## CHARACTERIZATION

## SOIL

### Introduction

The Fall Creek watershed analysis area consists of the area of land that is drained by Fall Creek and it's tributaries. It also includes the Pritchard and Garden Creek drainages. This area includes approximately 60,000 acres of the northern portion of the Caribou National Forest administered by the Caribou-Targhee National Forest, Palisades Ranger District. A small portion of this watershed is in private ownership.

The Fall Creek watershed is located within the Dry Domain, of the Temperate Steppe Regime Mountains Division, of the Southern Rocky Mountain Steppe-Open Woodland-Coniferous Forest Province, of the Overthrust Mountains Section, of the Caribou Range Mountains Subsection as outlined in the National Hierarchical Framework for Ecological Units (ECOMAP, 1993). A map of the subsections for the Forest is shown in Figure 4.

Descriptions of these different levels of ecological units are found in "Targhee National Forest Subsections and Landtype Associations" (USDA-FS 1998). There are two landtype associations nested within the Caribou Range Mountains Subsection. These are identified as High Caribou Mountains-Conifer Forest, and Low Caribou Mountains-Shrub Steppe.

### Physiography

The landforms within the watershed consist mainly of foothills, mountains, ridges and basins formed from a series of thrust faults know as the Idaho-Wyoming Thrust Belt (Harrison et al., 1953). Elevation ranges from 5,200 feet at the mouth of Fall Creek to 8,121 feet near Fourth of July Ridge. Slopes range from nearly level in riparian areas to over 70 percent on mountain sideslopes. Drainage patterns are dendritic with moderate to strong dissection. Some drainages are structurally controlled by bedrock. Many drainages in the watershed are intermittent, however a few perennial streams such as Fall Creek, Pritchard Creek and Garden Creek exist. Aspects are generally northeast and southwest because of the north-south trending strike/dip slopes of the mountain ridges and valleys that were formed from the overthrust (Jobin et al., 1964).

### Geology

Geological information for the watershed was collected from several publications and maps (Mitchel et al., 1979; Jobin et al., 1964; and Ross et al., 1967). Surficial geology in the watershed consists mainly of sedimentary rocks with isolated areas of volcanic rock occurring near Point Lookout above Blacktail Canyon. Areas of travertine exist in lower Fall Creek drainage and in isolated areas of other drainages. Travertine beds are attributed to the development of the existing Fall Creek waterfalls located at the mouth of Fall Creek where it drains into the South Fork of the Snake River. Travertine is more

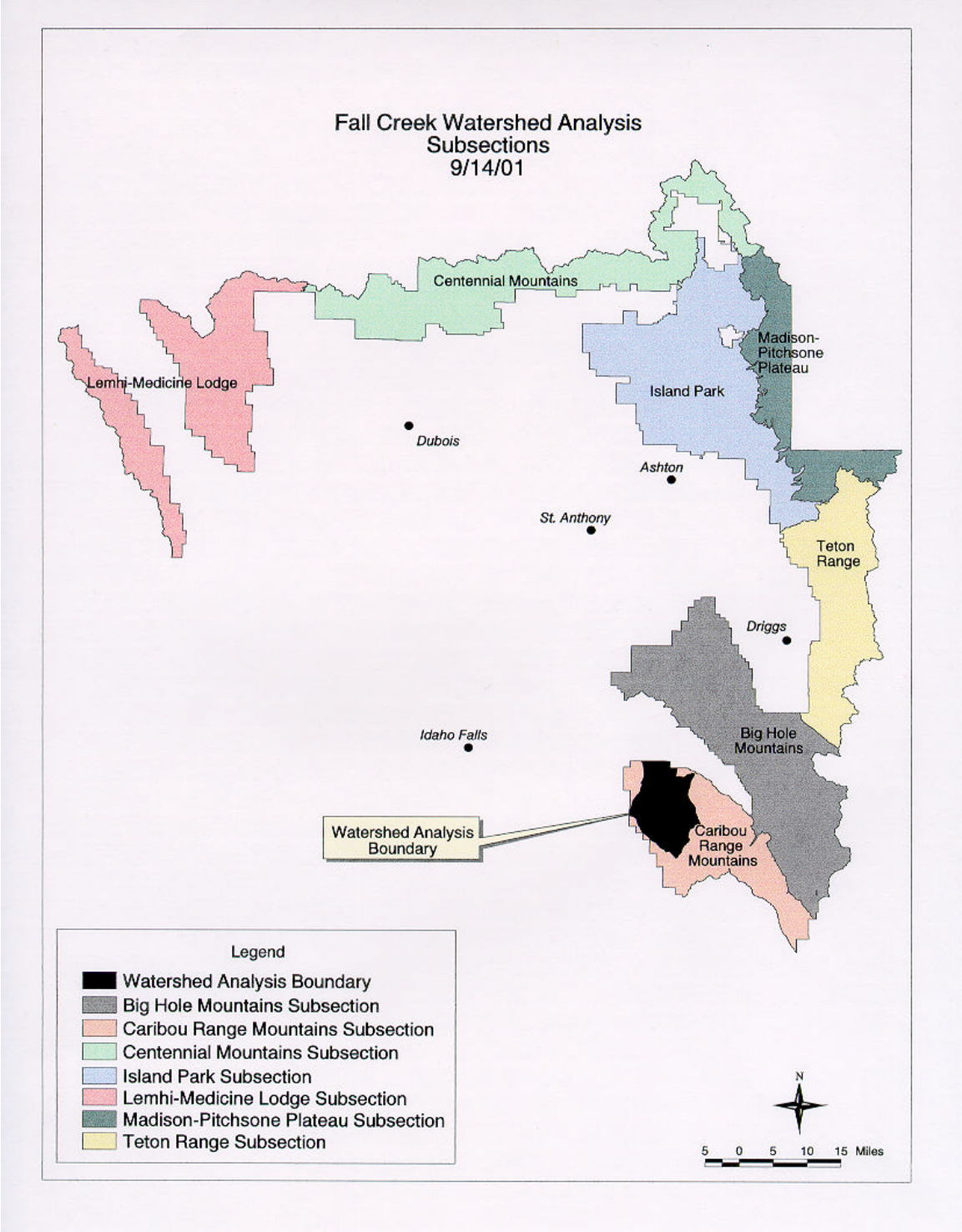



Figure 3. Fall Creek Watershed Analysis Subsections

resistant to erosion and deposits build up over time leaving the mouth hanging above the floodplain of the South Fork.

