STEP 5 - INTERPRETATION

INTRODUCTION

This chapter is structured into two sections. The first section compares the existing and reference conditions, identifies trends, and answers key questions for each of the three resource areas; Aquatic Resources, Terrestrial Resources, and Human Dimension Resources. The second section identifies issue-specific desired conditions for the analysis area, based on *Forest Plan* guidance and landscape characteristics. Desired conditions are organized by issues, as identified in Step 2, and incorporate all relevant resources.

AQUATIC RESOURCES

WATERSHED HEALTH

Key Question 1- How do current erosion rates compare with reference erosion rates?

Erosion rates are modeled for Beaver Creek using the landslide rates developed from the Salmon Sub-Basin Sediment Analysis (de la Fuente 1991). The landslide rates are based on sediment delivery to streams as determined by air photo interpretation and field verification of observable failures and debris torrents. The applicability of Salmon River landslide rates to Beaver Creek is uncertain but a few specific concerns have been identified. For one, the Salmon River watershed receives more rainfall overall than Beaver Creek. Storms in the period 1970 to 1975 caused a great deal of landsliding in the Salmon River but only a small amount in Beaver Creek. Also, much of the granitic terranes in the Salmon River are deeply dissected and prone to landsliding. Few landslides have occurred in Beaver Creek granitics. Finally, no Condrey Mtn. schist bedrock exists in the Salmon River. The general assumption is made that Condrey Mtn. schist terranes slide similarly to other metamorphic rock types, which may or may not be true.

Two different landslide volumes are modeled for this analysis. The first is current condition, modeled by overlaying the roaded and timber harvested areas with the geomorphic terranes and multiplying by landsliding rates. The second is the undisturbed condition, assuming all of the watershed is in pristine condition with no affects from management or natural disturb-ances such as fire. The results of the modeling are displayed in Table 5-1. Subwatershed Landslide Volumes, and the modeling assumptions and land-slide rates are detailed in Appendix C - Cumulative Watershed Effects.

Table 5-1. Subwatershed Landslide Volumes *

Subwatershed	Current Volume	Undisturbed Volume	% Over Undisturbed
Cow Creek	4.4	2.3	90
Long John	7.2	1.8	310
Grouse Creek	6.8	1.6	
Hungry			

Creek	6.2	1.2	330
Bumblebee	9.3	3.0	410
Jaynes	9.5	4.1	210
Canyon	8.0	3.7	130
Upper W	8.3	3.5	110
Fork	7.9	3.5	140
Lower W	**7.6**	**2.8**	130
Fork			**170**
Buckhorn			
Total			

* All landslide volumes are expressed as cubic yards per acre given a landslide producing event or events with similar impacts to the floods of 1970-1974.

Key Question 2- What subwatersheds should be considered Areas with Watershed Concerns and why?

The *Forest Plan* uses 200% over undisturbed in the landslide model as an indicator that a subwatershed is "over threshold" and is a candidate for Areas with Watershed Concerns (AWWCs) consideration. For Beaver Creek, this applies to Long John, Grouse Creek, Hungry Creek, and Bumblebee subwater-sheds. Each of these subwatersheds, except Bumblebee, have a large proportion of granitic soils combined with a considerable amount of disturbance. However, percent over undisturbed may not be an appropriate measure to compare current and reference conditions. Reference conditions should include some effect of natural, pre-Euro-American wildfire. Quantifying natural wildfire effects is difficult and not done for this analysis, although in general, granitic soils are more sensitive to wildfire than other soil types. The high percent over pristine sediment levels in the granitic subwatersheds will be moderate if natural wildfire is accounted for.

A surface erosion model is used in the *Forest Plan* as an indicator of watershed health. This analysis does not use this model. The landslide model incorporates many of the same factors (amount of road and timber harvest for each soil type) as the surface erosion model so the outputs of the landslide model will approximate relative surface erosion also.

