)

Administrative Costs

The annual National Forest System budget appropriation provides the funds for stewardship and management of federal lands and the natural ecosystems that exist on those lands. Appropriated funds are key for translating the goals, objectives, and management requirements stated in the Forest Plans to on-the-ground results. As such, forest plans predict the level of funding necessary for translating those goals, objectives, and management requirements into actual work accomplishments. Annual budgets are allocated between the various resource programs based on program development, annual work planning, and monitoring processes. Included in this annual budget are provisions for administering livestock grazing allotments. Costs to the Forest Service to administer permitted grazing use on the allotments are based on the following duties:

- preparing Annual Operating Instructions
- submitting billing information
- meeting with permittees
- inspecting and monitoring grazing management and allowable use standards during the grazing season

- gathering resource data
- monitoring effects of management direction and decisions
- dealing with management problems and permit violations
- responding to information requests and lawsuits
- compiling data, managing information and submitting annual reports
- coordinating grazing uses with other resource uses
- resolving disputes and conflicts between grazing activities and other uses and users,
- preparing planning documents and decisions through NEPA procedures.
- carrying out consultation and implementing consultation requirements under ESA with NOAA Fisheries, and USFWS.

Predictions of annual budgets in the 1987 Sawtooth FLRMP necessary to implement the range program are much higher than actual budget allocations. Actual allocations have averaged approximately 67% of what was identified in the 1987 FLRMP. Increasing management costs and inflation since the 1987 Sawtooth FLRMP have reduced the effective budget further. Additionally, costs associated with consultation under ESA and management of consultation requirements were not included in the Sawtooth FLRMP estimates; nor were costs identified consistent with requirements for developing up-to-date allotment management planning and NEPA decisions as required by the section 504 of the Rescission Act (PL-104-19). Had these costs been known during the writing of the 1987 FLRMP, today's funding allocations for the range program would be less than half of funding levels called for by the FLRMP.

Obvious budget shortfalls have been a continuing problem. In some years, Forest management priorities have resulted in this part of the Forest receiving disproportionate shares of range administration budgets in order to meet expenditure requirements associated especially with ESA consultation requirements.

FLRMP Direction applicable to Social/Economic resources include:

- Develop sustainable land uses and management strategies that contribute to economic development goals. SEGO03
- Provide a predictable supply of Forest goods and services within sustainable limits of the ecosystem that help meet public demand. SEOB01

Heritage

Fishing, hunting and gathering activities of Native Americans play a major role in their culture, religion, and commerce. The Shoshone-Bannock, Nez Perce, and other tribes have off-reservation federal treaty rights to hunt, fish, and gather on Forest Lands, including the SNRA.

Although there have been numerous archaeological investigations within the allotments (discussed below), no systematic research has been done in the eastern section of the Boulder-White Cloud area of the Sawtooth National Recreation Area (SNRA). We know that the earliest inhabitants of the area were prehistoric peoples who hunted big game, caught salmon, and gathered camas from the many wet meadows of the region. The oldest known

occupation by these peoples in the SNRA occurred at Redfish Overhang near Redfish Lake where radiocarbon dates in excess of 10,000 years ago were reported. Based on the limited evidence gathered to date, Native American occupation is presumed to be largely seasonal and continued up to A.D. 1840. Butler (1971) states that the East Fork of the Salmon was integral to the bison hunting territory of eastern Idaho and the project area is part of a natural geographic divide between the eastern bison hunting areas and the salmon fishing and mountain sheep hunting areas of central Idaho. Later Native Americans were primarily Sheepeater Shoshone but it may be that other Shoshone groups as well as other tribes such as the Nez Perce frequented the area. The exact dimensions and scope of these occupations is unknown although evidence for it is abundant.