Sedimentary rocks are mainly sandstone, limestone, shale, conglomerate and siltstone/mudstone. Primary geologic formations identified by the Idaho Department of Lands, Bureau of Mines and Geology that formed the mountains and ridges are Wayan Formation; the Gannet Group consisting of Tygee Formation, Draney Formation, Bechler Formation, Peterson Limestone, and Ephriam Conglomerate, Nugget Sandstone, Stump Sandstone and Preuss Sandstone, Twin Creeks Limestone, Ankareh Shale and Thaynes Formation, Dinwoody Formation, Bear River Formation, Wells Formation (Mesozoic Era); and Mission Canyon Limestone (Paleozoic Era). A few isolated ridges near Blacktail Canyon are formed from silicic volcanic rock. Foothills near the South Fork of the Snake River are formed from colluvium, olivine basalt, and loess. Geology of the drainages consists of stream alluvium and isolated areas of travertine from the Cenozoic Era.

Many ridges and mountain sideslopes in this watershed have exposed bedrock. Some geologic materials such as the Wayan Formation have high natural erosion potential. Others have high mass instability.

Mineral prospecting and small amounts of mining have occurred within the watershed. An active travertine mine exists on the foothills near Fall Creek and 10-15 prospect pits have been excavated in the Blacktail/Pritchard drainages.

Climate

The climate for the Fall Creek watershed is influenced from major topographic features such as the Pacific coast mountain ranges and local mountain ranges. The mountain ranges trend north and south and are almost at right angles to the prevailing eastward airflow, affecting wind, precipitation and temperature patterns. In general, precipitation increases with elevation, but steepness and direction of slope, orientation, height of ridges, direction of prevailing winds and other features also exert considerable control over the amount of precipitation that falls in a specific area. Increased precipitation at higher elevations is considerably greater in winter than in summer. Less than half of the precipitation falls from April through September (USDA, 1990). Orographic lift intensifies precipitation in these mountains. Precipitation ranges from 16 inches at the lowest elevations to 30 inches at the highest. Average annual air temperature is about 38 degrees F (Abramovich, 1998).

Soils

Soils that formed from the geologic parent materials listed above have high base saturation that provides relatively high natural fertility. Because many of the soils in this watershed formed from geology containing shale and limestone, they have a dominance of clay and silt in the profile. Sandy soils are usually associated with geologic formations of sandstones and conglomerates. These kinds of soils have high erosion potential and

may produce high levels of sediment when erosive conditions occur. This watershed has a majority of soils that formed on unstable landforms (USDA-FS, 1997). For purposes of this characterization, soils are broken into three major landform groupings for simplification. Soils are described in relationship to 1.) mountains and ridges, 2.) basins and foothills, and 3.) drainages.

*Soils on Mountains and Ridges*

Soils that formed on the mountains and ridges are moderately deep to very deep (20”->60”) with some shallow soils (<20”) located on the ridgetops. Because they formed on steep slopes with sedimentary parent material, erosion potential is high for these soils when they lose their protective ground cover. The potential is also high for mass movement when soils become saturated with water. Some areas of exposed geologic materials on mountain sideslopes have high natural erosion. This type of erosion and mass instability is generally associated with the Wayan Formation (Olson et al., 1970). As these geologic materials weather out and are exposed, they erode down-slope. Steep areas near Fourth of July Ridge show evidence (i.e., gulling and sheet erosion) of past livestock overuse on bed-grounds and driveways but most areas are now healing because of watershed restoration efforts. In some areas, soils in the watershed have been impacted from off-road vehicle use and evidence of trails in the watershed is noticeable.

*Soils on Basins and Foothills*

Soils that formed on the basins and foothills are generally very deep (>60”) and are well drained. They are dominantly vegetated with big sagebrush, aspen and mountain shrubs. These soils have less potential to erode than those formed on the mountains and ridges because they formed on slope less than 40 percent. Maintenance of ground cover on these soils is important to maintain stable conditions. They have high range productivity potential and support a variety of uses including grazing, recreation and wildlife habitat. Because they often have high clay content in the profile, over-use may produce compaction that could lower potential productivity. Erosion from roads in this area is notable because ruts are often formed from vehicles when they are wet and channel sediment into the streams. Road maintenance is often required to reduce these impacts.

*Soils in Drainages (Riparian)*

Soils that formed in drainages are the most productive in the watershed. They are almost always very deep (>60”) and are influenced by wetness during some period of the year. Riparian vegetation such as willows and sedges grow in most of the drainage soils. Soils in drainages may be affected by grazing livestock and wildlife, recreation, roads and influences from upland conditions. Some areas are susceptible to down-cutting which often lowers the water table. When this occurs, riparian vegetation is gradually replaced by upland species such as sagebrush. Most riparian soils appear to be in a productive condition in the watershed but some gully erosion and trampling in riparian areas has been observed.

