STEP 3 - Current Conditions

INTRODUCTION
This step describes the current range, distribution, and condition of the aquatic, terrestrial, and human ecosystem elements within the watershed as related to the identified issues. This step is organized by the Key Question categories as presented in Step 2. The Key Questions are used to define the scope of the analysis.

AQUATIC RESOURCES

This section is organized into three subsections: **Watershed Health**, **Riparian Reserves**, and **Aquatic Species**. The Watershed Health subsection discusses the current state of upslope erosion processes and disturbances as they relate to impacts on downstream uses. This subsection considers the effects of both public and private lands over all subwatersheds within Beaver Creek. Nine subwatersheds have been deline-ated for the Beaver Creek watershed. The subwater-sheds are displayed in Figure 3-1 Subwatersheds and Areas with Watershed Concerns (located in the Map Packet at the end of this document) and the acreage of each is displayed in Table 3-1. Subwatershed Acreage.

Table 3-1 Subwatershed Acreage

Subwatershed	Total Acres	%NF (BLM)	%Pvt.
Cow Creek	8,140	98	2
Long John	5,680	98	2
Grouse Creek	6,520	85 (4)	15
Hungry Creek	7,090	46 (1)	54
Bumblebee	10,080	56 (<1)	44
Jaynes Canyon	7,010	59	41
Upper West Fork	4,820	48	52
Lower West Fork	8,270	46	54
Buckhorn	12,090	52	48
TOTAL	**69,700**	**64 (1)**	**36**

The Riparian Reserve subsection discusses the riparian areas on both public and private land as approximated by the interim Riparian Reserve boundaries. The Aquatic Species subsection discusses the presence of fish and amphibians as currently known, and the condition of their habitat.

Key Question 1- What are the long-term erosional processes in the watershed?

The geology and geomorphology of the Beaver Creek watershed, like the rest of the Klamath Mountains, is a complex of intrusions, contact and shear zones, large dormant slides, moderate to steep mountain slopes, inner gorges, glacial deposits, and floodplain alluvium. The Rattlesnake Creek terrane is a complex of shear zones and intrusions occupying about 45% of the watershed. Most of this terrane is metamorphic rocks but includes ultramafic (serpentine) intrusions over about ten percent of the watershed. The Mount Ashland granitic pluton is the primary intrusion in the Beaver Creek watershed, occupying the eastern 30%, mostly as one massive body but also exposed in isolated intru-sions within the Rattlesnake Creek terrane. The Condrey Mtn. schist is a relatively uniform bedrock type occupying the western 25% (see Figure 3-2 Bedrock Geology).

Beginning approximately 14 million years ago and continuing through the present, this area of the Klamath Mountains has been uplifted. Condrey Mountain is the center of the uplift event. The current rate of uplift is thought to be at a much slower rate than the periodic events that have occurred in the past. The increased relief has led to down-cutting of stream channels and increased stream gradients. The results of the down-cutting can be seen throughout the watershed in the vast network of inner gorges, steep slopes, and active or dormant landslides with few floodplains or terraces.

Dormant landslides, mountain sideslopes, and inner gorges make up the majority of the landforms in Beaver Creek. Dormant landslides are an extensive landform feature within the Rattlesnake Creek terrane and Condrey Mountain schist. Few dormant slides are present within the area of the Mt. Ashland pluton where mountain sideslopes and inner gorges are the most common landforms (see Figure 3-3 Geomorphic Terranes). Some glacial deposits are present in the Siskiyou Crest zone. These were formed by glacial movement in the Ice Ages that ended about 10,000 years ago. A small amount of stream terraces and active slides make up the remainder of the geomorphic terranes. Table 3-2. Percentage of Geomorphic Terrane by Subwatershed, summarizes the percentage of each geomorphic terrane for the subwatersheds in Beaver Creek.

Table 3-2. Percentage of Geomorphic Terrane by Subwatershed

Sub-watershed	Active Land-slides %	Dorm. Land-slides %	Inner Gorge %	Gran. Mtn. Slope %	Non-Gran. Mtn. Slope %	Glac. Terr-ace %
Cow Creek	<1	24	8	4	43	21
Long John	<1	10	10	63	12	4
Grouse Creek	<1	3	12	81	<1	4
Hungry Creek	0	0	9	90	1	0
Bumblebee	1	36	13	20	30	0
Jaynes Canyon	<1	62	9	0	23	6
Upper West Fk.	<1	53	10	<1	34	2
Lower West Fk.	<1	48	11	<1	38	3
Buckhorn	<1	48	12	4	36	<1

The dominant long-term erosional processes in the watershed are stream downcutting and consequent landsliding on the steepened slopes. The large, currently dormant earthflows shift periodically during wet climatic periods and toe-zones of the flows contribute debris slide material to streams. In the granitic area of the watershed, where there are few dormant slides, stream scour and surface erosion appear to be the primary erosion processes. The sensitivity of granitic soil to disturbance, such as natural wildfire, allow for periodically high erosion rates.

Debris slides are activated in all terrane types during flood events, especially on active landslide, inner gorge, and toe zones of dormant slide terranes, and release large amounts of sediment to adjacent streams. This sediment often causes a debris torrent with additional stream downcutting. Eventual deposition occurs in the low gradient, lower reaches of Beaver Creek, West Fork, and Hungry Creek forming those stream's small floodplains and terraces.

Key Question 2- What are the accelerated erosional processes and rates as influenced by disturbance?

Fire, mining, and grazing are all disturbances which have had major impacts on erosion rates in the past but relatively minor impacts currently. The last major fire (greater than 100 acres) in Beaver Creek was the Dutch Creek Fire of 1955 (a.k.a. the Haystack Fire). It burned several thousand acres along the lower reach of Beaver Creek. This fire has little impact on erosion processes currently. Mining was a large erosion source early this century but current effects are mainly slow regeneration and instability in riparian areas. Grazing was once very intensive in the watershed, especially along the Siskiyou Crest, but has minor erosion impacts currently. There are about 250 acres of barren area/exposed soil along the Siskiyou Crest as mapped in the vegetation layer. These areas are a chronic erosion concern but the impacts of past grazing on them is unknown.

The disturbances that contribute to the majority of current accelerated erosion are roads and timber harvest. Road construction began over 100 years ago and the current transportation system contains nearly 440 miles of roads, including National Forest, cooperative, and private roads but not unmapped skid trails. Roads can contribute to increased landsliding, especially in granitic soils. According to data from the Salmon River, a watershed about 40 miles south and west of Beaver Creek, road-related landslide rates range from 60 to 800 times greater than undisturbed rates in granitic soils (de la Fuente and Haessig 1991). In other geomorphic terranes, increases in landslide rates range from 2.3 to 80 times greater with roads than in undisturbed areas. Refer to Appendix C - Cumulative Watershed Effects, for actual values by terrane type. Several factors influence road-related landslide rates besides geomorphic terrane including road design specifications, road width, sizes of cuts and fills, fill compaction, and culvert sizes. Specific road parameters are not included in the Salmon River landslide study so their influence on landsliding is not quantified.

Roads also increase surface erosion, both on the road surface and on cut and fill slopes. Roads through granitic soils are the most susceptible to erosion although Condrey Mtn. schist also makes an easily eroded road surface. Most roads in Beaver Creek have well vegetated cuts and fills and many roads have been treated in recent years (outsloped, narrowed, inboard ditches removed, rock armored) to reduce road erosion. However a comprehensive database for road conditions in Beaver Creek is not available for this analysis.

Roads influence channel erosion by increasing streamflows during rainfall or snowmelt. Roads concentrate water on the road surface or in a roadside ditch, increasing the amount of water reaching a channel. But the greatest channel erosion caused by roads occurs when a road-caused debris torrent scours a channel below the debris source, often when a culvert plugs and high water washes out the road fill over the culvert. Preliminary surveys indicated that many culverts in Beaver Creek are undersized and may fail during large (ten year recurrence interval or greater) flood events. Granitic terranes are the most susceptible to channel scour but the Condrey Mtn. schist type is also easily scoured. The Rattlesnake Creek terrane is less susceptible due to greater amounts of competent rock.

Recent Watershed Improvement Needs (WIN) inventories identified several hundred projects to help decrease erosion from roads in Beaver Creek. The inventories have been done on all Forest Service and cooperative roads on National Forest, Fruit Growers Supply Company, and Timber Products lands. The small number of roads on other private property have not been inventoried.

In summary, the majority of identified watershed improvement projects involve decreasing erosion (mostly gullying) on road cut and fill slopes. A large number of the projects are intended to decrease damage to the road driving surface while decreasing erosion. Prioritization and scheduling of the WIN projects has been completed and some improvement projects have been implemented. Industrial forest land owners have been completing WIN projects coincident with timber harvest projects. On National Forest lands, project completion is dependent upon funding. The WIN records are available in the Oak Knoll District files.

Landslide rates have increased in the Salmon River following timber harvest. Granitic terranes are again the most sensitive with increases ranging from 9 to 20 times over undisturbed landslide rates, according to the Salmon Sub-basin Sediment Analysis (de la Fuente and Haessig 1991). Other geomorphic terranes range from 1.2 to 7 times greater for harvest related rates compared to undisturbed. The Salmon River study evaluated

those areas of intensive timber harvest (clearcuts or other significant reduction of overstory) lumped with areas impacted by stand replacing fire. Partial cuts or low intensity wildfires were assumed to have a small impact on landslide rates. Landsliding has not been studied in detail in the watershed so landslide rates are assumed to approximate the landslide rates in the Salmon River.

Surface erosion increases with timber harvest and associated fuel treatments but at highly variable rates depending on residual soil cover, time since treatment, and soil type. Timber harvest that leaves soil cover mostly intact will have little increased soil erosion compared to highly ground disturbing harvest and fuel treatment. Since soil erosion increases from timber harvest usually return to background levels within a few years, the amount of increased erosion is very time-dependent. Granitic soils are again the most sensitive to surface erosion increases, closely followed by soils derived from Condrey Mountain schist.

Channel erosion can increase due to higher peak flows following canopy removal. Harvested areas allow increased snowmelt rates and decreased interception of precipitation than fully forested areas, especially during rain-on-snow storms; skid trails and fuel treatments can decrease infiltration and increase runoff.

Sufficient information on past timber harvest is available for Beaver Creek to do basic watershed modeling. This information is from the Klamath NF timber database or air photo inventory and considers only intensive timber harvest (clearcuts or other significant reduction of overstory). Harvest is lumped into two categories, that which happened 0-20 years ago, and 20-40 years ago. For this analysis, timber harvest (and fire) which has happened more than 40 years ago is considered recovered. The acreage of intensive timber harvest, including all ownerships, is displayed by time period for each subwatershed in Table 3-3. Subwatershed Road Density and Timber Harvest.