The historic period begins with visits by fur trappers and, later, miners. One of the first documented European American appearances in the present-day SNRA occurred in 1824 when Alexander Ross led a party from the Hudson Bay Company into the Wood River, Little Lost and Big Lost Rivers and the headwaters of the Salmon River. A few other trappers, including John Work and Captain Bonneville, tested the Sawtooth Valley for beaver over the next decade. Beaver were scarce and from the mid-1830's until 1862 there was little reason to exploit or settle in the area. Then in 1862, gold was discovered in Boise Basin and miners rapidly pushed into the Payette River to the west of the SNRA and into Wood River to the south. Additional discoveries were made in 1863 on the Feather River and Rocky Bar and placer gold was found in Stanley Basin and then at Atlanta in 1864. Hard rock or quartz mining boomed in 1879 at Vienna and Sawtooth City and in the early 1880's at Galena; but the ores that started these towns were declining by the late 1880's, although occasional spurts of activity occurred throughout the 20th century. Both Vienna and Sawtooth City are now in decay and Galena has virtually disappeared. The project area contains several historic mining districts that date to the 1920's (Hermit, Silver Rule, and Livingston Mine) but minimal documentation or research have been completed.

Over the past thirty years, approximately 15 documented archaeological investigations have been conducted within the project area. However, less than 0.06 % (approximately 678 acres) of the project area has been surveyed as a result of earlier Forest Service projects and usually the methods used for older surveys do not meet current standards.

As predicted by Butler in 1971, two studies in particular point to the potential prehistoric richness of the area. The first study was an inventory performed during the late 1970's for the Challis Planning Unit, Bureau of Land Management (BLM). As a consequence of the BLM inventories, the Challis Archaeological Spring District was nominated to and listed on the National Register of Historic Places in 1980. The district consists of 26 Paleo and Archaic archaeological sites which are described as seasonally occupied camps with various flakes, tools, ceramics, groundstone, faunal remains, and features. The sites are discontinuously spread across BLM land south, southeast, and southwest (including along the East Fork Salmon River) of Challis (1980 Vaughn). The other study was a survey conducted by Sawtooth National Forest archaeologists in 1988 for the proposed East Fork Road Realignment Project. Thirteen new sites were recorded as a result of that project; all talus slope pits/hunting blinds except for one lithic scatter. Seventeen prehistoric hunting blinds were recorded during this project alone. These blinds were located in talus slopes on hillsides bordering the East Fork Salmon River. Although most of the survey area and all of the sites except for SW-812 are located outside the allotment boundaries, the results indicated

the types of sites and site density we might discover in adjacent areas during the survey for this project.

Twenty-seven heritage resources, almost evenly divided between prehistoric (13) and historic (14), have been previously identified and recorded within the project area (see Table 2 and Map 3). Recorded sites consist mostly of prehistoric hunting blinds/talus pits and lithic scatters and historic mining sites and cabins. Mines that have been recorded within the project area include: Tempest, Hermit, Carbonate, Livingston, and Silver Rule. In addition, Bowery Guard Station (10-CR-840), a Forest Service guard station has also been recorded. The residence at Bowery Guard Station was originally constructed in 1940 and may have been built by the Civilian Conservation Corps. The guard station has also been used for fire control and administrative personnel over the years. In the late 1970's a structure was brought to the guard station site from Obsidian and used as a shed.

Heritage Table #1 . Previously recorded sites within the allotment boundaries.

