STEP 4 - *REFERENCE CONDITIONS*

This step describes how ecological conditions have changed over time, resulting in current conditions as described in Step 3. A reference will be developed based upon historic conditions for comparison with current conditions. This is an attempt using historical data to determine how the ecosystem adapted/ developed. The time period will vary by ecosystem features and data availability. Where actual data is lacking, descriptions of historical conditions will be constructed from a multitude of sources, inferences, and professional judgement.

This step begins with an historic overview that sets the framework for the step. Following the overview are answers to key questions by issue as presented in Step 2. See Figure 4-1 Historic Features, contained in the Map Packet located at the end of this document, for a visual display of several historic features present in the watershed.

HISTORIC OVERVIEW

The analysis area falls within the ethnographic boundary of the Scott Valley Shasta Tribe. Permanent Shastan village settlements in Scott Valley were generally located at the edge of the valley or at the confluence of major tributaries or streams. A few villages were located on higher hills among the oaks, and situated near large springs. According to Heizer and Hester (1970), seven villages were located along Scott River.

Dwelling houses were semi-subterranean with dirt sidewalls and split-board endwalls. These houses were only occupied during the winter. In spring they were abandoned for brush shelters. Temporary camps, associated with seasonal hunting and gathering, were single family bark houses. Later in the fall, during hunting expeditions, they camped in the open.

Subsistence strategies relied on seasonal exploitation of a variety of animal and vegetal resources from varying ecological zones. The mountainous terrain was utilized during summer and fall for seasonal hunting and gathering of plant foods. Among the vegetal foods collected were acorns, pine nuts, seeds, bulbs, greens, roots, berries, and other fruits. Non-vegetal foods included deer meat, bear, small mammals, salmon, trout, suckers, eels (Pacific lamprey), crawfish, turtles, mussels, fowl, insects, and grubs. Mountain lion and wildcat were also hunted. Manzanita berries were used as a cider drink and milkweed was a source for chewing gum.

Shasta Indian land management practices included burning for wild seed and tobacco crops. Fire was also used during deer hunting in late fall when the Shasta would encircle the deer with fire. Fires were also set on hills in the fall when oak leaves began to drop. Subsequently, areas which had new growth of hazel and beargrass were visited by basketweavers. These areas were visited two to three years after burning.

Existing literature does not address the use of high mountain spiritual or ceremonial areas. Holt (1977), however, does mention that "during a certain moon each year...boys and young men went alone on dark, stormy nights to a certain rocky point and piled stones. This was to make them brave..."

In the 1820s and '30s, the first Euro-Americans exploiting a resource in the area were the Hudson Bay Company fur trappers. Scott Valley was particularly utilized for trapping beaver, mink, and other furbearing animals.

The landscape within the watershed has experienced a dynamic evolution of resource exploitation and land ownership. The discovery of gold in the 1850s in Shasta County brought an influx of people to areas such as South Fork, Slide, Jackson, Wildcat, Fox, and Boulder Creeks. Miners displaced American Indians as the extractive process of mining progressed.

Initially, placer gold was taken from old bench gravels and river tributaries which yielded substantial amounts of the metal. Placer mining could be performed by one individual or several men and did not require a large expenditure of capital especially when compared to later mining technologies. The Chinese followed the miners and successfully recovered gold by re-working old claims. In the 1892 State Mineralogist's Report, it states "Mining in this district is exclusively placer, and is confined to...bars of the South Fork of Scott River." In former years the main Scott River below the junction of the South and East Forks at Callahan was mined for two or three miles, and considerable gold taken from its channel and high bars, but the latter are now worked out, and gold in the river channel is at such a depth that it cannot be profitably mined. On the South Fork about twenty white miners and fifty Chinese were engaged in mining, the former in small claims in gulches and high bars, and the latter in about half a dozen claims in the bed of the river and hydraulics in one of the high bars. The output of the District averages $75,000 annually. In the 1894 Report, the Chinese-owned Montezuma mine was in operation one-half mile from Callahan. The claim, which increased from forty to sixty acres, consisted of "part of a river bed, with a 20 ft. bank of gravel, on the South Fork of Scott River. The gold is both coarse and fine; the former lies near the bedrock. Bedrock lies from 20-30' below water-level. All the gravel from the full width of the valley is run through the sluices. The sluices are 4'x4' and 3,000' long".

Around 1900, the French Beaudry Company bought 3,000 acres of mining property extending to near Callahan to the area around Wildcat Creek. Although miners were on Wildcat Creek prior to the presence of the company, the construction of a boarding house and sawmill has been attributed to the company. Other companies with mining interests included the Oro Grande Mining Company and Sugar Hill Mining Company. Boulder Creek was included in the Boulder Creek Mining District.

During this time period the Slide Creek Mine was intensively worked through the use of a self shooter which effectively ground sluiced the creek. It has been stated that this method left a chasm from thirty to forty feet deep. More recent hydraulic mining may have obliterated evidence of this activity. Any of the water channels west of the creek may have been used with the shooter or later hydraulic mining. Placer mining also occurred at the mouth of Fox Creek and followed the creek to the falls. The A.B.C. Mine followed a high channel or rim "on the hillside above the ford at Fox Creek. This channel was mined for about a quarter of a mile, producing over $700,000 at $18.00/oz."