Table 3-3. Subwatershed Road Density and Timber Harvest

Subwatershed	Rd. Density (Miles/Sq.Mi.)	Intensive Harvest Acreage 1975-95	1955-74
Cow Creek	3.0	630	240
Long John	3.9	330	320
Grouse Creek	3.5	740	10
Hungry Creek	4.4	170	360
Bumblebee	4.9	560	1,040
Jaynes Canyon	4.2	670	770
Upper West Fk.	4.3	400	300
Lower West Fk.	4.4	91	1,220
Buckhorn	3.6	720	2,910
TOTAL	**4.0**	**4,310**	**7,170**

Flooding is both a disturbance in itself and the ultimate cause, in combination with other disturbances, of major erosion events. The 1964 flood created or enlarged many active landslides and had a major impact on the Beaver Creek stream system. But it is difficult to separate flood effects from the combined effects of flooding and other disturbance. In general terms, disturbances magnify the effects of flooding. Some landslides would have occurred in Beaver Creek during the 1964 flood even under pre-Euro-American settlement conditions, but the amount of landsliding may have been increased by roading and timber harvest. Likewise, instream channel effects would have occurred under pre-settlement watershed conditions but increased landsliding and mining induced riparian instability magnified flood effects. The residual impacts of the 1964 flood are active landslides which have not recovered and riparian conditions that retain noticeable flood effects.

Localized flooding in 1989 resulted in a debris torrent down Grouse Creek with impacts to Beaver Creek, all the way to the Klamath River. The cause of this debris torrent was a severe summer thunderstorm falling on a recently harvested section of granitic soils. Some impacts would have been noted with such a severe storm even under pre-settlement conditions but the timber harvest and roads greatly magnified the impacts. High levels of sand currently impacting water quality and fish habitat in Beaver Creek are in part due to this event. Grouse Creek still contains unstable banks, and even with a constructed settling pond catching sediment, annually contributes large amounts of sand to Beaver Creek.

<u>Key Question 3-</u> What areas in Beaver Creek are considered Areas with Watershed Concerns (AWWCs) in the *Forest Plan* and what additional areas should be evaluated in this process?

The *Record of Decision* for the *Forest Plan* identified two areas within Beaver Creek as Areas with Watershed Concerns (AWWCs). The areas identified were the east 1/4 and the southwest 1/3 of the watershed (see Figure 3-1 Subwatersheds and Forest Plan Areas with Watershed Concerns, located in the Map Packet at the end of this document). This determination was based on cumulative watershed effects of land disturbing activities, and the condition of the stream system and fish habitat. The AWWCs determination put restrictions on additional land disturbing activities, specifically timber harvest, on the National Forest lands until an analysis of the watershed had been completed.

The strategy for a watershed scale review of Areas with Watershed Concerns is to reevaluate the subwatersheds overlapping the *Forest Plan* AWWCs along with other subwatersheds which have high disturbance levels and watershed sensitivities. Each watershed analysis examines the watershed conditions, processes, and functions for all subwatersheds which are possible AWWCs. The analysis determines which subwater-sheds should presently be considered AWWCs and discusses recovery criteria. Determination through watershed analysis that an area has watershed concerns is not a planning decision. The determination advises managers that a subwatershed may not meet Aquatic Conservation Strategy objectives if land disturbance occurs. Future analyses will determine if an AWWCS has recovered.

The factors used to determine AWWCs are the roads, timber harvest, riparian conditions, quality of aquatic habitat, and watershed sensitivities. Road density and acres of timber harvest for each subwatershed are displayed previously in Table 3-3. Each subwatershed has a moderate to high road density and level of timber harvest so all will be evaluated for AWWCs consider-ation. The riparian conditions and aquatic habitat will be discussed in their own sections in this document and integrated into the AWWCs determination in Step 5. The watershed sensitivity parameters are beneficial uses, channel sensitivity, soil erodibility, hydrologic response, and slope stability.

The index for beneficial use is determined by estimating the potential of a watershed or subwatershed to impact different classes of beneficial use streams. The main stem of Beaver Creek, from the junction of Grouse and Cow Creeks to the mouth, and West Fork Beaver Creek to Jaynes Canyon are considered very highly significant beneficial use streams (Class 1A) because they are highly productive anadromous streams. Cow Creek up to a point above Long John and a small portion of Jaynes Canyon are considered highly significant streams (Class 1B) because they are moderately productive anadromous streams. The remaining anadromous streams are considered moderately significant (Class 2) because they are low productive. Beaver Creek rates as a very high beneficial use watershed because a Class 1A stream is entirely within the drainage. The subwatersheds of Beaver Creek contribute only portions of the drainage area to the Class 1A stream reaches so rate a high or lower. Refer to Appendix C for details of this rating system.

The channel sensitivity index is from stream surveys and local knowledge. Grouse Creek has unstable banks and a high sensitivity resulting from the 1989 debris torrent. Hungry Creek has unstable banks due to granitic soils and continued fillslope sloughing of the primary road along the stream. Most remaining major stream reaches have some instability problems, often due to close proximity of streams to roads. Cow Creek is the most stable major stream reach.

The soil erodibility index varies by geology and soil type. Granitic soils are considered the most easily eroded, Condrey Mtn. schist somewhat less, and Rattlesnake Creek terrane soils the least. All or most of the Long John, Grouse, and Hungry subwatersheds are in granitic soils so rate a very high. All or most of Jaynes Canyon, Upper and Lower West Fork, and Buckhorn are in Condrey Mtn. schist soils so rate a high. Cow Creek and Bumblebee are mostly within the Rattlesnake Creek terrane so rate moderate.

Hydrologic response depends on the amount of each subwatershed in the rain-on-snow zone, between 3,000 and 4,500 feet elevation. Cow Creek, Long John, and Jaynes Canyon are mostly above this zone and rate a low. The Grouse Creek and Upper and Lower West Fork subwatersheds are between 1/4 and 1/2 within this zone and rate a moderate. The rest are over half in the rain on snow zone and rate a high.

The slope stability index depends on the amount of active landslide, inner gorge, and toe zone of dormant slides in each subwatershed. Hungry Creek has relatively little inner gorge and active slides so rates a moderate. The other subwatersheds have a high or very high proportion of unstable geomorphic terranes.

Each of the watershed sensitivity indices are used in the watershed modeling discussed in Step 5 and explained in Appendix C. The indices are displayed in Table 3-4. Subwatershed Sensitivities.

Table 3-4 Subwatershed Sensitivities

SUBWATERSHED	Bene-ficial Uses	Chan-nel Sensi-tivity	Soil Erodi-bility	Hydro-logic Res-ponse	Slope Sensi-tivity
Cow Creek	H	L	M	L	H
Long John	H	M	VH	L	H
Grouse Creek	H	H	VH	M	H
Hungry Creek	H	H	VH	H	M
Bumblebee	H	M	M	H	VH
Jaynes Canyon	H	M	H	L	VH
Upper W Fk.	H	M	H	M	H
Lower W Fk.	H	M	H	M	VH
Buckhorn	M	M	H	H	VH
TOTAL	**VH**	**M**	**H**	**M**	**VH**

VH=Very High H=High M=Moderate L=Low

RIPARIAN RESERVES

Key Question 1- What are the current character-istics of the riparian areas in the watershed, including the *Forest Plan* Riparian Reserves?

There are 15,160 acres of interim Riparian Reserves mapped for this analysis. This area includes private as well as public lands that meet the criteria for interim Riparian Reserves in the *Forest Plan,* even though the Riparian Reserve land allocation only applies to National Forest and BLM lands. This does not imply that private lands are bound by Standards and Guidelines for Riparian Reserves in the *Forest Plan*, rather this boundary is used to analyze the riparian area as approximated by the interim Riparian Reserves.

The interim Riparian Reserves for Beaver Creek include: 300 feet on each side of fish-bearing streams and around lakes and natural ponds, 150 on each side of non fish-bearing perennial streams, 120 feet (approximate height of site-potential trees in Beaver Creek) on each side of intermittent streams and ditches, and the extent of riparian (wetland) vegetation and unstable or potentially unstable areas. The streams and lakes used for the interim Riparian Reserve boundary include those mapped on USGS 1:24,000 quadrangle maps, attributed as fish-bearing, other perennial, or intermittent. Several other intermittent stream segments were added based on Digital Elevation Model (DEM) accumlation of 20 acres, assuming annual scour streams begin after about 20 acres of drainage area. The riparian vegetation includes those areas identified as riparian vegetation in the intensive Beaver Creek riparian mapping. The unstable and potentially unstable areas are active landslides, inner gorges, and toe zones of dormant slides as currently mapped by the Forest geology staff. All of the interim Riparian Reserve mapping is approximate, subject to change upon ground verification.

There are currently about 98 miles of roads in the mapped Riparian Reserves. This is a road density of about 4.1 miles per square mile, a very high road density similar to the watershed as a whole. The primary arterial road through the watershed and several collector roads (see Human - Roads section) are parallel to and within the riparian area of the primary streams, mainstem Beaver Creek, West Fork, and Hungry Creek. In places the fill slopes of these roads constitute one bank of the stream. Most of the other roads cross streams but do not run parallel.

The vegetation mapping used for the Terrestrial portion of this analysis is also used to describe the current conditions of the interim Riparian Reserves (refer to the Terrestrial Vegetation section for details on the vegetation mapping). Five classifications are used to describe interim Riparian Reserve vegetation: conifer stands <17" DBH and <60% crown closure (CC), <17" and >60%, >17" and <60%, >17" and >60%, and hardwoods, shrubs, grass/forbs, or barren. Figure 3-4 Riparian Reserve Vegetation (located in the Map Packet at the end of this document) displays Interim Riparian Reserve vegetation classes and table 3-5. Interim Riparian Reserve Vegetation Acreage, displays acreage and percentage of each vegetation classification.

Table 3-5. Interim Riparian Reserve Vegetation Acreage

Vegetation Grouping	Acreage *	% Riparian Reserve
Conifers <17", <60% CC	3,550	23
Conifers <17", >60% CC	1,430	9
Conifers >17", <60% CC	1,160	8
Conifers >17", >60% CC	7,070	47
Hardwoods, Shrubs, Grass/Forbs, Barren	1,950	13
TOTAL	**15,160**	**100**

***** The vegetation mapping does not differentiate roads from the adjacent vegetation so the approximate 390 acres of road surface, cut and fill (assuming 33 feet road corridor width) is distributed among all vegetation groupings.

The conifer type includes conifer/hardwood mix, mixed conifer, and true fir. The hardwood, shrub, grass/forb, and barren group includes wetland associated species as well as upland species. The vegetation mapping used for this grouping did not differentiate between wetland and non-wetland communities.