Site #	FS #	Site Type	Site Description
10-CR-231	SW-1578	Prehistoric	Open campsite
10-CR-840	SW-293	Historic	Bowery Guard Station
10-CR-839	SW-331	Prehistoric	Lithic Scatter: 3 projectile points, debitage
10-CR-825	SW-332	Prehistoric	3 Hunting blinds
10-CR-853	SW-333	Prehistoric	Lithic Scatter: desert side-notched point, debitage
10-CR-617	SW-334	Historic	Mine dump
10-CR-616	SW-349	Historic	Livingston Mine historic mill
10-CR-719	SW-359	Prehistoric	Hunting blind
10-CR-720	SW-408	Prehistoric	Quarry site: blue-green chert
10-CR-732	SW-554	Historic	Cabin
	SW-568	Historic	Cabin
10-CR-938	SW-674	Prehistoric	Hunting blind
10-CR-937	SW-703	Prehistoric	Hunting blind
10-CR-935	SW-705	Historic	Pre-1900's horse corral
10-CR-943	SW-711	Historic	Tempest Mine
10-CR-944	SW-720	Historic	Cabin
10-CR-962	SW-741	Prehistoric	Lithic Scatter/Fishing camp
	SW-812	Prehistoric	Hunting blind
	SW-838	Historic	East Fork Ranch compound
10-CR-1433	SW-1283	Prehistoric	Lithic scatter: chert debitage
10-CR-1500	SW-1427	Historic	Carbonate Mine
10-CR-1501	SW-1428	Historic	Silver Rule Mine
10-CR-1494	SW-1430	Prehistoric	Heat-treated chert debitage
10-CR-1547	SW-1521	Historic	Hermit Mine Adits

10-CR-1548	SW-1522	Historic	Hermit Mine collapsed structure and trash dump
10-CR-1549	SW-1523	Historic	Hermit Mine cabin and trash dump
10-CR-1550	SW-1524	Historic	Isolate: A-frame wooden implement, possible plow

FLRMP standards relevant to heritage

- Identify and manage cultural resources (HPGO01).
- Integrate the Heritage Program into land and resource management (HPGO03).
- Develop a pro-active program of cultural resource management consistent with federal guidelines for the implementation of Sections 106 and 110 of the NHPA (HPOB04).
- Maintain an ongoing inventory to locate and identify historic properties on National Forest System lands (HPOB05).
- Protect historic properties through stabilization and monitoring efforts. Monitor historic properties that may be adversely affected by management activities (HPOB09).
- Review undertakings that may affect cultural resources to identify potential impacts. Compliance with Sections 106 and 110 of the NHPA shall be completed before the responsible agency official signs the project decision document (HPST01).
- Conduct cultural resource inventories in consultation with the appropriate Tribal and State Historic Preservation Offices and other individuals and organizations likely to have knowledge of historic properties in the area (HPST02).

The Desired Condition identified in the FLRMP for historic values on the SNRA is to "Preserve, restore, and interpret the historic and prehistoric values within the SNRA, including ranching, mining, and frontier character that typify the American West. Maintain the integrity of the historic landscapes and uses throughout the SNRA".

In accordance with the requirements of the National Historic Preservation Act of 1966, as amended (NHPA), Executive Order 13007, and the American Indian Religious Freedom Act, and others, consultation with The Shoshone Bannock, Shoshone Paiute, and the Nez Perce Tribes was initiated in April, 2003 in order to identify any potential impacts to traditional cultural properties or sacred sites. Consultation with the Idaho State Historic Preservation Office (SHPO) included submission of the technical report of the field investigation discussed below for SHPO comment.

In accordance with the requirements of Section 106 of the NHPA, a Phase I archaeological inventory was conducted in July-August, 2003 for the Upper and Lower East Fork Cattle and Horse Allotments Environmental Impact Statement (East Fork EIS). Since archaeological

investigations were not routinely conducted in the past prior to the issuance of grazing permits this is the first time the Sawtooth National Forest has needed to develop field methods for surveying this type of undertaking. Many grazing permits are coming up for renewal across the western United States and methods for dealing with these types of projects need to be developed since the Area of Potential Effect (APE) consists of a considerable amount of acreage. Field methods needed to address collecting enough data to determine whether grazing is adversely affecting historic properties.