Another modeling technique used in the *Forest Plan* is the Equivalent Roaded Area (ERA) methodology. This will be the primary indicator of the watersheds to be considered as AWWCs in Beaver Creek. The methodology combines roaded acres with acres of other disturbance, using coefficients that equate other types of disturbance to an equivalent road. The amount of roads and timber harvest are presented in Step 3 for each subwatershed in Beaver Creek. These are multiplied by coefficients presented in Appendix C . The sum of the disturbances (ERA) is divided by the area of each subwatershed to arrive at a relative disturbance rating, percent ERA.

The percent ERA is then compared to a Threshold of Concern (TOC). The TOC is derived considering the beneficial uses, channel sensitivity, erosion potential, hydrologic response, and slope sensitivity for each subwatershed, as discussed in Step 3. These factors are combined in an algorithm that determines the TOC (refer to Appendix C). The TOC is compared to the percent ERA for each subwatershed to determine a risk ratio. These values are displayed in Table 5-2. Equivalent Roaded Area, Threshold of Concern, and Risk Ratio.

Table 5-2. Equivalent Roaded Area, Threshold of Concern, and Risk Ratio			
Subwatershed			
Cow Creek	% ERA	TOC	Risk Ratio
Long John	3.8	10.0	0.38
Grouse Creek	4.2	7.5	0.56
Hungry Creek	4.7	5.5	0.85
Bumblebee	3.8	5.5	0.69
Jaynes	5.3	7.0	0.75
Canyon	5.7	7.5	0.75
Subwatershed			
Upper W Fork	~~***% ERA***~~	~~***TOC***~~	~~***Risk***~~
Lower W Fork	5.1	7.5	~~***Ratio***~~
Buckhorn	4.4	7.0	0.68
Total	5.7	7.5	0.62
	4.8	**6.0**	0.76
			0.80

A risk ratio of >1.0 means that a watershed or subwatershed is over threshold. Over threshold has been interpreted as either a "yellow flag" or "red flag" warning that unacceptable cumulative watershed effects may occur. For this analysis, a risk ratio of >1.0 is interpreted as a red flag. Risk ratios of between 0.5 and 1.0 are interpreted as yellow flags. The yellow flag threshold of 0.5 is selected based on knowledge of subwatershed conditions and modeling procedure. The yellow flag watersheds are not necessarily in eminent danger of excessive cumulative watershed impact, rather they contain enough disturbance to warrant a closer look. The Beaver Creek watershed as a whole is within the yellow flag range with a relatively high risk ration of 0.80. The condition of the fisheries habitat indicates that adverse cumulative effects have occurred in the watershed. But rather than evaluate the watershed as a single unit, the subwatersheds with risk ratios greater than 0.5 will be evaluated for an AWWCs determination.

The ERA methodology, sediment model results, fisheries habitat quality, and any other pertinent information will be considered for each subwatershed to make an AWWCs determination. A subwatershed determined to be an Area with Watershed Concerns does not constitute a planning decision, rather it advises managers that a subwatershed may not meet Aquatic Conservation Strategy objectives if additional land disturbance occurs. The analysis makes recommendations for future management of AWWCs subwatershed, primarily those actions intended to improve long-term watershed health.

Recommendations in an AWWCs subwatershed are primarily focused towards National Forest lands and National Forest or cooperative roads. Private land s and roads are subject to owners and managers desires under regulation of State agencies. Cumulative watershed effects assessments, however, consider impacts on all ownerships in the watershed being assessed. This requires some information sharing and collaborative interpretations to provide an integrated assessment. Coordination of management activities is also important to avoid undesired levels of cumulative effects.

Long John has a risk ratio of 0.56 and a high percent over undisturbed sediment input (310%) from the landslide sediment model (refer to Table 5-1). Long John is mostly granitic soils and the channel of Long John Creek carries large amounts of granitic sand to Cow and Beaver Creeks. Much of the sand originates from the road network but the barren areas on the crest are also likely contributors. The Long John subwatershed has a low hydrologic sensitivity because it is mostly above the rain-on-snow zone, however it does experience heavy thunderstorms not accounted for in the ERA model. Long John is currently an AWWCs due to

the sand contribution to Cow and Beaver Creeks. The sources of sand into Long John Creek should be identified and restored to the extent possible.