Intensive riparian area mapping was done on about 1,480 acres (about ten percent of the interim Riparian Reserves) along the primary Beaver Creek streams (see Figure 3-4). The 15 plant associations defined during this task are combined into four groups for this analysis; highly disturbed weed and shrub sites, moderately

disturbed shrubs and hardwoods, natural wetland associations, and conifer or conifer/hardwood sites. The acreage and percentage of each type is displayed in Table 3-6. Riparian Vegetation Mapping Acreage.

Table 3-6 Riparian Vegetation Mapping Acreage		
Plant Association Grouping	**Acres**	**% Riparian Mapping**
Highly Disturbed Weeds/Shrubs	40	3
Moderately Disturbed Shrubs/ Hdws.	330	22
Plant Association Grouping	**Acres**	**% Riparian Mapping**
Natural Wetlands Associations	450	30
Conifer or Conifer/Hardwood Sites	660	45
TOTAL	**1,480**	**100**

Highly disturbed sites are slowly recovering mine spoils or flood deposits. They are occupied by weed species, cheat grass, and some Hind's willow. Moderately disturbed sites have recovered somewhat from disturbances, generally flooding, mining or logging, but are not yet up to site potential. They are often well occupied by early seral riparian species, white or thinleaf alder, cottonwoods, willows, maples, and forbs, but are absent of conifers. The natural wetland associations are occupied by willows, sedges, thinleaf alder, or quaking aspen. They are generally on sites too wet to support conifers. The conifer sites include ponderosa pine, Douglas-fir, incense-cedar, white fir and red fir as overstory trees with alders, maples, willows, and other wetland shrubs and forbs as understory species.

Some riparian planting has been accomplished in Beaver Creek. Planted areas are along Beaver Creek about 1 1/2 miles from the mouth, along Grouse and Cow Creeks a short distance upstream of the junction of each, and along Hungry Creek about a mile upstream of its junction with Beaver Creek. Total area planted is less than 40 acres. The emphasis is to revegetate highly disturbed areas, and at the Hungry Creek planting site, help improve streamside vegetation following road reconstruction.

AQUATIC SPECIES

Key Question 1- What is the role of the watershed for aquatic species?

Beaver Creek and its tributaries provide 31 miles of anadromous habitat for spring and fall run chinook salmon, winter and summer run steelhead, winter coho salmon, and Pacific lamprey. Presently self supporting populations of spring chinook and summer steelhead do not exist in Beaver Creek, however, there have been sporadic observations of these individuals over the last 5 years. There are 54 miles of habitat provided for other native fish species including rainbow trout, speckled dace, Klamath small-scaled sucker, marbled sculpin, and Pacific brook lamprey (refer to Figure 3-5 Fish Species Range Map, located in the Map Packet at the end of this document).

Summer steelhead and spring chinook salmon are Regional Forester-designated Sensitive Species. Spring and fall run chinook salmon, winter and summer run steelhead, and coho salmon have all been petitioned for listing under the Federal Endangered Species Act (ESA). The Klamath Mountain Province Evolutionarily Significant Unit of Steelhead, both summer run and winter run, and coho salmon have been proposed for Threatened status.

The Beaver Creek watershed analysis area provides spawning, rearing and holding habitat for both adult and juvenile fish. Anadromous fish species present in the Beaver Creek watershed are listed in Table 3-7. Anadromous Fish Species/Months Present.

Table 3-7. Anadromous Fish Species/Months Present	
Fish Species	**Months Present**
Adult spring chinook salmon	June - Sept.
Adult fall chinook salmon	Oct. - early Dec.
Adult coho salmon	Nov. - Jan.
Adult summer steelhead	July - May
Adult winter steelhead	Nov. - May
Adult Pacific Lamprey	April - June

Anadromous young are found within the system year-round, steelhead juveniles remain up to three years and lamprey young (ammocoetes) remain up to seven years before outmigrating to the ocean.

Beginning in 1988 to present, fall chinook spawning surveys have been conducted from October to mid-December in mainstem Beaver Creek. The number of redds and their locations, along with carcass informa-tion, have been collected. From these surveys California Department of Fish and Game estimated the number of chinook returning to Beaver Creek to spawn. Table 3-8. Chinook Spawning Survey Results, shows both the number of redds and the escapement estimates by year. Seventy-seven percent of redds were found in reach 1,

Beaver Creek Campground to the mouth, 22% in reach 2, Soda Creek to Beaver Creek Campground, and 1% in reach 3, Grouse Creek to Soda Creek.

Table 3-8. Chinook Spawning Survey Results

Year	# of Redds	Escapement Estimate
1981	16	N/A
1982	562	N/A
Year	**# of Redds**	**Escapement Estimate**
1983	420	N/A
1984	275	N/A
1985	1,505	N/A
1986	1,673	N/A
1987	1,359	N/A
1988	36	538
1989	9	140
1990	0	2
1991	35	2
1992	44	16
1993	173	346
1994	136	260
1995	408	817

From 1990 to present, similar steelhead spawning surveys have been conducted sporadically during the months of January to April on mainstem Beaver Creek. Because the relative success of completing these surveys is highly dependent on spring flow conditions, these data are very spotty, however, steelhead are utilizing Beaver Creek for spawning. Table 3-9. Steelhead Spawning Survey Results, show the number of redds identified in mainstem Beaver Creek. Nineteen percent of the redds were in each of reaches 1 and 2, while 62% were in reach 3.

Table 3-9. Steelhead Spawning Survey Results

Year	# of Redds
1990	57
1991	3
1992	2
1993	0

The watershed also provides habitat for several amphi-bian and reptile species. For discussion, herpetofauna that have an association to riparian areas in the watershed can be divided into two categories, aquatic related amphibians, and aquatic related reptiles. Terrestrial related amphibians will also be discussed .

Aquatic related amphibians including red-legged frog, yellow-legged frog, and tailed frog occur at higher elevation springs, seeps, and creeks where there is cool water, high dissolved oxygen levels, and moderate to low gradients. The south facing slope of the Siskiyou Crest zone provides these habitats especially in the headwaters of Cow and Grouse Creeks, Long John and West Long John Creeks, and Red Mountain and Little Red Mountain Creeks. Mid-elevation streams with cool water temperatures and high gradients provide ideal habitat for tailed frog, Pacific giant salamander, Pacific chorus frog, long-toed salamander, and western toad. Areas in Jaynes Canyon, West Fork Beaver, Trapper, Hungry and Grouse Creeks meet these criteria.

Aquatic related reptiles that occur in the watershed are Pacific Coast aquatic garter snake, western terrestrial garter snake, and western pond turtle. Both species of garter snakes are highly tied to riparian habitat. Western pond turtles inhabit streams of lower gradient such as mainstem Beaver below the West Fork. During local migration periods they may travel to higher elevations. They are a candidate species under the Federal Endangered Species Act and are Regional Forester designated sensitive.

The group of terrestrial related amphibians occur in upland areas and may have a portion of their lifecycle in an aquatic setting. The most common species in the watershed are black salamander and ensatina. They do not require open water at any stage of their life cycle but occur in rock talus soil types or under downed logs that may be located near seeps, and springs, especially on toe zones of dormant slides.

The Siskiyou mountain salamander has been found in areas near the watershed but not in the watershed itself, although much habitat for the species exists and should be further explored. The Siskiyou mountain salamander is a rock talus obligate, that may be associated with high percentages of canopy closure and has a high likelihood of occurring within stabilized landslides. It is listed as a State of California Threatened species. Currently there is a habitat association study being conducted by Pacific Southwest Research Station, US Forest Service, Fruit Growers Supply Company, Timber Products, and both Oregon and California State game agencies. Beaver Creek may be the eastern fringe of this species range.

Key Question 2- What are the current habitat conditions for aquatic species?

Some quantitative information on water quality, including water temperature, is available for the watershed. Water temperatures were continuously recorded near the mouths of streams during 1994. Temperatures ranged from lows near 0°C in winter months to highs near 23°C in late summer. Table 3-10. Stream Temperatures, displays the average three day high temperatures where recorded. All temperatures were recorded during July. Most salmonids are placed in life-threatening conditions when temperatures exceed 23-25°C (Meehan 1991). Temperatures near lethal impair growth rates. The *Forest Plan* states that maximum summer temperatures should be below 70°F (21°C).

Table 3-10. Stream Temperatures

Stream	Temperature
Mainstem Beaver	23°C
Cow Creek	17°C
Hungry Creek	18°C
Grouse Creek	19°C
West Fork Beaver	19°C

Water rights have been issued for a total of 14.37 cubic feet per second (CFS) in the basin, mostly for domestic and irrigation purposes. Average annual low flow for Beaver Creek is 25 CFS, usually during September. During drought years and with diversions the low flow has been measured down to nine CFS. During August and September flow rates at the mouth of Beaver Creek are less than those measured in Beaver Creek above Hungry Creek. Low flows contribute to higher stream temperatures and low water barriers to returning chinook salmon.

Physical habitat inventories and biological surveys were conducted in Beaver, Deer, Long John, West Long John, Hungry, West Fork Beaver, and Cow Creeks during summer low flow conditions. These inventories provide quantitative information of key aquatic habitat para-meters and fish species and location that can be used to assess overall suitability of stream habitat from a fisheries perspective. Important parameters for fisheries habitat included in this analysis are in-channel large woody material (LWM), pools, surface fines, and embed-dedness. Appendix D - Fisheries Habitat, displays the detailed survey results and how they were conducted.

LWM is important for providing cover and habitat complexity in fish-bearing streams. According to a 1989 survey, Beaver Creek from the mouth to Grouse Creek contained an average of 1.5 pieces per 1,000 feet of stream. This was well below the 20 pieces per 1,000 feet criteria referenced in the *Forest Plan*. Many debris jams and other accumulations of wood were removed from Beaver Creek after the 1964 flood. More recently, extensive restoration projects have been undertaken in Beaver, Cow , and West Fork Beaver Creeks to mitigate the insufficient amount of LWM. A total of 343 instream structures, including log/boulder weirs, boulder clusters, mini debris jams, and woody channel margin structures have been placed. Blowdown and other natural sources have added LWM to streams in recent years.

Pools are an important habitat component, providing rearing and holding habitat. The criteria referenced in the *Forest Plan* is one pool every three to seven bank- full widths. All streams, including mainstem Beaver Creek, have pool frequencies much greater than the stated criteria (refer to Table 3-11. Average Fish Habitat Parameters). Only about 11% of the length of mainstem Beaver is made up of pool habitat while approximately 58% is riffle habitat. The remaining 31% is run habitat.