## Summary

Generally, undisturbed soils in the watershed are in a productive state that is associated with good watershed health. Localized impacts on soils related to livestock grazing, mining and recreation use have been identified and documented. Recreation use, road construction and livestock use have the greatest potential impact on riparian and upland soils. Erosion from upland soils is occurring from naturally erodible geologic formations such as the Wayan Formation and from intensive livestock and recreation use. Erosion potential is highest on soils that formed on the mountains and ridges. Mass instability occurs on many areas of the watershed although recent mass movements are few.

## WATER

### Introduction

For any given location there are four primary components that regulate landscape development or expression. These four components frame the fundamental signature of a landscape and must be described to properly evaluate a watershed's function. These components/characteristics are parent geology, topography, geography, and climate. The long-term interaction of these components creates three dominant landscape features: soils, hydrography, and vegetation (McCammon, 1999). This hydrologic analysis describes the first three components and the landscape features under the heading "Drainage Basin Description" and the fourth component under "Climate". These components and features are then subject to a variety of natural and human-related disturbances that occur at varied frequencies and magnitudes across the landscape. These interactions and the resulting conditions are described in subsequent chapters under the headings "Watershed Conditions" and "Riparian Conditions". Finally, watershed and riparian conditions can affect the balance between the multiple processes acting to form and maintain the physical channel and water quality. These processes and conditions are discussed in subsequent chapters in the sections titled "Stream Conditions" and “Water Quality.”

### Drainage Basin Characterization

These are north aspect watersheds located in the “Palisades Subbasin.” This area was formed when an overthrust belt, that was active during formation of the Rocky Mountains, pushed from the southwest through layers of sedimentary bedrock to form the Caribou Range. High angle block-faulting then cut into this overthrust belt. Mountains associated with overthrust are composed of hard Mesozoic sedimentary bedrock, mostly limestone, but also with layers of conglomerate, sandstone, siltstone, and shale. The thrust plate then contorted and folded these sedimentary layers until in some places the oldest layer is topmost. The Caribou Range overthrust structure is broken into many valleys; not only by streams eroding less resistant rock, but also by Basin and Range block faulting that occurred at the same time as the formation of the Snake River plain. Pliocene rhyolitic flows overlay some of the sedimentary layers in the Caribou Range from Swan Valley up through Antelope Flat to Lookout Mountain. Basalt flows can also be found overlapping the base of the Caribou Range (Alt and Hyndman 1989). These processes of extensive folding, faulting, mass failures, and erosion formed the general topography seen today.

Fall Creek is a 75.5 square mile watershed drained by 133 miles of perennial, intermittent, and ephemeral streams. This is an area of steep to moderately steep (30-60%) mountains that rise from the South Fork Snake River. Elevations range from 5276 (SF Snake River) to 8019 feet (Dead Horse Ridge). When subject to erosive forces these rock types break down into silt and fine sand sized particles (this mineralogy is important in determining sediment delivery, sediment routing, and water quality effects). Once

eroded, these soil particles are readily transported down these steep slopes to the valley bottoms. These are low gradient, alluvial valley bottoms that have cross sections that can be described as either “flat” or “U” shaped. When well vegetated, these valley bottoms are effective in filtering sediments produced on the adjacent slopes. Therefore, natural sediment levels are dominated by instream sources. The Garden and Prichard Creek watersheds are similar to Fall Creek.

Climate-Precipitation

Expressions of Climate, such as precipitation, play a vital role in determining the character of the physical landscape. In fact, precipitation is typically the dominant driver of hillslope and hydrologic processes and disturbances in mountainous watersheds. While precipitation is the dominant driver, it is difficult to predict exact conditions or the consequences of various events due to the highly stochastic nature of this element.

*Data Sources*

- Data was obtained from the National Weather Service Cooperative Network Station "Palisades, Idaho" (106764).
- Data was obtained from the National Weather Service Cooperative Network Station "Swan Valley, Idaho" (108937).
- Data was obtained from the Fall Creek, Idaho Snow Course.

*Assumptions*

- While the periods of record for Fall Creek and the other stations do not fully overlap (Fall Creek only runs from 1984-1999), it is assumed that the data is comparable.
- The Swan Valley station moved 3 miles in 1981. It is assumed that this would not substantially affect average values.
- The Palisades and Swan Valley Climate Stations were assumed to represent average conditions in the lower watershed (5400 feet).
- The Fall Creek Snow Course was assumed to represent average conditions in the upper watershed (6800 feet).

*Analysis Results*

Swan Valley Idaho Climatic Summary (Elevation 5360 feet)
Annual precipitation averages 17.0 inches, which for the most part is evenly distributed throughout the year. The exception is in May and June when 23% of the annual precipitation occurs. This precipitation is usually in the form of snow from mid-November until March; a rain-snow mix in March, April, and early November; and rain between May and November. Snow accumulation begins in late November reaching a maximum depth in early-mid February. At this point, the average maximum temperature exceeds freezing and melt begins. Between mid-February and mid-March 60% of the total snow accumulation melts off. This lower portion of the watershed is generally snow free by April 1$^{st}$. Table 1-1 summarizes the climate data for this station.

Table 1: Climatic Data from Swan Valley, Idaho

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ave Max Temp (F) | **29.5** | **35.4** | **43.1** | **54.1** | **65.0** | **74.9** | **84.7** | **82.8** | **72.8** | **60.5** | **42.6** | **31.4** | **56.4** |
| Ave PCP (in) | **1.47** | **1.06** | **1.04** | **1.48** | **2.32** | **1.65** | **1.25** | **1.29** | **1.61** | **1.15** | **1.48** | **1.22** | **17.02** |
| Ave Total Snowfall (in) | **17.0** | **8.6** | **7.2** | **3.7** | **1.1** | **0.1** | **0.0** | **0.0** | **0.2** | **0.9** | **7.2** | **12.4** | **58.3** |
| Ave Snow Depth (in) | **10** | **10** | **4** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **4** | **--** |

Palisades, Idaho Climatic Summary (Elevation 5390 feet)

Annual precipitation averages 20.3 inches, which for the most part is evenly distributed throughout the year. The exception is in May and June when 22% of the annual precipitation occurs. The form of precip itation is usually snow from mid-November until March; a rain-snow mix in March, April, and early November; and rain between May and November. Snow accumulation begins in late November reaching a maximum depth in February. At this point, the average maximum temperature exceeds freezing and melt begins. Between mid-March and mid-April 65% of the total snow accumulation melts off. This lower portion of the watershed is generally snow free by May 1st. Table 1-2 summarizes the climate data for this station.