Hydraulic mining began in the area sometime after 1850 and operations were often concurrent with hard rock and dredge mining. This form of mining may have existed into the 1930s along with dredge and small scale, depression-era placer mining. Large scale dredge mining, however, continued until the 1950s.

Dredge mining took place within the Callahan Mining District by 1907 with the use of the Wade dredge. The Scott River received the most impact with activity occurring north of Callahan for approximately five miles. An article in a 1907 Mount Shasta Herald newspaper stated, "dredger mining started on the Scott River...averaged $10,000/week." After a general decline within the state, operations sporadically continued in the 1930s with the Yuba dredge along the Scott River. In 1936, the Yuba Dredge Company built a settlement at the mouth of Sugar Creek which housed approximately 16 workers. The dredge worked down river from Sugar Creek, operating 24 hours a day until 1950. Approximately 75,000 yards of rock could be moved in a week, recovering up to 300 ounces of gold. It did not operate during the war years. Some dredging also occurred along the mouth of Wildcat Creek and at the Last Chance Mine, one mile south of Callahan. These dredges were superior in moving deep gravels and large boulders.

Mining has continued sporadically into the 1960s. In a 1969 Mines and Geology Report, the Cummings or McKeen Mine, was one of a number of gold-quartz mines in the Callahan Mining District. The total output was valued at $500,000.

During the early mining period, Callahan's Ranch (now referred to as the town of Callahan) was the hub of activity, supplying food and materials to the mines. In 1853, M. B. Callahan filed a land claim and opened a hotel where he could feed and lodge miners and travelers. By 1900, Callahan had three hotels and five saloons. The California Stage Company ran a stage line from Sacramento to Old Shasta to Yreka and into Oregon. The Old Hayden Hotel was a stage stop along this route between 1852 and 1887.

Other small, local towns were in existence within the vicinity of Callahan during the early mining days. Springtown and South Fork were occupied by the Irish and Chinese, respectively. It has been speculated that, between the years 1850-54, as many as 3,000 men were living along the creeks around Callahan.

During the 1860s and early 1870s, Elisha Mancell (Deacon) Lee became well known for delivering heavy mining equipment to Black Bear Mine, on Black Bear Creek. The trail originated at Wildcat Creek and partially followed an old Indian trail to the mine. (The Black Bear Mine became one of the most productive gold quartz mines in the area). The Deacon Lee Trail also was part of a trail system that linked Callahan to the Salmon River mining region.

To support early mining activities, many individuals acquired homesteads and went into ranching. As Wells states, "As early as 1851 land claims were taken up in Scott and Shasta Valleys, the first industry being the cutting of hay for the Yreka and Scott Bar market, as well as the grazing of cattle for a supply of beef." One rancher, James B. Hayden, "had a fine ranching property about a mile from town where large bands of sheep roamed." The Denny brothers began farming in Noyes Valley from the 1860s. Soon thereafter, many ranchers began dairying and Scott Valley became well-known for its butter and cheese. In the mid-1850s, A. H. Denny fenced an area on Wildcat Creek, bought a few milk cows, and sold milk to the miners. By the 1860s, the towns of Etna Mills and Fort Jones had thriving flour mills. (Etna was previously named Aetna Mills in 1854; Rough &

Ready from 1855-56, Etna Mills in 1863; and subsequently Etna in 1870).

As a response to the economic growth within ranching and dairying industries, Siskiyou County's principal exports, by 1877, were wool, butter, and flour. In the same year, Scott Valley was expected to produce 250,000 bushels of grain. By 1915, two dairy creameries were operating in "the prime dairy region of Scott Valley." Scott Valley was also known to produce from thirty to eighty bushels of oats without irrigation. It has been documented in a report of the State Conservation Commission for 1912 that Scott Valley was classified as having 55,000 irrigatable acres. However, in a 1915 document by French, he states that "There are one hundred and fifty thousand acres of arable land in Scott Valley, of which only ten percent are under irrigation. An abundant rainfall provides sufficient moisture to the soil, though ditch-diverting water increases the yield of later crops of alfalfa. Cattle raising brings in most of the revenue to the fortunate ranchers, who until very recently have been reluctant to part with any portions of their large holdings. Yielding to the urge of land-hungry seekers of homes attracted by improved transportation facilities, these far-reaching ranches are now beginning to be subdivided to satisfy the demand of more intensive farmers and dairymen."

Early documented grazing on public lands within Siskiyou County was in 1851 in Scott Valley. A trading post was established in Fort Jones to supply the miners with beef and staples. In the July 1905 Forest Service "Use Book" it states "Every effort will be made to assist the stock owner to a satisfactory distribution of stock on the range. Grazing permits for the 1906 season would be given preference in the following order; small nearby owners and then persons living in or close to the reserve whose stock have regularly grazed upon the reserve range and are dependent upon its use. The protection of settlers and home builders against unfair competition in the use of the range is a prime requisite. Priority in occupancy and use of the range and the ownership of improved farming land in or near the reserve will be considered, and preference will be given to those who have continuously used the range for the longest period." Land use expanded through the *Homestead Act of 1906* (34 Stat. 233) which provided that "those lands within Forest reserves chiefly valuable for agriculture were to be released for homestead entry purposes. Homestead cases on the KNF to date were 729 patented and 159 rejected or relinquished."