Table 3-11. Average Fish Habitat Parameters

Sub- watershed	Avg. Chan. Width *	Percent Substrate Composition Fines	Gra-vel	Cob-ble	Boul-der	Bed-rock	Percent Embed-dedness
Beaver	38	34	14	23	26	3	53
W Fk Beaver	16	22	15	27	23	13	34
Long John	64	38	20	22	15	5	54
WLong John	27	40	10	17	28	5	63
Deer	63	50	14	20	16	0	52
Hungry	93	34	16	11	18	21	42
Cow	21	29	8	25	26	12	48

Table 3-11 also shows the average percentages of substrate composition across all habitat types for the surveyed streams. The *Forest Plan* criteria calls for less than 15% fines as the area weighted average in spawning habitat. A high amount of fines in spawning beds limit egg survival and is a major limiting factor of fish production in this watershed. West Long John and Deer Creeks have the highest percentages of fine sediment; mostly granitic sand.

As a result of the high amounts of fine sediment in the Beaver Creek system, embeddedness levels are very high. Highly embedded substrate limits food production and hiding cover for small fish. The *Forest Plan* criteria is less than 20 percent embeddedness. All surveyed stream reaches are well in excess of this criteria, as displayed in Table 3-11.

AMPHIBIANS - Many diverse habitats and conditions exist for herpetofauna throughout the watershed. These conditions range from high elevation wet meadows where streams originate from springs, and mid-elevation high gradient streams, to low elevation, low gradient streams. Herpetofauna guilds are closely linked to specific habitat conditions and are generally found in areas of good water quality. Western toad, Pacific giant and long-toed salamanders require pools that are cool and high in oxygen for adequate breeding conditions. Tailed frogs are highly indicative of good quality stream condition. Surveys in Beaver Creek were first conducted in 1989 by Dr. Hartwell Welsh where he documented them in many areas throughout the mid and upper elevations of the watershed. Recently they have been documented near Flystain Creek (Buckhorn subwater-shed), and in the Cow Creek subwatershed.

TERRESTRIAL RESOURCES

VEGETATION

<u>Key Question 1-</u> What is the current vegetative conditions within the watershed?

Current vegetative communities have been identified through landsat data and aerial photo interpretation. For this analysis, six vegetation communities have been identified. Region 5 tree mortality flight survey protocol, was used to identify conifer mortality in the watershed. Information from these flights helps in providing information as to the conditions of the communities. Table 3-17. Mortality on Public Land by Vegetation Community, displays this information. Table 3-12. Vegetation Communities, is a breakdown of the six communities by elevational range, acreages, and percentage of watershed; Barren areas account for 650 acres.

Table 3-12. Vegetation Communities

Vegetation Type	Elevation Range	Acres*	Percent of Watershed

Hardwood	1,500-4,000	2,550	4
Hardwood/Conifer	1,500-4,000	8,840	13
Mixed Conifer	3,000-6,000	38,520	55
True Fir	5,000-7,500	11,130	16
Shrub	5,000-7,000	5,040	7
Grass/Forb	5,000-7,500	2,920	4
TOTAL w/Barren	--	**69,650**	100

***** Elevational range for each community is the range where majority of the community exists (>50%). Acreages include all acres, both inside and outside elevational range.

In the Beaver Creek Watershed, vegetation communi-ties are dependent upon elevation, precipitation, and exposure. The watershed ranges in elevation from 1,680 to 7,530 feet, and average annual precipitation varies from 24" in the lowest elevations to >60" at the highest elevations. The watershed has numerous tributaries disecting the terrain, creating a variety of exposures, with south exposures the most common (36% of the watershed). Most of the watershed is capable of growing conifers, exceptions are locations that historically have been maintained with grass/forb and shrub communities.

Table 3-13. Seral Stage Description, describes the seral stages used in this analysis. Each community description, except for shrub and grass/forb, includes a table describing the seral stages and densities within each seral stage.

Table 3-13. Seral Stage Description

Seral Stage	DBH
Early-Seral	<11"
Early/Mid-Seral	11" - 17"
Mid/Late-Seral	17" - 24"
Late-Seral	>24"

Hardwood Community - This community is found mostly in the lower elevations of the watershed where much was burned in the Dutch Creek Fire (part of the Haystack Fire 1955). Oregon white oak is the dominant species on sites with good soils, occurring with both greenleaf and whiteleaf manzanita, deerbrush, and scattered grasses and forbs. On good sites, tree densities increase, with some areas having complete crown closure. On harsher sites, canyon live oak is the dominant species, with inclusions of pacific madrone, and scattered grasses and forbs.

Snags and downed woody material are generally sparse throughout the hardwood community. Table 3-14. Hardwood Community Acreage by Seral Stage and Density, identifies acreage and densities for the hardwood community. This table indicates most of the community is in early-seral and has greater than 40% crown-closure; mainly based on tree size. Although the majority of trees are 40 years old, they remain in the smaller size class due to site limitations.

Table 3-14. Hardwood Community Acreage by Seral Stage and Density

Seral Stage	Acres	%	Density	Acres
Early	2,350	92	>70 40-70 20-40	140 1,790 420
Early/Mid	210	8	>70 40-70 20-40	90 90 30

Hardwood/Conifer Community - These hardwood dominated areas are found at low elevations within the watershed, mostly on the lower one-third of south aspects. This community is often a transition zone between hardwood and mixed conifer stands. Much of these areas were impacted by the 1955 Dutch Creek Fire and the 1924 West Fork Fire.

The community often occurs in a mosaic-like pattern with small, pure stands of conifers interspersed with small stands of hardwoods. Typically, conifers form the upper canopy and hardwoods comprise the lower canopy. Little understory occurs under the dense, bilayered canopy; however, considerable ground and shrub vegetation can occur in ecotones or following disturbance such as fire or logging. Steeper slopes normally have a light covering of litter; gentler slopes often have considerable accumulations of litter and downed woody material.

Hardwoods occurring are the same as earlier discussed in the Hardwood community. Oregon white oak, California black oak and Pacific madrone are the most common hardwoods in this community, with big leaf maple and red alder found in riparian areas. Ponderosa pine is the main conifer, with Douglas-fir, incense-cedar, and sugar pine also associated with the community. Table 3-15. Hardwood/Conifer Community Acreage by Seral Stage and Density, indicates much of the community is in early/mid to mid/late-seral and is moderately dense.

Table 3-15. Hardwood/Conifer Community Acreage by Seral Stage and Density

Seral Stage	Acres	%	Density	Acres
Early	1270	14	>70 40-70 20-40	0 940 330
Seral Stage	**Acres**	**%**	**Density**	**Acres**
Early/Mid	5190	59	>70 40-70 20-40	1,590 2,890 710
Mid/Late	2180	25	>70 40-70	1,370 810
Late	210	2	40-70	210

Mixed Conifer Community - Klamath mixed conifer makes up the majority of vegetation within the mid-elevations of the watershed. The overstory consists of a mixture of conifers. Dominant conifers on moister north and east aspects, are Douglas-fir and white fir, with small numbers of ponderosa pine, sugar pine and incense-cedar. On drier south and west aspects, ponderosa pine becomes the dominant conifer, with smaller numbers of the other conifers. California black oak is found mixed in both the overstory and understory, more commonly on south and west aspects. Canyon live oak and pacific madrone are found on harsh sites within the community. North and east aspects and the lower one-third of all aspects support dense stands of conifers. These areas often have higher accumulations of snags, litter, and downed woody material than drier south and west aspects.

More open conifer stands often have a very rich shrub layer, which can include; western thimble berry, manzanita, huckleberry oak, golden chinkapin, bitter cherry, and mahalamat. A well developed herbaceous layer can also be present, including; Idaho fescue, tufted pinegrass, and twinflower. Following disturbance such as fire or logging, dense shrubfields often develop.

Table 3-16. Mixed Conifer Community Acreage by Seral Stage and Density, indicates there is a fairly even distribution from early/mid-seral to late-seral. From mid/late to late-seral, the stands are for the most part very dense, with greater than 70% crown-closure.

Table 3-16. Mixed Conifer Community Acreage by Seral Stage and Density

Seral Stage	Acres	%	Density	Acres
Early	3,010	8	>70 40-70 20-40 <20	1,870 550 550 40
Early/Mid	9,590	25	>70 40-70	700 6,780

			20-40	2,110
Seral Stage	**Acres**	**%**	**Density**	**Acres**
Mid/Late	12,680	33	>70 40-70 20-40	9,130 2,850 690
Late	13,250	34	>70 40-70	13,020 230

True Fir Community - This high elevation conifer community is dominated by red fir. The elevational band varies with aspect; widest on north aspects. White fir dominates the lower edge of the band. The presence of red fir defines the community. Western white pine and mountain hemlock are found at highest elevations. True fir communities are typified by even-aged stands of trees that can cover hundreds of acres. The cause of this pattern is probably a history of recurrent lightning fires, windthrows, and insect outbreaks acting to kill groups of trees. The understory often consists of fir seedlings and saplings with sparsley scattered grasses, forbs and shrubs. At higher elevations, where the true fir is dominated by red fir, heavy shade and a thick layer of duff tends to inhibit understory vegetation, especially in dense stands. These normally dense stands often have high numbers of snags and large accumulations of litter and downed woody material.

Table 3-17. True Fir Community Acreage by Seral Stage and Density, indicates 94% of this community is in >17" size class and has a moderate to high density.

Table 3-17. True Fir Community Seral Stages and Densities

Seral Stage	Acres	%	Density	Acres
Early/Mid	690	6	40-70 20-40	110 570
Mid/Late	8,020	72	>70 40-70 20-40	1,200 4,980 1,840
Late	2,450	22	>70 40-70	2,210 240

Shrub Community - Two distinct shrub communities found in the watershed could not be separated in the mapping process. The largest is the riparian shrub community, comprised of riparian shrubfields found at higher elevations. These often occur as alder or willow stringers along streams or seeps. A high diversity of grasses and forbs are common associates in the riparian areas. With reductions in livestock grazing after WWII, this community received very little disturbance during the last 50 years, allowing much of the shrubs to become decadent.

The other shrub community identified is Montane Chaparral. Much of this community is the result of high intensity fire or other disturbance, and possibly shallow soils. In this watershed, much of it is found in areas burned by the Dutch Creek Fire. Whiteleaf manzanita, deerbrush, and greenleaf manzanita comprise the dominant shrubs. Much of this community is found in the Dutch Creek and Sterling Mtn. Fire areas. These fires occurred in 1955, and the community has not received any large fires in the last 41 years.