Table 2: Climatic Data from Palisades Idaho

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ave Max Temp (F) | **29.8** | **35.5** | **43.1** | **54.6** | **65.6** | **75.1** | **84.4** | **82.6** | **73.3** | **61.1** | **43.5** | **31.7** | **56.7** |
| Ave PCP (in) | **2.02** | **1.61** | **1.48** | **1.62** | **2.36** | **2.00** | **1.24** | **1.40** | **1.70** | **1.36** | **1.79** | **1.70** | **20.28** |
| Ave Total Snowfall (in) | **21.0** | **14.8** | **11.0** | **3.5** | **0.5** | **0.0** | **0.0** | **0.0** | **0.0** | **1.0** | **7.3** | **17.7** | **76.9** |
| Ave Snow Depth (in) | **12** | **14** | **10** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **5** | **--** |

Fall Creek, Idaho Summary (Elevation 6820 feet)

Snow depth and snow water both reach their maximum levels in early March. Sixty-two percent of the total snow depth melts-off in April (16 out of the 26 inch total), with the area being snow free by June 1st. Table 1-3 summarizes the climatic data for this station.

Table 3: Climatic Data from Fall Creek, Idaho (First of Month Measurements)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ave Snow Depth (in) | **17** | **24** | **26** | **18** | **2** | **0** | **0** | **0** | **0** | **NC** | **NC** | **NC** | |
| Ave SWE (in) | **3.8** | **6.4** | **7.7** | **5.9** | **0.4** | **0.0** | **0.0** | **0.0** | **0.0** | **NC** | **NC** | **NC** | **--** |

*NC = Not Collected*

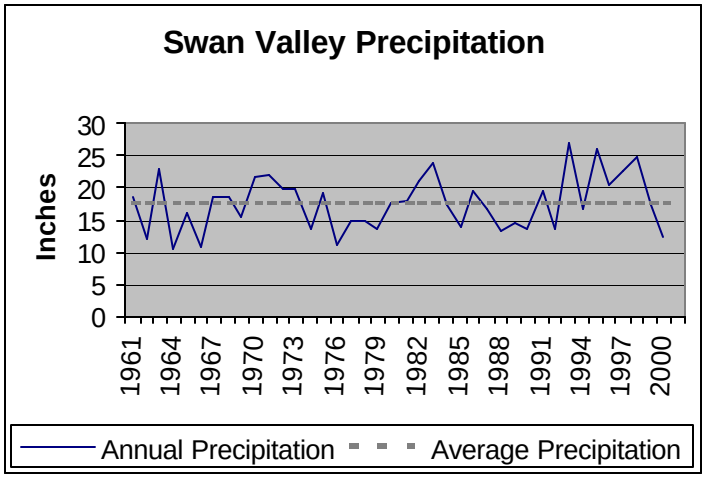
*Watershed Summary*

All three of stations show characteristics typical of a snowmelt-dominated watershed. In these systems, deep snow packs form during the winter storing water until it's release during spring snowmelt. This melt then provides the primary source of ground, soil, and surface water.

The snowmelt hydrograph's peak flow is generally a long lasting event containing a large volume of water. Driving this peak are large volumes of available water, soils approaching saturation, and low evapotranspiration rates (losses). While their total volume of water is high, these events have lower instantaneous peaks than rain-on-snow dominated hydrographs (the rain-on-snow flood is an extremely flashy event that has a rapid rise and fall with an enormous short-term peak). As with many mountainous watersheds, elevation plays a significant role in the Fall Creek basin. As shown by tables 1-1 through 1-3 elevation affects total winter precipitation, maximum snow depth, and the time the area is snow free.

Precipitation patterns appear cyclical with droughty conditions occurring approximately five out of every ten years (figure 1-1). It appears we are coming out of a wet period with our second consecutive year of dry conditions. Conditions in 2000 and 2001 appear similar to those seen in the mid 1960's.

Figure 4: Swan Valley Precipitation Trends



**FIRE**

The Fall Creek watershed analysis area consists of the area of land that is drained by Fall Creek and it's tributaries. It also includes the Pritchard and Garden Creek drainages. This are includes approximately 70,000 acres of the northern portion of the Caribou/Targhee National Forest, Palisades Ranger District. A small portion of this watershed is in private land ownership.

The analysis area has less tree cover than adjacent watersheds to the south and is bordered by private open lands to the north. This watershed consists of varied vegetative habitats, Douglas –fir, Lodgepole Pine, Englemann spruce Alpine Fir, Aspen and various shrub species. Scattered through out the analysis area. The primary forest types are aspen (31 percent) and mixed lodgepole and Douglas-fir (47 percent). This makeup consist is 60 percent forested and 40 percent nonforested. The interspersion of forest with sagebrush, grass/forbs meadows and mountain brush provides for good diversity of plant species.