Grouse Creek has a risk ratio of 0.85; high for the subwatersheds in Beaver Creek. It has a high percent (330%) over undisturbed sediment input based on the landslide sediment model. Grouse Creek has a low Threshold of Concern (TOC) (5.5%) resulting from the high soil erodibility and high slope sensitivity of the granitic soils in this subwatershed.

Of greatest importance is the high channel sensitivity of Grouse Creek. The stream channel has residual instability concerns from the 1989 debris torrent. Barren, eroding areas on the crest also add sand to stream. Grouse Creek annually contributes many tons of sand to Beaver Creek, even though a constructed settling basin catches a portion of the sediment. The fish habitat has not been surveyed but is believed to be poor. Grouse Creek is considered an AWWCs. Additional timber harvest should not occur until the area has recovered. Road, hillslope, and stream restoration should occur as determined in WIN inventories and the sediment basin maintained for the short term.

Hungry Creek has a risk ratio of 0.69 and a percent over pristine from the landslide sediment model of 410% (very high). This subwatershed is entirely granitic and mostly within the rain-on-snow zone so has a low TOC (5.5%). The channel sensitivity is considered high because of the extent of road adjacent to the stream and unstable banks along the mainstem of Hungry Creek. As recently as the winter of 1995-96 a road related fill failure/small landslide deposited sand into Hungry Creek and its floodplain.

Recent mining activity in the North Fork Hungry Creek altered the stream channel and increased sediment loads to the stream. Restoration work has been completed on a portion of the primary road along Hungry Creek. This work involved reshaping the road to lessen stream impacts and riparian planting to improve stream conditions. More time is needed for the road work and planted vegetation to have an affect on stream stability.

Fisheries habitat in Hungry Creek is poor with few pools, and high levels of sand. Hungry Creek is currently considered an AWWCs. Additional disturbances should be postponed, unless beneficial to long-term watershed health. Identified WIN projects should proceed and additional sediment sources restored as needed.

Bumblebee has a risk ratio of 0.75 and a percent over undisturbed from the landslide sediment model of 210% (high). The TOC is 7.0, somewhat higher than the Grouse and Hungry Creek subwatersheds due to a lesser extent of granitic soils. The channel sensitivity is classified as moderate overall, although some segments of Beaver Creek in this subwatershed are immediately adjacent to the primary road.

Beaver Creek is the primary stream through this subwatershed and has poor fisheries habitat with large amounts of sand. The main sources of sand in this reach are the granitic upstream subwatersheds and not generated in this subwatershed. Pools are infrequent but more common than many other streams in the watershed.

Tributaries entirely within the analysis area; Deer, Soda, and Bumblebee Creeks among others, have limited fish populations. Only Deer Creek has been habitat typed and shows very high levels of fine sediment and few pools. The Bumblebee subwater-shed is not currently

considered an AWWCs because it has a relatively low risk ratio. Future disturbance activities should be evaluated carefully for impacts on both Beaver Creek and the more important tributaries within the subwatershed. Watershed improvements should occur as needed, especially improvements along the main road where it is adjacent to Beaver Creek.

Jaynes Canyon has a risk ratio of 0.75, high for subwatersheds in Beaver Creek. The percent over pristine from the landslide sediment model is a relatively low 130% because of the naturally high landslide rates of the terranes in this subwatershed. The TOC is 7.5, higher than the granitic subwater-sheds because of the less sensitive soils and stream channels.

Jaynes Canyon has a small stretch of moderate productivity anadromous stream but is mostly low productivity. This stream has not been surveyed for fisheries habitat. The West Fork of Beaver Creek downstream of Jaynes Canyon has been surveyed. While pool frequency and embeddedness are not ideal, this stretch of stream has some of the best habitat in the watershed. The Jaynes Canyon subwatershed is not currently considered an AWWCs.