Grass/Forb Community - Areas typed as this community consist of riparian meadows, young plantations (less than five years old), dry meadows or glades, and harsh sites with little vegetation. Meadows and glades are found at the highest elevations of the watershed, (the crest) between patches of true fir and riparian shrubs. These meadows and glades consist of sedges, grasses, clover, forbs and a few riparian shrubs. Young plantations are found scattered throughout the true fir and mixed conifer communities. Native grasses, forbs, and introduced exotics occupy most of these sites until they are over-topped and shaded out by the conifers planted in these areas. Rocky out-crops and areas of thin droughty soil may have a light covering of scattered grasses and forbs.

Mortality flights done in 1993,1994, and 1995 identified recent mortality on public lands within the watershed. See Table 3-18. Mortality on Public Lands by Vegetation Community, for an acreage breakdown by community.

Table 3-18. Mortality on Public Lands by Vegetation Community

Vegetation Community	Acres High >10%	Acres Mod 5-9%	Acres Low 1-4%
Hardwood	450	280	470
Hardwood/Conifer	920	1,070	1,140
Mixed Conifer	2,180	9,090	9,990
True Fir	70	4,610	5,050
Shrub	200	1,300	1,980
Grass/Forb	180	1,140	800
TOTAL	**4,000**	**17,490**	**19,430**
PERCENT	10%	43%	47%

Levels of mortality are identified on public lands by looking at stands of timber with similar size and density characteristics and determining the percent of mortality within each stand. The percent of recent mortality in conifers determines the ratings of high, moderate and low. Although the hardwood, shrub, and grass/forb communities have few conifers within them, recent conifer mortality is evident. The flights also indicate current mortality is still at low levels, when compared to areas of the forest experiencing much higher levels of mortality.

FIRE

Key Question 1- What is the present fire regime in the watershed?

The past fire regime (prior to European settlement) is characterized as a short return interval (1-25 years) with low to moderate intensity fires. The shortest returns were on low elevation south aspects and longest return intervals were found in riparian vegetation along perrenial streams and high elevation north aspects. The current regime is characterized as a longer, but still short return interval (25-100 years) with moderate to high intensity fires. As a result of fire suppression efforts of the the past 75 years, vegetative biomass has increased in all vegetative types over the previous fire regime.

The analysis area has an extensive system of roads, allowing good access for fire suppression resources. Buckhorn Bally Lookout was established in 1933 and provides excellent coverage for the watershed. Fire suppression forces have been effective in suppressing fires in the watershed.

Where fire starts have overwhelmed fire suppression forces (dry lightning storms), fires escaping initial attack have burned large areas of the Klamath. In the Beaver Creek watershed, recent large fires (greater than 100 acres) have not occurred since 1955.

Key Question 1a- What is the predicted fire behavior potential?

Fire behavior potential modeling is done to estimate the severity and resistance to control that can be expected when a fire occurs during what is considered the worst case weather conditions. Late summer weather conditions are referred to as the 90th percentile weather data, which is a standard used when calculating fire behavior (90th percentile weather is defined as the severest ten percent of historical fire weather, i.e., hot, dry, windy conditions occurring on mid-afternoons during fire season). The modeling incorporates fuel condition, slope class, and 90th percentile weather conditions in calculating projections on flame lengths and rates of spread. A **low** rating indicates fires can be attacked and controlled directly by ground crews building fireline and will be limited to burning in understory vegetation. A **moderate** rating indicates that hand built firelines alone would not be sufficient in controlling fires and that heavy equipment and retardant drops would be more effective. Areas rated as **high** represent the most hazardous conditions in which serious control problems would occur i.e., torching, crowning, and spotting, control lines are established well in advance of flaming fronts with heavy equipment and backfiring may be necessary to widen control lines. For more information on fuel modeling and the development of fire behavior potential for this analysis, refer to Appendix E - Fuel Model Definition/ Process.

Table 3-19. Fire Behavior Potential identifies the areas of high, moderate and low fire behavior potential within each vegetation community.

Table 3-19. Fire Behavior Potential

Vegetation Community	Acres High FBP	Acres Mod FBP	Acres Low FBP
Hardwood	1,900	20	620
Hardwood/Conifer	3,620	2,500	2,730
Mixed Conifer	18,620	17,790	930
True Fir	4,570	6,400	150
Shrub	5,540	300	340
Grass/Forb	2,850	0	70
TOTAL	37,100	27,010	4,840
PERCENT	54	39	7

Key Question 1b- What is the current role of fire, as an ecological process?

Recent fire suppression practices in the watershed (since approximately 1920) have virtually eliminated fire as a significant ecological process. One of the goals of the *Forest Plan*, is "to restore fire to its natural role in the ecosystem, to the maximum extent, consistent with the safety of persons, property and other resources." However, current funding covers required site preparation burning following timber harvest and very little for

restoration of fire into this fire adapted ecosystem. Currently, no funding exists for restoration burning in this watershed.

Checkerboard landownership in the watershed increases the challenge for both private and public land managers when implementing projects that require the use of fire. Due to the need to restrict burning to one ownership, costs are increased when burning is required along boundary areas. For these reasons, projects that require burning are often avoided near or along boundaries.

The removal of fire as an ecological process has increased the cover and density in all vegetation communities. Fire exclusion tends to favor conifer species, hardwood species, and shrubs, at the expense of grasses and forbs. There has been an increase in snags and down logs with successful fire suppression. Snags and down logs are important for the structure and function of hydrologic processes, associated wildlife, and fisheries, although large amounts of dead woody material increase the likelihood of stand replacing fires, especially during drought.

In most stands, an understory of reproduction has developed that had not been allowed with frequent fire intervals of the past. Vertical diversity is extensive throughout the watershed, except where site quality is poor. These dense-canopied stands maintain higher relative humidities and reduce heating and drying of surface fuels by solar radiation and wind, thus are less flammable under most conditions, during this development. As fuels accumulate, however, fires are increasingly likely to become large, more intense, and damaging.

This increase in vegetation has increased competition for moisture and nutrients, causing the vegetation to be more vulnerable to disturbance processes, such as insects, disease, drought, and wind. As these disturbances affect the vegetation, conditions for high intensity fires develop. These high intensity fires are likely to cause type conversion of mixed conifer and true fir stands to montane chaparral.

<u>Key Question 1c-</u> What are the differences between fire suppression forces used in the *Forest Plan* and the forces currently available?

Current budget constraints have not allowed for implementation of the Preferred Alternative of the *Forest Plan* for the fire suppression organization. Table 3-20. Current and Preferred Fire Organization for the Forest indicates the differences between the two.

Table 3-20. Current and Preferred Fire Organization for the Forest

Resource	Current #	Current Staffing	Preferred #	Preferred Staffing
Engines	10	3 person/ 5 day	15	5@ 5 person, or 10@ 3 person /7 day
Watertenders	0	0	6	2 person/ 7 day
Handcrews	0	0	5	5 person/ 7 day
Helicopters	2	5 person/ 7 day	2	5 person/ 7 day
FPTs	6		19	
Lookouts	8	7 days	9	7 days
Air Attack	1	7 days	1	7 days
Reload Base	1		1	
Dispatch Ctr.	1		1	
Total I.A.	70		163	

During the development of the Forest Plan, the Initial Attack Assessment Model of the National Fire Management Analysis System (NFMAS) was used to evaluate the cost of various fire organizations against the potential loss of

resources. The optimum situation is where the expected cost of suppressing wildfires plus net benefit or resource value expected to be lost is minimized. The results indicate the most efficient initial attack fire organization and the budget needed to finance this organization. This organization, identified as the Preferred and "most efficient while considering land and resource values" is designed around the capability to successfully prevent at least 90% of fire starts from becoming escaped fires.

The Preferred organization was also identified as being instrumental in accomplishing natural and prescribed fire objectives of re-introducing fire as an ecological process. The wide margin between the current organization and the preferred indicates that suppression objectives and the implementation of natural and prescribed fire programs will not be met.

Key Question 1d- What are the affects of the interspersed lands on fire suppression activities?

The elaborate road systems on both private and public lands in the Beaver Creek Watershed has allowed for an increase in the ability to suppress fire in this area. Increased access allows for quick responses by equipment and personnel. These roads can at times be utilized as natural breaks (firelines) on small fires. This has also allowed the Oak Knoll Ranger District to be self reliant and not have to depend on other Forest Fire Suppression forces to support fires in this area.

These interspersed lands have also provided barriers in the treatment of activity fuels. Not treating activity fuels increases the fire behavior potential in the activity areas and also in adjoining areas. Besides the examples identified under question 1b, differences in resource values and management objectives may also be creating difficulties for both public and private managers in these checker-board areas.

WILDLIFE

Key Question 1- What are the key species (including T,E&S species) or assemblages found in the watershed and what is the condition of their habitats?

Key Question 1a- Where and in what condition is the connectivity for late-seral-species in the watershed?

Habitat requirements for northern spotted owls are linked to age and structure of timbered stands. Table 3-21. Seral Stages and Densities in Mixed Conifer and True Fir Communities, identifies the age and density of conifer stands in the watershed.

Table 3-21. Seral Stages and Densities in Mixed Conifer and True Fir Communities

Seral Stage	Acres	Percent	Density Percent	Acres
Early	3,010	6	>70 40-70 20-40 <20	1,860 550 560 40
Early/Mid	10,270	21	>70 40-70 20-40	690 6,890 2,690
Mid/Late	20,690	42	>70 40-70 20-40	10,330 7,820 2,540
Late	15,690	31	>70 40-70	15,220 470
TOTAL	49,660	100		

The diversity of the Beaver Creek watershed in terms of elevation, aspect, and vegetative community is wide. As a result, habitats for wildlife species are also diverse. The watershed provides habitat conditions from high elevation meadows, dense conifer forests at mid elevations, a large oak woodland/conifer interface and chaparral habitats at low elevations. Though limited in acreage, riparian habitat is found throughout the watershed. This riparian habitat can be divided into two major types; riverine riparian along stream courses and wet meadow riparian along the Siskiyou Crest.

Wildlife use patterns in this watershed can be organized between those species that utilize a variety of habitats across the watershed and those species that are more tightly associated with specific habitat conditions.

Wide Ranging Species: A group of species occur (or may occur) in the watershed that range through a variety of habitats. This group of wildlife species use the entire watershed, making monitoring difficult. These species include mountain lion, black bear, wolverine, black-tailed deer, and Roosevelt elk, for further information see Appendix F - Wildlife.

There is no documented evidence of wolverine use in this watershed; little is known about wolverine populations in Northern California. Of the other representatives in this group, some commonalties occur for life history needs. Roosevelt elk (which are quickly reestablishing in the watershed), black-tailed deer (portion of the Hamburg Deer Herd) and black bear generally winter at lower elevations and summer in the higher elevations near the Siskiyou Crest. Mountain lion will tend to follow the deer herd migrations throughout the watershed. The Crests' open glades, the Sterling Mountain burn area and the numerous scattered clearcuts all provide important foraging habitat during summer periods.