Forest Service management of the watershed was initially the responsibility of the Trinity National Forest. During the 1930s, Callahan was selected for an administrative site. When the Trinity and Shasta National Forests were combined in 1951, the Scott River drainage became part of the Klamath National Forest (KNF) and the existing Callahan District of the Trinity National Forest. On August 9, 1970, the Oak Knoll and Seiad, as well as the Scott River and Callahan Districts were combined. The first was named the Oak Knoll District and the second the Scott River District.

Recreational activities within the watershed has always been an integral part of management within the KNF. Recreation includes but is not limited to activities such as hunting, fishing, mining, snowmobiling, sledding, backpacking, horseback riding, and camping. Sightseeing and fishing in many of the high elevation lakes has been a major factor within a larger recreational setting. In 1939, Powder Basin Inc. was organized primarily to develop a ski area for the people of Scott Valley and vicinity. The ski lodge supported a downhill ski run near the first switchback on the county road on the Etna side of Salmon Mountain Summit. A Swedish Speed Ski Lift (tow rope) was in operation on the slope below the lodge. Powder Basin was only in existence for a few years. In the 1960s, International Paper Company developed a public park at Camp Eden. This site is now owned by Fruit Growers Supply Company and is primarily used as a picnic and fishing area.

KEY QUESTIONS BY ISSUE

UPSLOPE HYDROLOGIC PROCESSES

Key Question 1- What were historical (pre-Euro-American settlement) and reference erosion rates, and what disturbances affected them?

Summary Response- Historical erosion rates were influenced by natural erodibility and instability, the occurrence of flooding, natural wildfires, or American Indian burning. Landsliding rates can be estimated based upon pristine conditions and inherent instability of landforms. This forms the basis for reference conditions. Effect of natural fires and timing of flooding is difficult to estimate and will not be factored into reference conditions. The discussion of reference erosion rates will be qualitative and the quantitative number will be presented in Step 5.

Background Information- Erosion rates previous to Euro-American settlement were influenced by natural erodibility and instability, the occurrence of flood events, and natural wildfire or Native American burning. The geomorphology of the area was basically the same as today with similar processes as described in Step 3. Active landslides, inner gorges, toe zones of large earthflows, and other unstable features provided the majority of sediment to streams during periodic flood events. The timing and frequency of floods was primarily dependent on heavy rainfall or rain-on-snow climatic events but was somewhat influenced by the openness of the timbered stands (refer to Forest Health section discussed later in this step).

While flooding provided the mechanism to trigger large inputs of sediment to streams, fire was the primary upslope disturbance. Fires, either lightning or human started, frequently burned through the area impacting watershed conditions. Fires were generally low intensity with some patches of high intensity in upslope areas. They were less common and of lower intensity in riparian areas due to low slope position and moist conditions (refer to Fire section discussed later in this step). Fires increased erosion and landsliding, especially high intensity fire on granitic soils, while maintaining open stands.

Fire recurrence intervals in pre-settlement times have been studied in the Klamath Mountains area, but watershed impacts of these fires are not well known. Most burned acreage was likely burned at low intensity although patches of high intensity fire certainly occurred at various times and places. Therefore, while pre-settlement fire is acknowledged to have caused watershed disturbance historically, quantifying historic effects of wildfire is difficult. For modeling purposes, reference watershed conditions are considered pristine; no effects of fire or other disturbance.

RIPARIAN RESERVES

<u>Key Question 1-</u> What are the historic and reference riparian conditions in the watershed?

Summary Response- Riparian habitat conditions have been, and will continue to be shaped by ecological processes and events such as fire, floods, and drought as well as past and present human activities. Reference habitat components important to aquatic species have been compiled from unmanaged streams within the watershed. These are listed in Table 4-1 Reference Habitat Parameters, Table and 4-2 Reference Woody Material.

Background Information- There is a limited amount of information pertaining to riparian conditions prior to Euro-American settlement available based on historical accounts. In the early 1830s, Hudson's Bay Company trappers discovered the Scott Valley and Scott River. They described the Scott Valley as all one swamp caused by beaver dams (Wells 1881 in Sommarstrom 1990). In spite of trapping, the earliest map of "Scott's Valley" in 1853 indicates that beaver dams were still obvious around Kidder Creek near Greenview. The map also shows a defined stream channel for the Scott River rather than a marshy area of ill-defined channels (Sommarstrom 1990).

This general perception of beaver dams dominating the riparian zones of the Scott Valley probably applies to the lower gradient reaches of Scott River tributaries within the analysis area as well as the Scott River. These areas would have been dominated by wetland vegetation periodically altered by beaver activity or severe flooding. The riparian zones of higher gradient, more confined upland portions of these same streams were dominated by upland trees except in close proximity to perennial water. Intermittent streams had vegetation little different than adjacent uplands.