Age class diversity is limited. Some limited timber management has occurred in the lodgepole pine/Douglas-fir type. Almost no harvest has taken place in the Englemann spruce fir type. Some 99 percent of the conifer forests are in the mature or older seral stages. Douglas-fir is becoming more predominant as it encroaches on the stands of lodgepole pine, aspen and shrubs. Evidence of insect attacks is readily visible in the Douglas-fir and is increasing yearly. It is likely that there is more Douglas-fir here now, and less aspen, lodgepole pine and scrublands, than existed historically. Fires have been suppressed for many years. Because stands are scattered and difficult to access, this condition is likely to persist. Treatment opportunities center around prescribed burns and limited vegetation treatment where access is more easily obtained.

Most of the shrublands are also in late seral stages. Consequently there are potential risks of large fires, insects and disease outbreaks. These risks may be limited by the scattered nature of the stands. Insect attacks in recent years and fire suppression have increase fuel loading to abnormally high concentrations. Prescribed fire and some vegetation manipulation could be used in the subsections of the analysis area where access permits to help restore and maintain a healthy ecosystem.

**FORESTS**

The analysis area is characterized by a vegetation pattern of a dry area. Tree cover is scattered and generally tree stand size is small in acres. Wetter aspects support tree cover (north and east) while south and west aspects are sagebrush and grass. Tree height is often shorter than would be found on sites where moisture is more frequent suggesting a harder growing site. Tree species are generally Lodgepole Pine (early succession species) and Douglas Fir (mid succession species). Some later successional species such as Alpine fir can be found in the under story. Aspen stands are also common through out the analysis area. Douglas fir stands are often being taken over by the later successional species Alpine Fir. Many Lodgepole Pine stands may be considered late succession, because of their location and isolation from adjacent stands. Timber harvesting has been very limited in the past due to the high cost of accessing the timber stands. However, early logging (tie Hacking) has occurred in much of the area where horse logging was possible. Old stumps remaining from this logging can be seen in many areas. With the exception of the June Creek/Skyline Ridge area, timber stands are so isolated that the revenue from the timber sale would not finance the construction of roads. The sale would be simply uneconomical and is probably why some timber harvesting has not occurred in the past. Nonconventional means of harvesting the timber would also not allow timber harvesting at this time for the same reason. The June Creek/Skyline Ridge area has somewhat larger continuous timber stands and access roads in the general area. It would be possible to have an economical sale in this area. This analysis area is different from the watersheds to the south in that the watersheds to the south contain larger more continuous stands of timber. It is much like the watersheds to the south in that access would be very difficult because of the lack of suitable roads in the area. With the exception of those areas around the existing road system, timber harvesting in the entire Caribou subsection would be difficult to sale because of economics constants.

**RANGELANDS**

The Fall Creek Watershed Analysis includes the area north of the Fall Creek drainage, south of the Garden Creek drainage, west of South Fork of Snake River and east of Skyline Ridge. The area lies between the elevation of 5000 to 8000 feet. Annual precipitation for the area is normally around 20 inches, which usually comes in the form of snow between late October and end of April. Rain showers are common in May. June and September with July and August generally dry. Temperatures range from a maximum of 90 degrees in summer months to a minimum of –30 in winter months.

Garden Creek and Pritchard Creek are located on the north side of the analysis area. The upper half of Pritchard Creek is included in a sheep allotment. The lower portion of this canyon is not grazed by livestock. The upper portion of Garden Canyon which is located on National Forest Lands is grazed by cattle. These two drainages are narrow with fairly dense conifer stands on the north slopes with aspen, mountain brush and sagebrush on the south slopes. Riparian areas are also narrow and confined but in most cases are well armored with rock and willow. Both streams flow through a private ranch prior to empting into the South Fork of Snake River.

Fall Creek is a bigger drainage, with approximately 60% forested and 40% non forested. The primary forested types are aspen, (30 percent) and mixed lodgepole and Doug Fir, (47 percent) and mountain brush (chokecherry-serviceberry and bigtooth maple, 23%). Other tree and shrub types that occur within the area are: Rocky Mountain Juniper and curlleaf mountain mahongany. The non-forested areas include: mountain big sagebrush (*A. tridentata*), snowbush (*Ceanothus velutinous*), bitterbrush (*Purshia tridentata*), snowberry, horsebrush, and rabbitbrush. Major grass components are: Kentucky bluegrass (*Poa Pratensis*), mountain brome (*Bromus carinatus*), slender wheatgrass ( *Agropyron trachycaulum*),and bluebunch wheatgrass (*Agropyron spicatum*).

The forb component for the drier sites include: balsamroot (*Balsamorhiza macrophylla*), Arrowleaved Balsamroot (*Balsamorhiza sagittata*), Weatern Hawksbeard (*Crepis occidentalis*), and Buckwheat (*Eriogonum caespitosum*). Moist sites the forb component consists of Meadow Goldenrod (*Solidago Canadensis*), Cow Parsnip (*Heracleum lanatum*), Mountain Bluebells (*Mertensia ciliata*), and Tall and Low Larkspur (*Delphinium occidentiale* and *nelsoni*).

Fall Creek riparian is fairly broad with a meandering stream that covers a large portion of the canyon bottom. Beaver dams are common along the stream which allows for sub irrigation of much of the canyon bottom.

In riparian areas species such as Tufted hairgrass (*Deschampsia caespitosa*), Redtop (*Agrostis stolonifera*) are present along with a variety of carex and sedges. Willow, birch and alder are abundant along the lower reaches of Fall Creek.

Fall Creek drainage is grazed by cattle at the lower elevations and sheep in the higher areas. Fall Creek is the only area of the Palisades District that Forest Plan has identified grazing as the management prescription.

High run off (snowmelt) flows are common in the analysis area. Beaver trappers of the early 1800s referred to Fall Creek as Muddy Creek due to the large amounts of sediment in the stream during snowmelt and heavy rains. Most of this sediment appears to be entering the stream near the headwaters located in Fall Creek basin.