Due to the lack of recent fires, much of the lower elevation chaparral types, which are important for winter forage, are low in forage quality. Currently deer and black bear receive extremely high hunting pressure because Beaver Creek is highly roaded and easily accessed by California and Oregon hunters.

Indicator Species: Many wildlife species in the watershed have habitat needs that are specific enough to determine conditions and trends for those specific habitat types. For this discussion this watershed will be divided into three general habitat types; high elevation fir with scattered meadows, mid-elevation mixed conifer, and lower elevation oak/conifer/chaparral types.

HIGH ELEVATION FIR WITH SCATTERED MEADOWS

This type is dominated by red and white fir and found above 5,000' elevation. It also includes the subalpine habitats of the Siskiyou Crest. The habitat is dominated by mid and late-seral forests. It is typified by groups of even aged trees with little species diversity among trees. Meadows are interspersed between conifer stands near the crest and usually have stringers of willow and alder along creeks. This Siskiyou Crest zone provides ideal conditions for those species preferring edge habitat associated with older forest. Nearly all of this habitat type occurs on Forest Service lands within the watershed. Table 3-22. Acreage by Seral Stage for High Elevation Fir with Scattered Meadows, shows the acreage breakdown.

Table 3-22. Acreage by Seral Stage for High Elevation Fir with Scattered Meadow

Seral Stage	Acreage	Percent Fir Type
Early/Mid	680	6
Mid/Late	8,020	72
Late	2,450	22

The species that indicate condition and trend for this high elevation type within Beaver Creek are great gray owl, flammulated owl, American marten, willow flycatcher, blue grouse and the wet meadow riparian songbird assembledge. Great gray owl, flammulated owl and American marten require a meadow/older forest interface. The older forest habitat provides for reproductive needs with snags, broken tops, and downed logs. The adjacent wet meadows provide high quality foraging areas due to high rodent population. Blue grouse (a popular huntable species) are abundant in this habitat; they need older forest habitat with large woody material.

Many neotropical migrants are closely associated with alpine meadow and shrubfields. Particular species are associated with specific habitat characteristics, such as willow or alder thickets and lush herbaceous vegetation. Many of these birds are sensitive to disturbance and/or changes in their habitat. Monitoring the relative abundance of these birds can be a useful tool in measuring the change in habitat conditions.

Since 1992, willow flycatchers (a Federal Category 2 Candidate Species, a California Endangered Species, and a Forest Service Sensitive Species) have been monitored over the Oak Knoll District. Willow flycatcher have been recorded annually on the south facing slopes of Mt. Ashland. This species is associated with wet meadows having a significant willow component. Though not every patch of willow along the Siskiyou Crest has been

surveyed, there is a high likelihood of this species occurring throughout the Crest Zone during the breeding season.

MID-ELEVATION MIXED CONIFER

Klamath mixed conifer makes up the majority of forest vegetation in the watershed. Seral stage breakdowns for this type are displayed in Table 3-23. Acreage by Seral Stage for Mid-Elevation Mixed Conifer. Much of this type is divided between Forest Service and private industrial forest lands in a checkerboard pattern. Densities and species composition in the mixed conifer type is influenced by aspect and site quality. The cooler north and east facing slopes tend to have highest stand densities, while south and west slopes are more open. Fire suppression in this habitat has allowed more woody material to accumulate on the forest floor and an understory of white fir develop on all sites. Hardwoods in these stands are an important component for wildlife. The more open stands have a manzanita and buckbrush understory.

Table 3-23. Acreage by Seral Stage for Mid-Elevation Mixed Conifer

Seral Stage	Acreage	Percent Fir Type
Early	3,010	8
Early/Mid	9.590	25
Mid/Late	12,675	33
Late	13,250	34

Many species are associated to this mid-elevation zone. These include northern spotted owl, northern goshawk, Pacific fisher, the forest and cavity nesting song bird assemblages and the forest bat complex.

Though spotted owls are not restricted to this habitat zone, the majority of occurrence is in this type. Details of the spotted owl situation in the watershedis outlined in Appendix G - Norther Spotted Owl, of this document and the *Mt. Ashland Late Successional Reserve Plan (R0-248)*.

To summarize, the watershed has 20 owl activity centers distributed throughout most forested portions. All but four activity centers are above the minimum threshold of 1,365 acres. This includes both public and private lands. There are approximately 30,300 acres of Klamath Defined suitable roosting and nesting habitat within the watershed. In the mixed conifer and true fir communities, 63% is currently suitable nesting and roosting habitat, of which 26% occurs on private forest lands. In addition to this habitat, many sparser stands serve as foraging and dispersal habitat. The overall picture of suitable habitat is fragmented in some areas due to low site quality, timber harvest of the 1960s through 1990s, and old fire areas that have not revegetated with conifers. In the lower elevations, suitable habitat is more isolated and occurs in draws and north facing slopes. The upper portion of the watershed is delineated as Late-Successional Reserve shared with the Rogue River National Forest. LSR #0248 extends beyond the upper Beaver Creek watershed into the Mt. Ashland watershed, for more information on this LSR, refer to the *Mt. Ashland LSR Assessment 1996*.

Northern goshawk and Pacific fisher are found in conifer habitats throughout the watershed, but occur mostly in the mixed conifer zone. Surveys for these two species have not been extensive but records do exist. Both require older forest conditions for reproductive habitat needs. Goshawks require an open understory for hunting. Fisher appear to be associated to older forests adjacent to riparian areas. These riparian areas provide high prey densities and abundant cover.

Many songbird species use the mixed conifer zone, refer to Appendix F. Some of these species are suited to areas of dense shrub understories and others are found in open large tree dominated areas.

LOWER ELEVATION OAK/CONIFER/CHAPARRAL

At approximately 3,000' elevation and below, the vegetation is dominated by oak woodland with scattered conifers and shrubfields. There are approximately 16,390 acres of this type.

Shrubfields are comprised mostly of manzanita and buckbrush. They are important black-tailed deer wintering habitat, although current forage quality is extremely low due to the decadence of the shrubs. These shrubfields are also host to a group of songbirds that are specific to these dense shrub habitats.

The oak woodland conifer interface provides an important food source for black-tailed deer, black bear, and rodents. This area is important for many breeding songbirds and cavity nesters, refer to Appendix F.

HUMAN DIMENSION RESOURCES

This section includes human uses, needs, and values placed upon resources and lands of the Beaver Creek watershed. To adequately address Key Questions (from Step 2), this discussion is divided into five topics: **Heritage (Cultural) Resources, Access & Travel, Community Values & Private Land Uses, Recreation,** and **Commodities.**

HERITAGE (CULTURAL) RESOURCES

<u>Key Question 1-</u> What are the unique characteristics within the watershed in terms of heritage resources?

A specific timeframe for prehistoric occupation within the watershed is not available. Information on the American Indians inhabiting the area is based upon ethnographic and linguistic documentation; i.e., information that was gathered concerning the occupants at the time of, and following, contact with Euro-Americans. Settlements were comprised of the Klamath River Shasta Indians, one division of Shasta occupying an area from Scott River to the town of Hornbrook.

In 1983, the Quartz Valley Reservation was federally recognized to include the Shasta, Karuk, and Upper Klamath Indians. The Klamath National Forest signed a *Memorandum of Agreement* (MOU) in 1994 with the Quartz Valley Reservation to formalize processes of communication and improving relationships towards the common goal of wise land and resource management.
One village site near the mouth of Beaver Creek, on the north side of the Klamath River, is listed in Heizer and Hester (1970). Since American Indians would have used resources in and around water sources, there should be evidence of material deposits. However, many creeks and streams were excavated during mining operations, so evidence of previous use by American Indians was probably obliterated. Therefore, to a large degree, cultural resource field inspections have failed to document evidence of their occupation of the land. One prehistoric site has been recorded and is listed below in Table 3-24. Recorded Prehistoric and Historic Sites.

Table 3 -24. Recorded Prehistoric and Historic Sites

(P) Prehistoric/(H)Historic Site Type	Number of Sites
(P) Flaking Station-Hunting Blind	1
(H) Railroad Logging Camp	1
(H) Railroad Logging Artifacts	1
(H) Ditch	1
(H) Mining Associated Artifacts/Features	18
(H) Unknown Artifacts/Features/Structures	6
(H) Mineral Springs	1
TOTAL	**29**

Contemporary American Indian land use is limited to seasonal gathering of vegetal materials such as iknish (wild celery) with a few tribal members taking part in the activities.

Historic land use within the watershed is basically one of resource extraction. By the 1860s, gold mining dominated the landscape wherein various gold mining technologies occurred. Mining evolved from low impact placer mining to high impact hydraulic and dredge mining. During the Depression Era, gold mining was mainly limited to small, placer mining operations. Today, six mining claims remain active and are limited to pan or recreational dredge mining.

At the turn of the century, Cinnabar Springs became famous in Northern California and Southern Oregon as a destination point for people seeking its curative powers. The mineral waters supposedly cured everything from stomach ailments to pregnancy.

Railroad logging began in 1907 and continued until 1934 when Fruit Growers Supply Company pulled the tracks and converted to truck logging. Railroad logging increased dramatically after 1909 when the Northern California Lumber Company was taken over by Fruit Growers Supply Company. In the early years, fires were a common occurrence in the woods until spark arresters were installed on donkey engines. More recently, old railroad grades have gradually converted to roadbeds which now allow recreationists easy access for a variety of activities.

Development of the sheep and cattle industry increased as miners and ranchers moved into the area. Issues of overgrazing led to the implementation of Forest Service range management on public lands. Today, two range allotments remain within the watershed.

A significant number of recorded sites within the watershed reflect mining activities. The previous table includes prehistoric/historic site types and their quantity. None of the recorded sites have been evaluated for significance.

ACCESS & TRAVEL

Key Question 1- What are the characteristics within the watershed in terms of access?

There are approximately 440 miles of roads within the watershed. The majority were constructed to access the vast timber reserves that lie within the analysis area. Access exists to every section, both private ownership and government, within the watershed. The analysis area is accessible by road from all directions and there are numerous opportunities for loop routes because of the many tie through roads within and adjacent to it.

Of all the roads, less than three miles are under County or State jurisdiction. This includes Siskiyou County Road 8J01 (part of the Beaver Creek road) and a small segment of State Highway 96. There are about 65 miles of private roads. The remaining 372 miles are National Forest system roads (including cooperative cost-share roads) or non-system roads on National Forest lands.