A review of 1944 air photos shows that in general, many upland areas are relatively open compared to the current conditions, at least in those areas not impacted by timber harvest. By contrast, the riparian areas along larger, upland area streams appear mostly dominated by dense stands of timber. Apparently, the frequent fires that periodically reduced tree densities in the mid to upper slope areas had relatively minor effects on riparian areas. Most riparian areas probably had older conifers trees at densities near site potential. Infrequent severe flooding and debris torrents would decimate vegetation within the flood zones and create areas of early seral vegetation. Overall, about 70-80% of upland riparian areas were fully stocked mid to late-seral stages.

Little, if anything, is known about fish habitat conditions prior to trapping and mining operations. It is assumed the habitat was in good condition to support the salmon and steelhead populations that were said to exist by miners and R. D. Hume in Snyder's (1931) report. The extent of change removing beaver, and mining had on the physical characteristics of the streams including pools, fine sediments, riparian vegetation and stream channels is unknown, however can probably be considered extensive.

Factors affecting riparian habitat quality may vary from stream to stream, however, the physical and biological components that create and maintain riparian habitat are similar. These components are important within the aquatic, semi-aquatic, and surrounding riparian and upslope area and are able to sustain the character of a stream corridor. They are also continually changing as ecological processes within the watershed modify and reshape the habitat. Together, these components maintain and restore productivity and resilience. The following describes how these components contribute to a fully functioning aquatic ecosystem.

Upslope processes are critical in providing and maintaining suitable amounts and intensities of water flow, and natural delivery mechanisms of sediment without accelerated rates of erosion and sediment yield. Headwater areas are important for exchange of water, sediment, and nutrients. The timing, magnitude and duration of peak and low flows is critical to sustaining aquatic habitat and patterns of sediment, nutrient, and wood routing.

Riparian areas are essential in maintaining stream temperatures, dissolved oxygen levels, and other elements of water quality. They also ensure large wood recruitment, stabilize the channel, provide for filtration of sediment, and increase habitat diversity.

Forested riparian ecosystems should have a diversity of plant communities. Late-seral stages in a community should predominate and consist of endemic conifer and hardwood species, with intermingled areas of early-seral stages such as grasses and forbs. Ideally, this should be a multi-layered canopy including signs of decadence such as standing and fallen dead trees. An overstory of conifers should provide future recruitment of large wood, and shade and thermal cover of the streams and lakes. An intermediate layer of mixed deciduous and coniferous vegetation should provide thermal buffering, nutrient cycling, bank stability, and recruitment of terrestrial insects as an aquatic food source. The vegetative canopy should provide stream surface shading during the summer and should be at site potential.

Wet meadow areas should have stable overhanging banks with herbaceous vegetation and/or woody vegetation providing canopy cover, bank stability, and sediment filtration. The water table should be near the meadow surface, with the stream meandering through the meadow. Few signs of gullying or compaction should be apparent.

Diverse and complex instream habitats are essential for all life stages of aquatic species and should include large, deep pools for holding and rearing. Large woody material is critical for maintenance of these diverse habitats as it maintains stream channels and provides a source of cover through a range of flows and seasonal conditions. A diverse substrate is necessary with small percentages of fines and embeddedness for successful egg and alevin development. Sub-surface interstitial areas are also critical for invertebrates and juvenile fishes. An abundance of cool, well-oxygenated water, free of excessive suspended sediment is important for aquatic species production and survival.

Reference conditions for instream habitat components within the watershed have been identified in reference streams. Reference streams are either wilderness streams or reaches that are unroaded and primarily unmanaged.

Values in Callahan reference streams are averaged across all channel types, watershed areas, and elevations. Table 4-1 Reference Habitat Parameters, and Table 4-2 Callahan Reference Woody Material, both show more detailed breakdowns of local reference conditions.

Table 4-1 Reference Habitat Parameters

Stream	WA Area	Reach Length	Width/ Depth	% Substrate composition 1/					Pool Tailouts	Channel Widths/ Pool 2/		# of Pools/Mile		% Shade 3/
	(ac)	(m)		Fines	Gravel	Cobble	Boulder	Bedrock	% Fines	SCI	Primary	SCI	Primary	
W Boulder	1,500	449	26	29	17	33	21	0	6	3	0	140	0	69
Up Sugar 1	2,500	474	18	9	22	3	12	53	<1	2	12	160	31	62
Up Sugar 2	2,500	386	18	11	27	21	22	18	<1	3	29	134	13	90
Up Sugar 3	2,500	904	18	4	36	16	39	5	<1	2	25	157	14	75
L Etna Mill 1	6,700	328	40	12	39	10	12	31	<1	2	7	88	25	84
L Etna Mill 2	6,700	379	40	15	44	10	31	35	<1	1	14	157	13	78
U Etna Mill 1	6,700	730	31	-	32	34	33	4	<1	2	0	90	0	83
U Etna Mill 2	6,700	527	31	1	15	12	26	45	<1	1	21	168	9	65
Wooley 1	9,500	871	23	3	13	38	35	11	<1	6	17	26	9	79
Wooley 2	6,000	620	-	1	28	35	18	19	N/A	N/A	N/A	N/A	N/A	-
Wooley 3	15,700	862	31	2	30	39	25	46	4	9	10	11	9	-

1/ Substrate particle size breakdown; fines = <4mm, gravel 4-64mm, cobble 64-256mm, boulder >256mm

2/ Bankfull channel width divided by number of pools in each category. SCI pools are of a depth at least two time that of the pool tail crest. Primary pools are greater than three feet in depth.