Upper and Lower West Fork subwatersheds have relatively low risk ratios, 0.68 and 0.62 respectively. The percent over pristine from the landslide sediment model are low 110% and 140%. The primary beneficial use of water from these subwatersheds is the anadromous habitat along the lower part of West Fork. Fisheries habitat is not ideal along the lower West Fork but is best in the Beaver Creek watershed. These two subwatersheds are not currently considered AWWCs.

Buckhorn has a risk ratio of 0.76 and a percent over pristine from the landslide sediment model a relatively low 130%. Much of the disturbance in this subwatershed is older timber harvest associated with the Dutch Creek Fire. This disturbance is nearly recovered but is still counted in the modeling. The Buckhorn subwatershed is not currently considered an AWWCs.

Key Question 3- Are the accelerated erosional features recovering and how can recovery be promoted?

Mining and grazing have had impacts in the past that largely recovered. Some exceptions are mine tailings along Beaver Creek that have not revegetated and the barren areas/exposed soil along the Siskiyou Crest. The mined stream terraces have had vegetation removed and soil reworked, but generally did not have all fines removed as occurs with hydraulic mining. Generally the mined areas have become revegetated although evidence of working is still apparent. Some small areas are still unvegetated, as mentioned in the Riparian section. The barren areas/exposed soil may or may not have been impacted by past grazing. Whatever the case, planting native vegetation on these sites may help reduce erosion.

Roads are the largest accelerated erosional feature throughout Beaver Creek. They are recovering naturally to a limited extent as road surfaces, cuts, and fills stabilize over time. Most roads have continued surface erosion from unvegetated cut slopes, maintained ditches, road surfaces, and fill slopes that remain barren from stream cutting, fill failures, or gullying. Potential for mass failures during flooding exists on many Beaver Creek roads, especially at sites with undersized culverts or known stability problems. Recovery can be promoted by surfacing or closing roads as appropriate, removing or upgrading undersized culverts, stabilizing and revegetating barren cut and fill slopes, and repairing known slope stability problem sites.

Timber harvest in Beaver Creek has been in a constant state of recovery and additional disturbance over the last sixty years has taken place. Older timber harvest (greater than forty years) is largely recovered in terms of accelerated erosion. Younger timber harvest is in varying states of recovery depending upon age and intensity of activity. Recovery can be enhanced through post-harvest planting, although the natural revegetation of grass, shrub, hardwoods, and conifers following harvest can recover a site in terms of erosion about as quickly as planting commercial species.

The effects of the 1964 flood are mostly recovered in Beaver Creek. The effects of the 1989 debris torrent in Grouse Creek are still apparent in the unstable banks of Grouse Creek and the elevated levels of sand in Beaver Creek. Not much can be done to enhance recovery except wait for the banks to stabilize and the sand to be flushed from the system.

Key Question 4- When will the AWWCs be considered recovered?

Only the Long John, Grouse Creek, and Hungry Creek subwatersheds in Beaver Creek are currently considered AWWCs. Long John is an AWWCs due to its large contribution of sand to Cow and Beaver Creek. When the sources of sand are identified and repaired, the watershed will be considered recovered.

The primary reason Grouse Creek is an AWWCs is the continued channel instability resulting from the 1989 debris torrent. Grouse Creek continues to add large amounts of sediment to Beaver Creek. The subwatershed will be considered recovered when the channel instability has improved, as determined by future channel surveys.

Hungry Creek is also considered an AWWCs due to channel instability and high levels of sand in the stream bed. It will be considered recovered when channel stability increases and sediment sources are repaired.

RIPARIAN

Key Question 1- What are the limiting factors and trends of the riparian areas?