County and State roads provide year-round access for all users. Private roads provide access to residences and private lands to manage timber and other resources. It is not the goal of private landowners to provide access for general public use; public use is allowed on some private roads when there are no resource or other use conflicts.

Forest Service roads within the watershed are constructed for the administration of the National Forest lands and are not classified as public roads, most are open to the public. The Secretary of Agriculture has delegated authority to the Forest Service to restrict or control use on these roads to meet specific management objectives (FSM 7731) and a road use permit is required for all commercial use on National Forest roads (FSM 7730).

There are currently three types of management strategies used for traffic management on the National Forest system roads within this watershed. They include:

Open Road - These roads are opened for year -round access to all users. Closures are generally temporary, and are caused by natural events such as snow, down trees, rock fall, slides, washouts, or emergency situations such as fire, rescue, or public safety.

Seasonal Closure - These roads are closed to all vehicle traffic during a given period to minimize resource-use conflicts. Gates are used to restrict traffic. Seasonal closures are from November 15 to May 1 of each year.

Year-round Closure - These roads are closed to all vehicle traffic on a year-round basis due to resource-use conflicts. Gates or earth barricades are used to bar traffic.

During periods of closure for traffic management, administrative use is permitted on a limited basis to perform specific project work, or to monitor resource values. Other use may be permitted, provided there is a valid permit or any person(s) Federal, State, or local law enforcement officer, or member of an organized rescue or fire-fighting force is in the performance of an official duty.

The following Table 3-25. Travel Access Management Mileage, displays miles of road for each management strategy.

Table 3-25. Travel Access Management Mileage*

Management Strategy	Mileage

Open	282
Seasonal Closure	49
Year-round Closure	27

* Complete information unavailable for entire watershed.

The Forest Service does not manage traffic on private roads. However many roads within the watershed are cost shared with Michigan California Lumber Company (MCL, a.k.a. Timber Products Company), and/or Fruit Growers Supply Company (FGS), with the United States Government (US), refer to Table 3-26. Cost-Share Road Mileage. These companies have shared with the Forest Service in the cost of construction and maintenance of these roads and are cooperators or co-owners. Decisions relating to management of these roads are made by mutual agreement.

Table 3-26. Cost-Share Road Mileage

Cooperator	Miles
MCL/US	46
FGS/US	78
FGS/US/MCL	38

The roads in Beaver Creek are categorized into three functional classes: arterial, collector, or local. The County and State roads are classified as arterials, the private roads as local, and the National Forest roadsmay be any one of the three classes. The only National Forest arterial road is Forest Road 11 (the Beaver Creek road) from the end of the County road to Hilt (12.2 miles in the watershed). Beaver Creek road is paved in places, generally two lane, and usually open/maintained for travel by prudent driver in standard passenger car.

There are about 105 miles of National Forest collector roads in Beaver Creek. These roads provide primary vehicle access to many parts of the watershed and some alternate routes through the watershed. They occur on both National Forest and private lands, usually as cooperative roads on private lands. The collector roads are designed to a lower standard than arterial roads, usually single lane with turnouts, but are generally open and passable in a passenger car. Arterial and collector roads will handle the majority of Forest visitors.

Most National Forest roads (249 miles) within the watershed are classified as local. These roads are generally not maintained for passenger car traffic but are often passable with high clearance vehicles such as pickups, 4-wheel drive and off highway vehicles. Maintenance is sporadic and it is not uncommon to find objects in the road such as rocks, down trees, or slides. These roads are often dead-ends and are constructed for National Forest or private use, and management activities. These roads may be open or closed for public use, depending upon specific road management strategies.

Road maintenance is a major concern of the Forest Service. It is accomplished in several ways; through timber sale contract requirements, Forest Service crews, cooperators, permittees, and service contracts. The amount of maintenance accomplished each year within the watershed has declined over the last several years because of reduced maintenance budgets, and reduced timber sale activities.

Road maintenance levels define the level of service provided by, and maintenance required for a specific road, consistent with road management objectives considering needs, road condition, budget constraints, and environmental concerns. Road maintenance is grouped into five levels, they include the following:

Maintenance Level 1 - Assigned to intermittent service roads (year-round closures). Basic custodial maintenance is performed to protect adjacent resources and to perpetuate roads to facilitate future management activities. Emphasis is normally given to maintaining drainage structures and runoff patterns. Generally no surface maintenance is done. Planned road deterioration may occur.

Maintenance Level 2 - Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized use. Users traveling these roads may encounter rock fall, down trees, and narrow sections.

Maintenance Level 3 - Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are

typically low speed, single lane with turnouts. If roads are surfaced, they are surfaced with either native rock or crushed aggregate.

Maintenance Level 4 - Assigned to roads that provide a moderate degree of user comfort and convenience at moderate speeds. Most roads are double lane with aggregate or chip seal surface. However, some roads may be single lane.

Maintenance Level 5 - Assigned to roads that provide a high degree of user comfort and convenience. Normally roads are double-lane and paved or aggregate surface with dust abatement.

The following Table 3-27. Maintenance Level Mileage, displays miles of road by maintenance level on Forest System roads.

Table 3-27. Maintenance Level Mileage*

Level	Mileage
<1 - Closed	25
2 - High Clearance	194
3 - Passenger Car	122
4 - Other	<1
5 - Other	2
TOTAL	**344**

* Complete information unavailable for entire watershed.

COMMUNITY VALUES & PRIVATE LAND USES

Key Question 1- What communities utilize the watershed and what are these uses?

The land and resources of Beaver Creek are utilized by the California communities of Klamath River, Yreka, Montague, Hornbrook, and Hilt. Oregon communities which utilize the area are Ashland, Medford, Jacksonville, and Colestine.

The relatively close proximity of these communities to the watershed, combined with the high road density, allow for a moderate amount of use throughout the year. Community uses could be characterized as livestock grazing, gold mining, timber harvesting, firewood, posts and poles, and a variety of recreational opportunities such as sightseeing, hunting, fishing, camping, and winter recreation activities such as skiing and snowmobiling. These uses will be discussed further in the following sections.

The Beaver Creek Environmental Education Center is also located in the analysis area. It is in its final phase of construction and is expected to be mainly utilized in the spring, summer, and fall. The Center is to be used exclusively by the Yreka Union High School District under a M.O.U. and special-use permit.

"Sense-of-place" is an indicator of scenic quality that describes personal meanings, attachments, and expectations that people have developed about an area. Each person may have one, or more likely, several meanings for a single place. Examples of sense-of- place for the watershed include:

A place in which to acquire timber, economic value, employment, and promote forest health.

A place to recreate.

A place for high quality habitat for plants and wildlife; a place to live and enjoy a high quality rural lifestyle.

CENSUS DATA - The following is a summary of 1990 census data for Tract 4 in Siskiyou County and is very broad in scope. There are a total of 400 households in this tract which includes Hilt, Hornbrook, and Klamath River, California. Median age of the population is 42 years, with the largest age group falling into the 25-44 age class. Median family income is $26,000 for the county and $19,500 for the tract.

Median value for homes in the tract is $53,500. Sixty-four percent of houses are one-unit structures and 34% are mobile homes/ trailers. Thirty-five percent of houses in the tract were built between 1970-79 and 25% were built 1950-59. Forty-eight percent of the home's water source is from individual wells, and 64% of homes utilize firewood as their primary source of heating fuel.

Key Question 2- What are the private land uses in the watershed?

The watershed includes 25,200 acres (36% of the total) of privately owned lands. Most of these lands appear as "checkerboard" sections located in the southern half of the watershed. Isolated parcels of land are found throughout the area, but mostly in the eastern half.

Based on local knowledge, six generalized private land uses have been identified in the watershed. See Figure 3-11, Current Private Land Uses. They include: primary residences, secondary residences, industrial forestry, mining, grazing, and timber. Table 3-28. Generalized Land Uses, outlines the acres of generalized land uses found in the analysis area.

Table 3-28. Generalized Land Uses

Land Use	Acres	% Private
Primary Residence	260	1
Secondary Residence	250	1
Corporate Owned Timber	22,710	90
Land Use	**Acres**	**% Private**
Mining	170	<1
Grazing	120	<1
Pvt. Landowner Timber	1,680	7
TOTAL	**25,190**	**100**

There are approximately 30 residents living year-round in the watershed. All located along the lower three miles of Beaver Creek, near the confluence with the Klamath River. There are five domestic water sources identified within the watershed --two from Beaver Creek, another from an unnamed tributary to Beaver Creek, and two from unnamed springs adjacent to the creek.

Secondary residences include the Condrey Mountain Ranch, the May Flower Ranch, and property near Monte Creek. Because of limited winter access, owners only live on their property during summer months and ranch or recreate there.

There are approximately 22,700 acres of industrial forest lands which are owned by two timber companies. Fruit Growers Supply Company owns about 16,600 acres, and Michigan California Lumber Company owns the other 6,100 acres.

Mining properties are patented mining claims which have been or are being mined for gold.

The property in Cow Creek Glade was identified as grazing use due to the lack of fencing to exclude cattle from the adjacent allotment.

Timber lands are located in the eastern half of the watershed, near Fountain-of-Youth Spring, Four Corners, Sterling Mountain, Grouse Creek, and along the Siskiyou Crest near Mt. Ashland. Some of these properties have been recently, or are being harvested for timber.

An irrigation ditch is located parallel to the lower portion of Beaver Creek. This ditch was built in the 1890s by the Chinese for irrigation and other domestic uses. It used to carry water 12-13 miles downriver until it crossed the Klamath by pipe at the community center. The primary water inlet, which is on private land, diverts water from Beaver Creek at Polly Gulch. Several other tributary drainagescontribute water along its remaining four mile length. It irrigates private pasture lands outside the watershed. A second ditch exists on the west side of Beaver Creek, diverting water from the creek, crossing the road at Fish Gulch, and then heading to the mouth of Beaver Creek.

RECREATION

Key Question 1- What are the current recreation uses in the watershed?

The watershed lends itself to many recreational opportunities for Northern California and Southern Oregon, see Figure 3-12 Current Recreation Uses/ Facilities. Its northern boundary lies on the Siskiyou Crest which provides spectacular views both north and south. Views of Mt. Shasta, Mt. McLaughlin, and others provide an attraction for tourists. The mosaic of meadows, dense timber stands, and rock formations provide numerous opportunities for botanical, wildlife, bird, and butterfly viewing. Its many streams provide abundant trout fishing, camping and gold mining opportunities.

The abundance of roads and access points is a unique and desirable feature to some recreational users. The combination of logging roads, old railroad grades, beautiful scenery, and a 5,000 foot descent provide many opportunities for auto and bike tours.

Its mountainous terrain, numerous roads, and general forest characteristics provide for hunting of many species of wildlife, including deer, bear, grouse, and quail. This watershed receives the highest amount of deer hunting pressure on the Oak Knoll District.