3/ Average percent shade includes both canopy cover and topographic shade; not just vegetation.

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Table 4-2 Reference Woody Material					
Diameter* Class (m)	Pieces	Volume (cume)	Length1/ Class (m)	Pieces	Volume (cume)
.4	3.6	2.1	2-8	3.4	3.6
.4-.8	4.1	15.9	8-16	3.2	10.5
.8	.8	14.5	16+	2.0	18.4
TOTAL	**8.5**	**32.5**	**---**	**8.5**	**32.5**
1/ Minimum diameter =.4m, while minimum length varied and usually was 3+ meters					

AQUATIC DEPENDENT SPECIES

Key Question 1- What were the distributions and population sizes of aquatic dependent species?

Summary Response- Past human activities have influenced populations of aquatic dependent species. Trapping, mining, timber harvest, water diversion, and artificial propagation have affected both the numbers and distribution of anadromous and resident fish.

Background Information- It is difficult to determine the historical population size of salmon and steelhead in the Scott River watershed, however fish numbers were sufficient to supply the primary subsistence food and be the basis for the economy of the indigenous people prior to the mid 1800s. Starting in the 1820s, fur trappers removed thousands of Beaver from Scott Valley (then known as Beaver Valley) which set in motion the immense changes in the character of the Scott River and its tributaries (Scott River Watershed CRMP 1995). In the early 1830s, the Hudson Bay trappers discovered Scott Valley and its river. They reportedly trapped beaver on both forks (east and south) and described the Scott Valley as all one swamp caused by beaver dams (Wells 1881 in Sommarstrom 1990). The removal of beaver from the valley was the first unnatural change in the landscape. This likely affected tributaries as well. After 1850 and the discovery of gold in the area, fish populations were subject to additional human impact including mining, commercial timber harvest, water diversions and dams, artificial propagation, and other historical activities. The 1861 flood, in combination with mining activities, caused the Scott River to alter its course from the west side to the east side of the valley.

Stocks and species of salmonids that existed at the time of cannery development on the Klamath in 1912 included spring and fall run chinook salmon, coho salmon, and steelhead trout. Three fish canneries were operating at the mouth of the Klamath River which was heavily fished for salmon with no limits. Steelhead trout were an incidental catch since migration times coincide with salmon. Both Snyder and R. D. Hume in Snyder's (1931) report state that historically the spring run of chinook salmon was the "main run" of salmon and the population was very pronounced in the Klamath River basin. "These spring salmon have now come to be limited" and "practically extinct" while the fall run was reduced to "very small proportions" (Snyder 1931). By the mid 1930s it was reported that anadromous fish populations within the Klamath Basin were already significantly jeopardized (Taft and Shapovalov 1935). They reported "unfortunately no exact recorded facts exist concerning the size of the present and past runs of steelhead in the Klamath River. It would, nevertheless, be perfectly safe to say that the general consensus of opinion of fishermen and residents on the river is that these runs have decreased alarmingly, particularly during the past few years." Suggestions during the early 1930s to determine the decline of the spring run chinook included mining operations, overfishing both in the river and ocean, irrigation, and the building of Copco Dam.

Mining had other impacts to the Klamath fishery. "During the period of placer mining, large numbers of salmon were speared or otherwise captured on or near their spawning beds, and if credence is given to the reports of old miners, there then appeared the first and perhaps major cause of early depletion" (Snyder 1931). Taft and Shapovalov (1935) studied occurrence of benthic invertebrates in Klamath River tributaries and found mined areas had consistently fewer organisms than non-mined areas.

In 1965, the California Department of Fish and Game estimated the Scott River's fish population at 10,000 chinook, 2,000 coho, and 20,000 to 40,000 steelhead (CDWR 1965). These estimates were probably only a portion of the average fish populations that existed within the Scott subbasin in the early 1800s. Long-time valley resident Steve Farrington, owner of Farrington's Store in Callahan, reported seeing hundreds of steelhead on "short walks from Callahan to Frank Hayden's" from the 1940s through '60s. These conditions are not commonly observed today.

Many dams were built in the Klamath system to divert water for mining, agriculture, and domestic use. These dams and diversions blocked salmon and steelhead from more than 200 miles of spawning and rearing habitat along Klamath River tributaries (CDWR 1960 from CH2MHill). Unscreened or poorly screened water diversions and ditches resulted in a significant loss of juvenile fish in which Taft and Shapovalov (1935) reported as the "most serious present loss of trout and salmon". During their review of Klamath River ditches most were found to contain juvenile fish. In a survey of diversions in the Klamath basin, Scott River was reported to have seventy diversions, most of which were unscreened. The vast majority of screened diversions needed repair.