The practice of prescribed fire has occurred in the analysis area since the early 1970s. Primarily the species targeted has been sagebrush, mountain brush and aspen. Many of the areas burned in the seventies have converted back to the original habitat type. It appears that burning has a maximum effect on sagebrush of approximately 20 years.

**FISHERIES**

The Fall Creek Watershed Analysis Area includes the Fall Creek, Pritchard Creek, and Garden Creek Drainages. Native fish in these drainages include Yellowstone cutthroat trout, mountain whitefish, longnose and speckled dace, and mottled and Piute sculpin. Non-native fish include brook trout, brown trout, and rainbow trout. Key fish species and habitat characteristics are discussed below.

Yellowstone cutthroat trout are a Regional Forester Sensitive Species and listed as a Species of Concern in the State of Idaho. U.S. Fish and Wildlife Service received a petition to list Yellowstone cutthroat trout as Threatened in August 1998. In February 2001, the US Fish and Wildlife Service finalized their finding on the petition. They indicated the petition did not provide substantial information to indicate listing was warranted.

Two life history patterns of Yellowstone cutthroat trout occur in the Fall Creek Watershed Analysis Area; resident and fluvial. While resident fish spend the majority of their lives in a relatively short segment of stream, fluvial fish migrate into tributaries from the South Fork to spawn, returning to the South Fork for the remainder of the year. The offspring of fluvial fish spend a year or two in the nursery streams and eventually migrate downstream to larger water. Only resident Yellowstone cutthroat trout occur in Fall Creek and resident and fluvial life history patterns occur in Pritchard and Garden Creeks.

Yellowstone cutthroat trout occur in two physical varieties based upon markings; large-spotted and fine-spotted. While Pritchard Creek has both varieties, Garden and Fall Creeks apparently just have the large-spotted form.

Brook trout compete for habitat with Yellowstone cutthroat trout. They currently outnumber native cutthroat trout in Fall Creek.

Brown trout were introduced into the South Fork Snake River and have occasionally been observed in lower Pritchard Creek in past fisheries surveys. Although they don't interbreed with native cutthroat trout, they are voracious predators that likely prey upon their young.

Rainbow trout have been introduced to the South Fork Snake River and some of its tributaries, including Fall Creek. Some hybridization between rainbow and cutthroat trout has been documented within tributaries of the South Fork. Rainbow trout also compete with Yellowstone cutthroat trout for habitat and food.

Table 4: Native Fish in the Analysis Area

| Common Name | Scientific Name | Status |
|---|---|---|
| Yellowstone cutthroat trout | (*Oncorhynchus clarki bouvieri)* | S, SC-A |
| Mountain whitefish | (*Prosopium williamsoni*) | |
| Mottled sculpin | (*Cottus bairdi*) | |
| Piute sculpin | (*Cottus beldingi)* | |
| Longnose dace | (*Rhinichthys cataractae*) | |
| Speckled dace | (*Rhinichthys osculus)* | |

Table 5: Introduced non-native fish in the analysis area

| Common Name | Scientific Name |
|---|---|
| Rainbow trout | (*Oncorhynchus mykiss*) |
| Brown trout | (*Salmo trutta*) |
| Brook trout | (*Salvelinus fontinalis*) |

Status Codes

S: USDA Forest Service Regional Forester Sensitive species designation (Forest Service Manual 2670.5). Those plant and animal species identified by the Regional Forester for which population viability is a concern as evidenced by:

A. Significant current or predicted downward trends in population numbers or density.
B. Significant current or predicted downward trends in habitat capability that would reduce a species existing distribution.

SC: Idaho Fish & Game Species of special concern: native species that are either low in number, limited in distribution, or have suffered significant population reductions due to habitat losses, but is not likely to become threatened in the near future. There are 3 categories:

A. SC-A: Species, which meet one or more of the criteria listed above and for which Idaho presently contains, or formerly constituted, a significant portion of their range (i.e. priority species).
B. SC-B: Species which meet one or more of the criteria above but whose populations in Idaho are on the edge of a range that falls largely outside the state (i.e. peripheral species)
C. SC-C: Species that may be rare in the state but for which there is little information on their population status, distribution, and/or habitat requirements (i.e. undetermined status species).

Fisheries resources in the analysis area have been affected by past land management on and off the Forest. These impacts include livestock grazing, off road motorized vehicle use, road construction and maintenance, prescribed fires, wildfires, camping, and irrigation diversions/impoundments. In addition, the native fisheries in Fall Creek have been affected by the introduction of non-native fish.

In this document, the fisheries resources in the analysis area are described in Characterization (this chapter), Reference Conditions, Current Conditions, Trends, and Recommendations. Generally, the time frame 1900-1999 is considered reference conditions and 1999-present is considered current conditions in the Fisheries write-ups. This is primarily due to the data that was available for this analysis and most recent fisheries surveys occurring in the analysis area in 1999.

Data sources include scientific publications, interagency planning reports, interviews with individuals who live and work in the watershed, past internal and interagency letters and memos, meeting notes, and stream, fish, and riparian surveys by USDA Forest Service, Bureau of Land Management, Idaho Department of Fish & Game, and Idaho Department of Environmental Quality.

**WILDLIFE**

The Fall Creek Watershed Analysis Area includes the Fall Creek, Pritchard Creek, and Garden Creek Drainages. Most species of native wildlife that were here historically inhabit these watersheds. Those that may have been here historically that do not regularly occur here now may include bison, rocky mountain big horn sheep, whooping crane, gray wolf and grizzly bear. However, unconfirmed sightings of the latter two species have occurred during the past two decades. Key wildlife species and habitat characteristics are discussed here.