Current recreational uses include camping, fishing, hiking, hunting, mountain biking, recreational dredging, sightseeing, bird watching, swimming, cross-country skiing, and woodcutting.

Two developed campgrounds and a snow shelter are located within the analysis area. A ski area is located adjacent to the watershed. Beaver Creek Campground is located near the mouth of Beaver Creek (1,700' elevation) and provides camping year-round. Mt. Ashland Campground is on the southern slope of Mt. Ashland (7,500' elevation) and is generally open May through November. Mt. Ashland Ski Area and Grouse Gap Shelter are primarily winter sports facilities, but provide limited summer recreational opportunities.

Dispersed camping is very popular in this watershed and occurs throughout. The more popular sites are: Lower Beaver Creek Access and Campsite, Beaver Creek Corrals, Hungry Creek Corrals, Upper Beaver Creek Campsites, Longjohn Corrals (Camp 22), Meridian Overlook, Dry Lake Lookout, Cow Creek Trailhead, Buckhorn Bally Lookout, Mud Springs, and Deer Camp.

Two primary recreational routes exist within the project area. Road 11 is a north/south travel route from the State Of Jefferson Scenic Byway (Highway 96) up along Beaver Creek and over the summit to the historic railroad town of Hilt. FS Roads 40S16 and 40S15 leave Road 11 at Hungry Creek and are primary routes leading to Mt. Ashland. Road 20 is an east/west route along the Siskiyou Crest, attracting visitors from Interstate 5. This route is extended to the west by FS road 40S01 (the Crest Road). These routes are maintained for passenger car travel and encourage the everyday visitor.

Mountain bike races are held several times a year in the vicinity of Mt. Ashland. Bicycle tours and general mountain biking occurs regularly along the existing roads. A mountain bike route located along the crest is identified in the *Klamath National Forest Mountain Bike Guide* (1995).

Wildflower tours and viewing occur along the crest and within the meadows during the late spring and summer months. The Siskiyou Crest is utilized throughout the spring and summer as an outdoor "classroom" for art classes offered through Southern Oregon State College (SOSC).

A bird watching route through the area has been identified by the American Birding Association in their book *Birding Routes of 40 National Forests* (1994).

Mt. Ashland and the Siskiyou Crest provide many winter sports activities. The Mt. Ashland Ski Area provides downhill and cross country skiing. Cross country ski trails are located on the southern slopes in the Grouse Creek area. Grouse Gap Shelter is a destination for cross country skiers. Another common route for cross country skiers is the crest area down Beaver Creek drainage back to Klamath River.

Snowmobiling occurs throughout the project area, from Beaver Creek to Round Mt., to the Siskiyou Crest. Snowmobiling is popular all along the Crest, except where use is restricted from the Mt. Ashland parking lot to Siskiyou Peak. The Rogue Valley Snowmobile Club and others have asked that a designated snowmobile/ snow play area be developed in the Beaver Creek area.

Sledding, tubing, and general snow play occurs throughout the winter along accessible roads.

Two primary trails are located within the watershed. The Pacific Crest National Scenic Trail (PCT) traverses the Siskiyou Crest from Interstate 5, west across the watershed; the Cow Creek Trail runs from near Observation Peak at the PCT down to Beaver Creek. These trails serve as primary travel routes for foot/ horse/bike travelers to and from the crest area.

In terms of managing scenery, the Forest Service uses direction contained in the *Scenery Management System* manual. An indicator of scenic quality is Landscape Character. This describes the general appearance and scenic identity that people remember about a landscape, based on the overall composition of the landforms, water, vegetation, and human alterations. The analysis area has four distinct landscape character types: shrub, hardwood, mixed conifer, and crest zone. Brief descriptions of each are listed below, from lowest to highest elevation in the watershed.

LOW ELEVATION SHRUB is the least common character type, found in the southernmost portion of the watershed. Much of this area was burned by the Dutch Creek Fire in 1955, with shrubs found on lower and mid-slopes, and riparian vegetation along streams. The primary residences in the watershed are found in this character type.

LOW ELEVATION HARDWOOD - Much of this area was burned by the Dutch Creek Fire in 1955. A sparse canopy of oaks, with shrub and grass understory is found throughout on dry, south facing slopes. On north facing slopes, pockets of conifers are found.

MID-SLOPE MIXED CONIFER is the most common character type. With the exception of plantations, this conifer vegetation creates a mostly dense, continuous canopy, with a variety of conifer species present. It is found mainly on mountainous landforms, with interspersed winding drainages. The presence of water is noticeable. Most timber management activities occur in this character type.

The CREST ZONE is located atop Siskiyou Mountains along the northwest boundary of the watershed. With the exception of the crest road and Grouse Gap Shelter, this area appears as a naturally evolving landscape. The area is known for high elevation meadows with occassional rock outcrops, brilliant displays of wildflowers, interspersed islands of red fir, panoramic views to distant peaks in both Oregon and California, and stringers of red fir and riparian vegetation running up the slopes.

COMMODITIES

<u>Key Question 1-</u> What Commodities are currently being used or produced from this area?

The National Forests are working forests, producing commodities and contributing to the Gross National Product of the Nation. The Beaver Creek watershed today, provides a variety of commodities including minerals, wood products, forage, and special forest products.

Wood products encompass a variety of uses, including sawtimber, firewood for home heating, and posts and poles for fence construction.

Based on *Forest Plan* projections for timber volumes, the watershed has a timber output expectation of producing one million board feet (MMBF) per year (National Forest lands only). A green sale of one MMBF of saw logs is tentatively scheduled for advertisement in FY 97. Sanitation and salvage will account for 100% of the volume. This is the only sale in this area that is scheduled for advertisement during the next five years.

There are approximately 4,430 acres of plantations in the watershed. The primary silvicultural prescriptions used in the last five to ten years have been clearcuts and shelterwoods. An approximate timber sale volume of 27 MMBF has been sold in the watershed from 1986-1991(last available information).

Mining: There are currently many claims located within the watershed, even though some are not operational. The Forest Service has six claims with active current plans-of-operation in the analysis area. These claims are all recreational placer mining (gold) and consist of panning or dredging. These claims are all occupant free, and stream altering does not occur. Currently, no mechanical mining exists within the watershed.

Miscellaneous and Special Products: This area provides a variety of special products. These products include, but are not limited to, Christmas trees, boughs, bear grass, mushrooms, and limited amounts of edible and decorative products.

Grazing: The livestock industry in Siskiyou County plays an important role in local economies as well as contributing to local customs and traditional lifestyles. Agriculture is the sixth largest source of wage or salary employment in the county. There are portions of two grazing allotments within the watershed. Permitted livestock numbers for these allotments total 445 cow/calves for a three month season from July 15 to October 15.

According to the 1993 herd census information from the Siskiyou County Farm Bureau, the total number of cattle, including bulls, cows, calves, heifers, and steers in the county, is approximately 68,000. The total number permitted on the Klamath National Forest seasonally is about 5,900. Less than one percent of the total livestock numbers in the county are supported by this watershed.

There are four families dependent upon these allotments for seasonal livestock grazing needs to support their overall ranching operations and economic livelihood. Three families share the East Beaver Allotment. Private grazing lands (available and unoccupied grazing lands) are extremely scarce in the county and are a costly alternative to public land permits. Federal Animal Unit Month (AUM) cost is currently $1.61 for Fiscal Year 1995. Private land costs $15/AUM which equals $20,025 for 445 head for three months versus $2,150.

Forest Service cost to administer permits is approximately $5/AUM. Twenty-five percent of the monies collected from grazing are used for rangeland improvement and the rest goes to Treasury and County receipts.

The portions of the two allotments within the analysis area almost cover the entire watershed. Table 3-29. Grazing Allotment Acreage Inside/Outside Analysis Area, displays information for entire allotments, not just for areas within the watershed. Table 3-30. Grazing Allotment Acreage Within the Analysis Area, shows a breakdown for acreas within the analysis area only.

Table 3-29. Grazing Allotment Acreage Inside/Outside Analysis Area

Allotment Name	Total Acres	# Permittedin Allotment
Dry Lake	41,500	195cc*
East Beaver	67,000	250cc
TOTAL	108,500	445cc

*cc=cow/calf

Table 3-30. Grazing Allotment Acreage Within Analysis Area

Allotment Name	Acres	Grazeable Acres 0-5% Slope	Grazed Acres <40% Slope	Grazed 5% Slope Acres In Riparian Reserve
Dry Lake	19,300	30	14,800	20
East Beaver	45,500	80	24,900	150
TOTAL	**65,800**	**110**	**39,700**	**170**

Within the watershed, livestock utilize riparian vegetation types such as meadow, shrub, and tree communities. These areas provide forage for livestock and wildlife, and bank stability and shading needed by wildlife and fish. Riparian shrub types, including willow and alder are used for shade areas by livestock, but are browsed at 30% or less as indicated by yearly monitoring.

Upland vegetation and conifer types are spatially arranged by bedrock type, slope, and hydrology. Grazing occurs in small forest openings, conifer plantations, and mountain shrub/grassland types. These forage types constitute 60% of the watershed and 30% of these areas are grazed by livestock. The majority of younger (less than ten years old) plantations are on Fruit Growers Supply Company lands. The majority of forage available in plantations, therefore, is located on these lands as opposed to Forest Service managed lands. These forage types are mostly transitory rangelands which produce forage for a limited time after a disturbance; timber harvest and fire being the most common disturbance. This type of rangeland is dynamic in time and space with successional steps from grassland to shrubland to forest. At each step,

grazing capacity is decreased. Through this process, grazing areas in each allotment are rotated spatially depending upon the successional stage of a given disturbance site.

An area of concern exists on the Siskiyou Crest south of Mt. Ashland. This area has some of the highest livestock and recreational use, thus is where most inter-forest conflicts occur. Livestock drift across Forest boundaries along the crest has been an ongoing problem since earliest forest records. The open nature of the crest, along with numerous roads have made fencing infeasible. For many years a minimal amount of drift was tolerated by both permittees and the agency. In recent years, issues of excess and unauthorized use have escalated. Solutions are currently underway and should be forthcoming. For more information see *Horse Creek/Dry Lake Allotments*, *Horse Creek/Beaver Creek/Haystack Watershed Analyses* and *Siskiyou Crest Range Strategy*.

Another area of concern is Dead Cow Creek at the headwaters of Jaynes Canyon. This area receives utilization by three range permittee's cattle. A half mile segment of the creek is experiencing bank trampling, tunneling in alders, ground cover loss, and hammocking of bank areas. Over utilization of forage resource is occurring due to cattle congregating and lack of proper distribution.