Artificial propagation began within the Klamath River Basin in 1896 when eggs taken from a tributary to the Sacramento were raised to fry and introduced into the upper Klamath. Eggs from the Sacramento River were also taken in 1907, 1911, 1913 and 1917 for a total of 4,950,000; these were released in the Klamath River. A small hatchery was established at the mouth of the Klamath River in the 1890s that released fry originating from the Rogue River, and after Copco Dam was established, a hatchery was developed at Fall Creek (Snyder 1931). The affect these historic hatcheries and resulting fish had on the Callahan watershed is unknown. A hatchery was also built to mitigate the effects Iron Gate Dam would have on the salmonid fishery.

There are no historic records of amphibians and reptiles in this watershed. It is presumed that suitable habitat existed, but whether it was occupied or not is unknown. No records exist regarding the extent or condition of this habitat.

FOREST HEALTH

Key Question 1- Under natural disturbance regimes, what were the vegetation communities and what were the stand densities of the conifer communities?

Summary Response- Fire was the dominant disturbance regime, affecting all vegetation communities. Analysis of the 1944 aerial photos show for the most part, open stands of large conifers. Openings in the forest were prevalent. Meadows, shrubfields, and patches of small trees were found throughout the watershed.

Background Information- The natural disturbance regime for the watershed was dominated by fire. Natural fires were ignited by lightning. Fires were also ignited by American Indians. They ignited fires to enhance acorn production and facilitate gathering in oak woodland communities, improve beargrass quality for basket making in meadows and improve seed production of grasses, improve travel, and to facilitate hunting. The vegetation in all plant communities developed and adapted to a disturbance regime dominated by fire.

The result of disturbance regimes was a mosaic of meadows, shrubfields, and open stands of conifers. The best available information on historic vegetative conditions are 1944 aerial photos. The area of focus for analysis was the higher elevations and other areas where no human activity was evident. Analysis of the 1944 photos shows for the most part, open stands of large conifers with dense stands limited to the lower half of north slopes and drainage bottoms. Openings in the forest were prevalent. Meadows, shrubfields, and patches of small trees are found throughout the watershed. The picture from the 1944 photos is a structurally diverse landscape.

In the low elevation shrubfields, frequent high intensity fires were the most common natural disturbance. Frequent high intensity fires eliminated any competing conifers and helped perpetuate shrubfields in the landscape. This community grows into dense patches and is ready to burn again within a few years after burning. Plants in this community have adapted to this frequent fire regime by crown sprouting after a fire and/or by sprouting from seed banks in the soil.

In the oak woodland, frequent low to moderate intensity fires maintained an open understory and a scattered large tree overstory. Frequent low intensity fires cleaned up the surface litter and removed concentrations of small trees. Mature trees were resistant to damage by low intensity fires. The frequent burning stimulated acorn production, which was important to American Indians and many wildlife species.

In the various mixed conifer communities, which in total cover the largest area of the watershed, frequent low intensity fires were the primary ecological process shaping them. These fires varied in frequency and intensity depending on their position on the slope, the steepness of the slope, aspect, elevation, time of year, and size and density of trees. With frequent influence by fire, the understory of these stands was maintained relatively open, with few sapling and pole-size trees or brush. Frequent fires cleaned the forest floor of litter and understory vegetation. Some sites escaped the influence of frequent fires, especially on north and east aspects and riparian areas, where a thicker understory of shade-tolerant vegetation was often present. South and west aspects, especially at lower elevations, had much less coarse woody material and fewer snags than found on these sites today.

Above the mixed conifer was found the true fir community that had a different fire regime. This higher elevation community was cooler and moister than the mixed conifer resulting in less widespread fire activity. Fires were mostly limited in size, with infrequent large fires. True fir is sensitive to damage by fire and even low to moderate intensity fires could kill large trees. Small fires would normally kill trees in small patches and in natural regeneration created patches of even-aged and even-sized trees across this community.

In the higher elevation areas of meadows and shrubfields intermixed with small patches of trees, lightning fires were common, but moist conditions and lack of fuel continuity limited their spread and intensity.

Information from analysis done on other parts of the KNF has shown that prior to the removal of fire as a disturbance regime in the mixed conifer zone, ponderosa pine and sugar pine were the dominant conifer species on south and west aspects, and the upper one-third of north and east aspects. Douglas-fir and white fir dominated the cooler, moister sites, i.e., the lower one-third of slopes, and the lower two-thirds of north and east aspects. It is expected that this same species composition would be found in the analysis area.

Key Question 2- What were the endemic levels of mortality in conifer stands?

Summary Response- Endemic levels of mortality in natural conifer stands averages less than half a percent of the standing volume per year.