Habitats

Habitats that fall within these watersheds from the top down to the South Fork of the Snake River are many and diverse. The cottonwood gallery forest of the South Fork is ranked by the US Fish and Wildlife Service as the number one wildlife habitat in the State of Idaho (USFWS 1980). There have been many wildlife and habitat studies done here. The analysis area is home for the Conant Bald Eagle territory which has been monitored for up to 3 decades now. The stretch of river in this analysis area is among the more impacted stretches including the Conant Valley Ranch, Conant Boat Landing and visitors center, FS Snake River Guard Station and horse pastures, State Highway 26, Snake River road and Swan Valley bridge.

Figure 5: South Fork Snake River Cottonwood bottomlands habitat in watershed are characterized by cottonwood trees, dogwood and willow with north facing Douglas fir slopes above.

Away from the river corridor riparian willow and dogwood habitats of Fall, Pritchard and Garden Creeks are among the more important ones for wildlife. Other important riparian habitats are found in June Creek, Trail Creek, upper forks of Fall Creek, South Fork of Fall Creek and Rash Canyon. The Fall Creek road and associated human activities limits the full use of this riparian area for many species on a year round basis. Historically, this zone has probably had a lot of grazing activity as well as human recreational use, hunting, fishing and trapping. In the early 1800's it is most probable that Fall creek was heavily influenced by beaver with many dams. Evidence of old dams can be found

today. It is likely that trapping in the 1800's and early 1900's helped change the water regimen and channels of Fall Creek. Addition of the road later influenced it more. It is not clear how important the Travertine Warm Springs in Fall Creek are to wildlife, but they do provide a warm area for deer and other wildlife in the winter similar to what is seen in Yellowstone National Park.

The ridges and south facing slopes of these drainages are the most important winter ranges for mule deer and rocky mountain elk on the Palisades Ranger District. Fall Creek road (about 13 miles) and Snake River road through the National Forest has been turned over to Bonneville County and they manage the road maintenance and use. The county decides what motorized use may or may not occur on these roads. The roads are designated snowmobile routes through winter ranges, but surrounding National Forest is closed to most all other uses during that time to protect wintering big game. During the snow free seasons also, cross-country motorized travel is not legally allowed on National Forest lands. Mountain Mahogany and juniper is characteristic on harsh dry rocky ridges important for elk and deer winter range with southern exposures. Juniper such as in Blacktail Canyon can be important for wintering animals for cover. Sagebrush habitat such as in Fall Creek basin has been manipulated with prescribed burning during the past decades to increase low seral stages.

Figure 6: Currant Creek Burn (1966) along Fall Creek riparian habitat bottom influenced by beavers and dams.

Figure 7: Canyon mouth of Pritchard Creek at the Conant Valley Ranch alfalfa fields with slopes showing conifer encroachment of aspen clones.

Besides riparian and winter range habitats the landscape is characterized by north slopes dominated by mixed conifer of Douglas fir, lodgepole pine and subalpine fir often mixed

with aspen clones or mountain brush depending on elevation and aspect. North slope conifer is characterized by older late seral plants to old growth except where fire has occurred. Stand dead snags and down dead wood is a key component due to insect and disease activity or lightning strikes that never developed into full-blown forest fires. Often during the past four or more decades small fires were never able to develop due to suppression by smoke jumpers and hot shot crews that put them out while they were small.

Aspen clones also tend to be older age and found more often on southern slopes or lower on north slopes. A large amount of aspen is found in the upper Fall Creek basin interspersed with sagebrush, snowberry and bitterbrush openings mixed with serviceberry. Much of the aspen habitat has been lost to conifer habitat through succession in Fall Creek as well as other areas. This increase in old age conifer, older aspen and replacement of aspen is believe to be due to the fire suppression activities of man during the past 100 years. The late seral timbered types are important for a variety of species such as cavity nesters, hawks, owls, possibly lynx, bear, elk, songbirds, furbearers, woodpeckers and a variety of other species dependent on old age forests. Cavity nesters and other species in this group may be at a population high at this time.

Rocks and cliffs are found in the area and are important habitats for selected species, but are not as abundant as in other parts of the Palisades Ranger District. Where they are found they are important for a variety of small mammals and birds, raptors and bats including some Forest Service sensitive species. Historically, this habitat may have been important to bighorn sheep to escape predators.

The elk forage to cover ratio for this watershed is believed to be close to the ideal of 40 – 50 percent cover to 50 – 60 percent forage area in much of the analysis area, except the very open Fall Creek basin area. Because of the lower elevations and openness of the big game winter ranges the north slope conifer habitats were not considered important potential Canada lynx habitat during our Forest Lynx analysis. However, they could occur here using the thick north slope conifer patches and willow bottoms for travel corridors. Tracking surveys have also found an abundance of white tail jackrabbits in the upper Fall Creek basin area. This could be an important food source. Still, habitat would be limited in the analysis area for lynx.

Species

A great variety of wildlife inhabit the analysis area including nesting bald eagles, cougars, mule deer, white-tail deer, elk, moose, black bear, song birds, ruffed, blue, sharp-tail and sage grouse, songbirds, waterfowl, cavity nesters, small cavity owls, goshawks, great gray owls, coyotes, small mammals, golden eagles, snakes, amphibians and many others. Occasional unconfirmed reports of grizzly bear and gray wolf have been received in or near the analysis area, but no bighorn sheep on this side of the Snake River.

Federally listed threatened or endangered species that occur here or may occur here include bald eagle, Canada lynx, gray wolf, grizzly bear and whooping crane. Whooping cranes are very rare at this time, even at Gray's Lake, which is about 10 miles or more south of the analysis area. Gray's Lake has had whooping crane in the past and the analysis area could have had them occasionally as well. Intermountain Region of Forest Service Sensitive species are listed below.