With that objective in mind, the following strategy was developed for the Sawtooth based on the results of the background literature review, assessment of the quality of existing data about known historic properties, and staff and time limitations. The Assistant State Archaeologist at the Idaho State Historic Preservation Office, other Region 4 Heritage Program Managers, and Sawtooth National Forest Range Specialists provided input to the following strategy:

- Surveys will be conducted and mitigation implemented if an adverse effect is discovered for every location where ground-disturbing activities will take place, including:
- Installation of new facilities such as troughs, ponds, pipelines, fences
- Removal of old facilities
- Proposed facility improvements that have not been previously surveyed
- Surveys will also be conducted within the allotment boundaries at a variety of the following locations:
- High site probability areas (based on topographical landforms, slope percentage, and other associated natural features) that are within locations identified by Range Specialists as those most likely to be at risk due to concentrated grazing activities (i.e., springs and riparian areas).
- Existing troughs and ponds (high probability-concentrated grazing areas).
- Condition assessments will be conducted at a variety of known site locations and, if necessary, site records will be updated.

A total of 484 acres was surveyed during fieldwork. Seven new sites, two historic and 5 prehistoric, were recorded during the survey. In addition, members of the SNRA Wilderness crew located one new prehistoric site (SW-1820: lithic scatter) during their survey within the White Cloud Mountains. That site has not been formally recorded but will be submitted later once we have collected the information from the crew. We also found a prehistoric isolate record (SW-1823) with the projectile point attached to the form in the Sawtooth files. The record states that the isolate had been found by the SNRA wildlife biologist in 1997 but never formally recorded (see Table 3). We formally recorded the isolate as part of this project.

Heritage Table 2. New Sites.

FS #	*Site Type*	Site Description	Condition
SW-1807	Prehistoric	Hunting Blinds/Talus Pits	Good
SW-1808	Historic	Old Bowery Guard Station	Fair

SW-1809	Historic	Log Outhouse	Poor
SW-1810	Prehistoric	Lithic scatter/production site	Good
SW-1811	Prehistoric	Lithic scatter	Good
SW-1812	Prehistoric	Hunting Blind/Talus Pit	Good
SW-1813	Prehistoric	Lithic scatter	Fair
SW-1820	Prehistoric	Lithic scatter	Unknown
SW-1823	Prehistoric	Isolate, projectile point	NA

Twelve previously recorded sites were visited to assess their condition and whether impacts from grazing were occurring (see Table 4). One of the sites visited (SW-809) is not within the allotment boundaries but was one of the talus pits identified during the East Fork Road Realignment Project discussed above. All but one of the sites recorded during that project are outside the boundaries of the current project and are on private lands or the east side of the East Fork Salmon. Since Site 10-CR-1049 was accessible and along the travel route it was checked to see if it was still intact, which it is. The site was easily relocated from the existing maps and site record and was in very good condition, with little to no disturbance noted.

Heritage Table 3. Previously recorded sites monitored.

Site #	FS #	*Site Type*	Condition	Update
10-CR-825	SW-332	Prehistoric	Fair	Yes
10-CR-839	SW-331	Prehistoric	Poor	Yes
10-CR-719	SW-359	Prehistoric	Poor	Yes
10-CR-720	SW-408	Prehistoric	Not relocated	Yes
10-CR-943	SW-711	Historic	Destroyed	Yes
10-CR-944	SW-720	Historic	Poor	Yes
10-CR-962	SW-741	Prehistoric	Poor	Yes
10-CR-1049	SW-809	Prehistoric	Good	Yes
10-CR-1052	SW-812	Prehistoric	Good	Yes
10-CR-1433	SW-1283	Prehistoric	Good	Yes
10-CR-1494	SW-1430	Prehistoric	Good	Yes
	SW-838	Historic	Poor	Yes

No impacts from grazing to either the existing sites we visited or the newly recorded sites were found during the investigation. Although no impacts from grazing were found, impacts to eligible sites from natural forces such as time, weather, and gravity and from recreation through visitor off-road vehicle use and dispersed camping were found. As others have suspected, even though there has not been a concerted effort to record and research the East Fork area, what has been found and recorded indicates the potential this area holds to contribute to our understanding of the prehistory and history of the area.