Background Information- Endemic levels of insects and diseases have always been present in the landscape. However, amounts of these infestations were probably less prior to fire suppression activities (circa 1910) than today. Decreases in natural stand densities were largely due to mortality from lightning strikes, minor insect activity, and until recently, ground fires. This kept stocking at or below site capacity which tended to moderate the amount of mortality experienced during drought periods. Root disease pockets, blowdown, or areas which escaped American Indian underburning, would accumulate fuel. This would eventually promote a hot fire and develop a mosaic of size and age classes over the landscape. Also, because there was less incidence of high stocking levels, and resultant competition for moisture and nutrients, vegetation remained more vigorous overall and less susceptible to large scale mortality.

Broad scale mortality in natural stands in California ranges from 0.2-0.5% of the standing volume per acre per year. Natural mortality due to lighting strikes, and insect and diseases is approximately 0.2%/ac/yr. (personal communication David Schultz 1996).

FIRE MANAGEMENT

Key Question 1- What was the historic fire regime for each vegetation community?

Response- The historic fire regime, prior to settlement by Euro-Americans can generally be described as having frequent fires; 1-30 year intervals. Lightning ignited fires accounted for the majority of these fires. Being influenced by weather, vegetation and topography, lightning fires burned seasonally uninterrupted by humans until early in this century. American Indian burning is known to have occurred in the watershed, but information is limited. Discussions found within the Forest Health issue address the historic fire regime. For more information, a brief description of historic fire regimes by plant community is included in Appendix D - Fire and Fuels.

LATE-SUCCESSIONAL HABITAT

Key Question 1- What was the historic distribution and pattern of late-successional habitat in the watershed?

Response- The best tools available for looking at historic distribution and pattern of late-successional habitat are the 1944 aerial photos. By analyzing mid to high elevation areas showing little or no evidence of human activity, generalizations about forest conditions can be made. In 1944, dense late-successional conifer stands were limited to drainage bottoms and the lower half of north aspects. In most of these stands the density appeared to range from 70-90% crown closure with few stands exhibiting complete crown closure. Throughout the mixed conifer zone, open, late-successional conifers were well distributed. In 1944, it appears that between 60-80% of the conifers were in a late-seral state. The open conifer stands were dotted with meadows and small shrubfields. Estimates of density in the open forest range from 30-60% crown closure. This pattern would be expected with a fire-dominated natural disturbance regime.

Key Question 2- What were the historic dispersal routes in the watershed?

Response- For late-successional depen-dent wildlife species, the same basic dispersal routes to adjacent watersheds were apparent in the 1944 photos as were described in Step 3. Dispersal routes followed forested drainages and saddles into the North Fork Salmon, Upper South Fork Salmon, Trinity Alps, and Big Mill Creek. Within the watershed, the continuous open mixed conifer forest provided dispersal habitat from densely forested drainage to densely forested drainage. Dispersal to the north and east would have been difficult due to the lack of conifer forest cover.

TERRESTRIAL WILDLIFE

Key Question 1- What was the historic distribution of habitats for the identified species?

Summary Response- *Bald Eagle:* Anadromous fish runs in the Scott River would have supported a nesting population of bald eagles. Large riparian trees (cottonwoods and sycamores) and large ponderosa pine would provide nesting habitat. The alpine lakes were barren of fish and would not have furnished foraging habitat as they do currently. Before the agricultural development of Scott Valley, wintering waterfowl provided a food source for winter migrant and resident bald eagles.

Northern spotted owl and *goshawk:* The habitat requirements for these two species are very similar and at this level of analysis, can be discussed together. As shown in the discussion on late-successional habitat, suitable nesting and roosting habitat for these two species would have been limited to forested drainage bottoms and the lower half of north slopes. The open forest stands with numerous meadows and small shrubfields provided excellent foraging habitat. The diversity of habitats (open forest, meadows, and shrubfields) would have provided habitat for many prey species. Distribution and density of spotted owls and goshawks was most likely limited by availability of nesting habitat (dense late-successional forest).

Pacific fisher: Denning and nesting habitat would be restricted to the same general areas as suitable nesting/roosting spotted owl habitat. The numerous meadows and other small forest openings apparent in the 1944 photos, would have provided excellent fisher foraging habitat. Snow depth in the more open stands could have limited fisher use.

American marten: The structural diversity in the true fir and higher elevation mixed conifer forests provided good to excellent marten habitat. The small forest openings and meadows that were prevalent in these areas also provided excellent foraging opportunities. During the 1930s and '40s, marten were trapped extensively in Wildcat, Grizzley, and Jackson Creek areas.

Great gray owl: The extensive meadow complexes and forests near the headwaters of most drainages on south and west sides of the watershed would have provided good great gray owl habitat. There have been no documented sightings of great gray owls in the analysis area.

Willow flycatcher: Before gold mining and agricultural development, the extensive riparian vegetation along the Scott River and its major tributaries, would have provided willow flycatcher habitat. Riparian shrubs in high elevation meadows would have also provided habitat. Historically, willow flycatchers nested wherever riparian deciduous shrubs occurred in California (Grinnell and Miller 1944).