Table 6: Sensitive Wildlife Species in the Analysis Area.

| Sensitive Species | Key Habitats |
|---|---|
| Peregrine Falcon | Cliffs, crevices. Forages Snake River and riparian areas. Nesting very near analysis area. |
| Northern Goshawk | Dense mature conifer, Douglas fir, aspen, lodgepole pine forests. |
| Great Gray Owl | Often uses goshawk nests or other raptors nest or top of snags or brooms. |
| Flammulated Owl | Aspen or conifer cavities for nests. Mature Douglas fir for foraging for moths. |
| Boreal Owl | Subalpine and spruce in cooler north slopes, but also in Douglas fir. |
| Three-toed Woodpecker | North slope conifer with old trees and snags. |
| Townsend's Big-eared Bat | Mature forests, snags, cliffs, rocky habitat, crevices, caves, old mines. |
| Spotted Bat | Cliffs, rocky habitat, crevices, caves, old mines. |
| Fisher | Mature forests with down dead woody material. |
| Wolverine | Travels large areas and generally dens at elevations 7500 feet or high. Not likely to be denning in the analysis area but may be traveling through. |
| Columbian Sharp-tailed Grouse | Open brush and grass habitats in upper Fall Creek basin. |
| Sage Grouse | Found on Skyline Ridge on edge of upper Fall Creek basin. Open brush and grass habitats. |
| Spotted Frog | Riparian habitats of quiet water on stream edges of river, creeks and ponds. |
| Harlequin Duck | Found along Snake River. Fall Creek could have been historical habitat for nesting, but probably not enough whitewater. |
| Trumpeter Swan | Found year round on Snake River, but mostly in winter. Nesting not known yet. Have been observed in Fall Creek. |
| Common Loon | Not likely to be in the analysis area. They likely do not nest on Palisades Ranger District, but like the reservoir in spring. |

Activities

Beginning in the early 1800's white settlers had an influence on the wildlife and their habitats in the analysis area. Trappers began to impact beaver populations that altered riparian habitats for many species. Species such as grizzly bears, buffalo, wolves and bighorn sheep were eventually removed. Settlers set livestock out to graze. Some small scale wood cutting and logging and mining occurred.

Today livestock numbers on the forestlands are reduced from the days of early 1900's. The heaviest impacts to wildlife and habitat appear to be due to the increasing abundance of off road motorized vehicles, snowmobiles, road and trail construction, fire suppression and management, and dispersed motorized camping in riparian zones.

Figure 8: Motorized hill climbs characterized some big game winter range south facing slopes.

Figure 9: Road construction and maintenance encroaches on riparian wet meadow in Fall Creek.

Recent activities include domestic sheep and cattle grazing, fencing, mining (travertine and phosphate), noxious weed invasion, road and trail construction and maintenance, dispersed recreation including camping, hunting, fishing, trapping, horseback travel, hiking, motorized snowmobiles, all terrain vehicles (ATVs), motorcycles, off-road vehicles (OHVs), some logging, some firewood cutting, farming (both on and off the forest) and prescribed burning. Wildfire and fire suppression has also had an effect. A major power-line with associated road parallels Fall Creek. Irrigation diversion ponds were built in both Pritchard and Garden Creeks (private land). Major developments on both private and public lands are in the analysis area along the river corridor. All of these activities have and do affect the quality and quantity of wildlife and their habitat.

**RECREATION**

Recreation in the analysis area is best characterized by season of use, because each season sees different user groups in the area. Some of the same people may over lap for each season, but as whole there seems to be different public during then different seasons. Summer use is the time when the greatest number of public use the area. It is also a time when the greatest diversity of users occurs. Disperse camping is generally located along major roads and near water such as Fall Creek. Most of the camping occurs along the first five miles of the Fall Creek Road. Some Disperse camping occurs at other locations in the analysis area, but is generally much more limited. There are no developed sites within the area but Fall Campground and Group area is located along the South Fork of the Snake River near by. The Targhee Travel Plan has this as a motorized area, which means that most of the trails in the area are open to motorized travel less than 50' wide, designates the analysis area by vehicles. ATVs and motorbikes heavily use the trails during the summer. It is one of the important areas for this type of activity on the Palisades Ranger District. To a lesser extent summer hikers and horseback riding use the area. Site seeing via well maintained roads (generally limited to Fall Creek Road and the River Road), although some off road travel occurs on the less developed roads in the analysis area. Fall use is directly related to big game hunting season. Dispersed camping is more wide spread and trail use is limited to those hunting elk, moose and deer. Illegal cross-country travel is at its highest point during this period of time. Total public use is less than summer use, but is more concentrated around the beginning of each hunting season. Winter use is snowmachine travel with a limited amount of Nordic skiing on developed roads near easy access points. Much of the analysis area is within the Fall Creek big game wintering range and as such is closed to cross-country travel by snowmachines. Human entry during winter is also restricted. Some designated snowmachine routes have been identified through the winter range and are used by the public during the winter months. Illegal cross country travel does occur on the winter range, but is small in numbers and is limiting due to lack of snow and/or snow depth on south and west aspects. Spring recreation is very limited in the area and has the smallest public use of any seasonal period. Big Game horn hunting is the winter range is about the only use that occurs. Much of the illegal cross-country travel occurs during this time period.

The analysis area has less tree cover than adjacent watersheds to the south and is bordered by private open lands to the north; hence access is much easier from many locations than adjoining watersheds on the forest. Fall and summer use is similar to the remaining part of the Caribou Subsection. Winter use is much less in the analysis area, while spring use is higher because of the winter range.

Recreational outfitting is authorized in the analysis area and in most parts of the Caribou subsection. Hunting outfitting is authorized south of the Fall Creek road in the analysis area. No winter outfitting is allowed.

Firewood gathering has been allowed in parts of the analysis area, but is very limited due to the lack of roads and sparse tree cover.