The large amount of roads in riparian areas is the primary factor limiting riparian health. Riparian area roads contribute sediment to streams, negatively impact channel morphology where roads and streams run parallel, decrease stream shading and growing conditions for riparian vegetation, and provide access for continued disturbance of riparian areas through the easy removal of coarse woody material (CWM) and disruption of riparian growing conditions. Road impacts to riparian areas can be reduced through road closure, obliteration, or, for important access roads that need to remain open, maintenance practices that minimize road impacts. Decreased impacts from roads will result with the completion of ongoing road improve-ment projects.

Grazing continues to have impacts on riparian areas, although not nearly the impacts that have occurred in the past. Currently, cattle are well distributed through their allotments and riparian impacts are limited to a few points of concentrated use. One of these is Dead Cow Creek in the Jaynes Canyon area where cattle have caused noticeable impacts to a short stretch of stream and adjacent riparian vegetation.

In the non-roaded portions of the interim Riparian Reserves, the watershed-wide vegetation data indi-cates conifer types occupy 87% of the acreage. This is probably slightly less than previous to Euro-American settlement. Average tree sizes are somewhat smaller than reference conditions. Approximately 32% of the interim Riparian Reserves contain conifers less than 17" in diameter (from Step 3). Reference conditions are not known for sure but it is likely less than ten percent of Riparian Reserves contained dominant conifers less than 17" in diameter. Conifer size, on average, is increasing in the National Forest Riparian Reserve land allocation. Some areas with dense stocking of small trees (about nine percent of the RR) may become overstocked, inhibiting tree growth and causing mortality and excessive buildup of fuels. Riparian areas on private land are subject to continued timber harvest and will likely continue to have a high proportion of smaller trees.

The intensive riparian vegetation mapping (described in Step 3) indicates that about forty riparian acres are highly disturbed and mostly devoid of vegetation. Few highly disturbed sites existed previous to Euro-American settlement. The current small area of highly disturbed sites, mostly remnants of past mining, has some impact on stream channel integrity, stream shading, large wood recruitment, and riparian habitat Without restoration activities, highly disturbed sites will slowly revegetate.

Another 330 acres of the 1,480 acres of intensively mapped riparian areas contain riparian hardwoods without conifers (see Figure 3-4 Riparian Reserve Vegetation, contained in the Map Packet located at the end of this document). Riparian hardwoods were common historically but usually had some proportion of a conifer mix. The current lack of conifers in riparian hardwood sites is a result of mining, flooding, logging disturbance, and the fact that hardwoods occupy disturbed riparian sites more quickly than conifers. Large wood recruitment and riparian habitat diversity are limited as a result of this lack of conifers. Without human activities, the hardwood sites will slowly become more diverse as conifers naturally establish and grow to tree size.

The interim Riparian Reserves, as described in Step 3, are appropriate to protect Beaver Creek riparian areas. Not enough information exists to deviate from the guidance outlined in the *Forest Plan* concerning interim Riparian Reserves. Specific instructions for delineating Riparian Reserves on-the-ground needs to be written to assure consistency.

Private lands are not subject to Riparian Reserve guidance and are managed in accordance with State law. Coordination is needed between private and National Forest lands to assure adequate protection of riparian areas throughout the watershed.

AQUATIC SPECIES

Key Question 1- What are the limiting factors in terms of aquatic species?

The primary limiting factor for aquatic species is the accelerated erosion processes in the watershed which result in extremely high levels of stream sedimentation and accumulations of fine sediment. These conditions in turn result in a loss of habitat for all life stages of aquatic dependent species.

Other limiting factors are high summer water temperatures in mainstem Beaver Creek that reach lethal levels for fish species, and a lack of instream large woody material and large wood recruitment along stream courses.

Cattle trampling steelhead and resident trout redds in Beaver Creek is a concern since fry are not fully emerged from the gravel until mid-June. However, livestock use patterns in the lower reaches of mainstem Beaver Creek during the spring and limited stream access over much of the rest of the watershed make this unlikely. Coho and chinook salmon redds are not a concern during the beginning of grazing season. Chinook salmon are fall spawners and begin spawning in mid-October. There is a slight risk of trampling chinook redds if normal exit routes for livestock are not followed and cattle are allowed to move out of allotments through mainstem Beaver Creek.