Deer and elk: Before the goldrush, deer and elk were common. Early reports (1800s) commented on the abundance of elk in many parts of Siskiyou County including Scott Valley. The open forest, extensive meadows and shrubfields evident in 1944 photos, show habitat conditions that probably supported good populations of deer and elk. Important winter range was found at the lower elevation foothills surrounding Scott Valley, with summer range in the higher elevation meadows and shrubfields from East Boulder Creek to Etna Mill Creek.

ROADS

Key Question 1- Why and how was the road system developed?

Summary Response- The road system in the watershed was constructed from the late 1890s to about 1980. Early roads provided access to mines, following old trails, later roads were constructed for fire access, and lastly to provide access to new areas for timber harvest.

Background Information- The road system has been developed over the years primarily in association with resource development and/or extraction. Road construction initially followed old trail alignments and centered around providing access for workers and equipment to mines. Peak construction periods occurred in the late 1890s and late 1920s during boom mining cycles. In the 1930s, roads were constructed for fire access by the Civilian Conservation Corps including the High C Road (FS Road 41N14). A fourth surge of road construction occurred when the Forest Service began offering timber sales in 1960-80. These road systems were developed into new areas for log transport.

See Appendix I - Numerical Listing of Roads and Their Status, which identifies the approximate date built of individual roads or road segments.

TIMBER OUTPUT ON PUBLIC LANDS

Key Question 1- When, where, and how was the timber in the watershed harvested?

Summary Response- Small-scale logging, meeting only local needs, occurred from the 1850s to 1930s on the flatter slopes adjacent to Scott Valley. Much of this land is now in private ownership. Logging did not access most higher elevation slopes until the 1960s; where the majority of National Forest (NF) land is located. Most logging was sanitation-type harvests, however in the mid to late 1960s and in the early '80s, clearcutting was done. Approximately 100MMBF have been harvested from NF lands in the watershed.

Background Information- See Figure 4-2 Historically Logged Areas, 1955-1995, contained in the Map Packet located at the end of this document, which shows approximately 23,000 acres (50% of NF lands outside wilderness) have been logged during the past forty years.

Small scale logging began in the 1850s when miners came to Scott Valley. Logging was probably confined to flatter slopes along the valley, which is now mostly in private ownership. Logging continued on a fairly small scale, meeting only local needs, until sometime in the 1930s. There were three known small sawmills operating in the watershed in the 1930s; one at

McKeen Divide, Munson's Mill in Wolf Creek, and one below the bridge along Boulder Creek. These met local lumber needs with a small quantity being shipped from the valley. Three other mills operated from the 1950s until the early '70s. Long Bell Mill was located about one mile up French Creek and operated until the late '50s. Munson's Mill located at the dredger camp closed in the late '60s. Hertager operated a mill in Wildcat Creek which closed in the early '70s. These mills not only met local needs, but shipped lumber out of the valley. The volume produced by these mills was probably less than ten MMBF per year. There are no lumber mills operating in the watershed presently.

Even with the mills mentioned above operating in the watershed, logging was still pretty much confined to the flatter slopes along the valley. There were three main roads accessing the higher elevation areas until the late 1960s; the Foster Mine Road, High CC Road, and Clatt Mine Road. Two were used mostly for mining and not for logging. Logging did not access most of the higher elevation slopes, which is where most of the NF land is located, until the late 1960s.

Roading and logging began to increase rapidly in the late 1960s and continued until the mid 1980s when logging decreased due to the management direction change for National Forests in the range of the northern spotted owl. It is estimated that close to 100 MMBF has been logged on NF lands in the watershed since the 1960s. Most of the privately owned land in the watershed has been logged within the last twenty years.

The majority of the area logged on NF land has been sanitation type harvests with stands remaining essentially stocked soon after logging. There were basically two time periods when clearcutting was done; the mid to late 1960s and in the early '80s. These plantations have all been established and are
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growing well. The oldest plantations are about 30 years old and will be ready for a commercial harvest in 10-15 years.

Due to the logging being confined to the flatter ground, most logging in the watershed was by use of tractors until the 1980s when a substantial amount of skyline logging was done on NF land.

HUMAN USES

Key Question 1- **What are the prehistoric and historic land uses within the watershed?**

Summary Response- Based on ethnographic research, it is generally understood that the Scott Valley band of the Shasta Indians inhabited this area prior to Euro-American settlement. Their uses of the lands included transient living areas, seasonal hunting, the day-to-day activities necessary to live, such as food gathering, fishing, spiritual uses, and burning for wild seed and tobacco products, and to enhance hunting success.

Following an influx of Euro-Americans, the watershed was utilized for a variety of uses primarily related to resource extraction and/or development. Earliest use was believed to be fur trapping, followed by placer, hydraulic, and later hard rock mining. Private lands were acquired through homesteading and developed into ranches. Cattle and sheep were grazed to provide a supply of beef and wool in support of the miners. Some ranches took up dairying while others took farming. Scott Valley became well known for its dairy products and good climate for growing oats and grains without irrigation. Varying levels of timber harvest have occurred (see previous section).

Background Information- Refer to the Historic Overview section at the beginning of this step.