Key Question 2- How do current habitat conditions compare to the reference conditions and what are the trends?

Summer water temperatures are a concern in the watershed. Stream temperatures are related to water temperatures in headwater streams, solar radiation, air temperature, stream gradient, and flow. The amount of solar radiation hitting the stream is influenced by the amount of vegetative and topographic shade. During the summer months, temperatures greater than the optimum required for salmonid growth exist in mainstem Beaver Creek. Cow, Hungry, Grouse, and West Fork Beaver all have temperatures within recommended ranges, however, Grouse and West Fork Beaver Creeks are on the high end.

Many areas along mainstem Beaver are lacking shade because they have been highly impacted. Some are recovering slowly and others are still in need of rehabilitation. Efforts to reforest barren gravel bars and tailing areas with both deciduous and coniferous species have been successful, and continued revege-tation projects in streamside areas could help to lower lethal stream temperatures.

Large wood provides a source of cover and habitat diversity for fish through a range of flows and seasonal conditions. It is important for diversifying the habitats of amphibians and other riparian dependent species. Wood serves an important role in maintaining healthy stream channels. Following the 1964 flood the U.S. Forest Service and State agencies removed large amounts of wood from tributaries to the Klamath River, including Beaver Creek. Recent fish habitat surveys identified a lack of large woody material in Beaver Creek watershed streams. The number of instream structures placed within Beaver Creek has increased the amounts of instream large woody material and improved habitat diversity in the short-term. However, there are many streamside areas lacking a coniferous overstory to provide future large woody material recruitment and deeply anchored root masses for stream stability in the long-term.

The close proximity of roads to stream channels throughout the watershed is a major factor in limiting amounts of large woody material available to streams. The road prism itself decreases available growing area for large conifers, allows easy access to large wood in riparian reserves by fuelwood gatherers, and prevents recruitment of any wood from across the road as hazard trees are typically removed.

The composition of stream bed material influences the flow resistance in the channel, stability of the bed, and quantity as well as quality of aquatic habitat available to developing eggs, small fish, and invertebrates (Olson and Dix 1993). Streambed quality for aquatic dependent organisms is highly dependent on amounts of surface fines and substrate embeddedness; a measure of the extent that large streambed particles are surrounded or buried by fine sediment. Excessive embeddedness decreases embryo and fry survival and emergence, decreases or alters invertebrate populations that serve as a food base, decreases rearing habitat available for juvenile salmonids, and decreases pool frequencies.

The 1964 flood had a major impact to the Beaver Creek watershed when high flows carried tons of fill, logging debris, stumps, and logs. Slides that were roaded, logged, and mined were activated; the streambed received massive depositions of sedi-ments. Prior to 1970, however, embeddedness by granitic sands had not been documented in Beaver Creek above the confluence of Hungry Creek. Surveys of tributaries completed in 1978 document "heavy depositions" of sand in Hungry Creek, Grouse Creek, Long John Creek, and West Long John Creek.

While past and current human impacts all contribute to high sediment amounts, roads are the single largest accelerated erosional feature in the watershed (see Key Question 3, Step 5, Watershed Health). Unstable soils and sensitive geologic land forms of the basin are traversed by more than 600 miles of developed roadbed, in addition to hundreds of miles of unmaintained temporary roads, trails, and skid roads remaining from historic management activities. Sediments from these, along with an August, 1989 debris torrent in Grouse Creek, all contributed to the high fine sediment percentages and high embedded-ness levels in surveyed streams.

Cool, deep pools in Beaver Creek watershed streams are critical for summer holding and rearing habitat. Spawning occurring in mainstem Beaver takes place in the deposited gravel in pool tailouts. Several amphibian species require cool, deep pools high in dissolved oxygen for successful breeding. Pools can also be highly sensitive indicators of changes in watershed

condition (EPA 1991). All surveyed streams are severely lacking pools; probably a result of excessive sediment inputs into the entire watershed.

TERRESTRIAL RESOURCES

VEGETATION

Key Question 1- What is the desired stand structure and seral stage distribution for each plant community?

Desired conditions for the watershed reflect the comparison of existing conditions and reference conditions. The desired conditions are believed to be what will best benefit all the users of the watershed (aquatic and terrestrial wildlife, and humans) at levels that are sustainable over an infinite period of time.

DESIRED CONDITIONS FOR THE WATERSHED

Develop vegetative communities with species and structure that are tolerant to attacks by insects and diseases, and frequent fire disturbance. The most appropriate species and structure for these species will vary by site.

Provide habitats for wildlife species which currently and historically utilized the watershed.

Desired conditions are identified in the *Forest Plan* by Management Area. Each Management Area has a goal (desired condition). Watershed analysis is intended to refine the desired conditions that were identified in the *Forest Plan*. By separating out the management areas within each vegetation community, it may be possible to determine the most appropriate desired condition for these smaller areas.

Table 5-3. Management Area Goal Definitions, ident-ifies Management Areas found in the watershed and provides a brief definition for each of their goals.

Table 5-3. Management Area Goal Definitions
Management Area: Research Natural Area (RNA)
Goals: Manage RNAs for the "maintenance of unmodified conditions and natural ecological processes" (*FSM 4063.3*). Preclude impacts from human activities that would modify their value. This is to maintain the area's value as a significant contribution to the Forest's biological and physical diversity and also as a gene pool for plant and animal species. Promote and use RNAs for non-manipulative research and baseline or control sites for Forest management comparisons. Form partnerships with university and research communities.
Management Area: Late-Successional Reserve
Goals: The objective of an LSR is to protect and enhance conditions of late-successional and late-seral forest ecosystems which serve as habitat for late-successional and late-seral related species, including the northern spotted owl. These reserves are designated to maintain a functional, interacting, late-successional and late-seral forest ecosystem.
Management Area: Mapped Riparian Reserves
Goals: Maintain and restore riparian-dependent structures and functions of intermittent streams. Provide benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed. Provide connectivity corridors among LSRs. Be consistent with Aquatic Conservation Strategy goals.
Management Area: Retention
Goals: Provide a level of attractive, forested scenery by maintaining areas in a natural or

natural-appearing condition. Manage human activities so they are subordinate to the characteristic landscape. Also manage human activities so they are not evident to the casual Forest visitor. Manage for a programmed, sustained harvest of wood products in areas that are capable, available, and suitable for timber management. Maintain stand health, as well as resilience to wildland fire, insect, disease and other damage.
Management Area: Partial Retention
Goals: Provide an attractive, forested landscape where management activities remain visually subordinate to the character of the landscape. Manage human activities so they are subordinate to the character of the landscape. Manage for a sustainable yield of wood products in areas capable, available, and suitable for timber production. Maintain stand health as well as resilience to wildland fire, insect, disease, and other forms of damage.
Management Area: General Forest
Goals: Provide a programmed, non-declining flow of timber products, sustainable through time. Levels may vary year to year, based on ecological processes. Maintain conifer stocking levels and high growth rates commensurate with the capability of site to produce wood fiber. Intensively mange young regene-rated stands to maximize growth potential. Maintain stand health, as well as resilience to wildland fire, insect, disease, and other forms of damage. Emphasize salvage and restoration from catastrophic events. Reforest capable, but currently non-stocked, lands. Emulate ecological processes and stand and landscape patterns where possible. Within harvest units, maintain appropriate structure, composition, and ecological functioning of the area. Provide for snags and hardwood habitat to help maintain viable populations of wildlife species that require these structural components. Meet Visual Quality Objectives. Achieve less modified visual conditions when possible. Develop a transportation system to transport Forest commodities efficiently to available markets. Where possible, adjust planting levels to reduce precommercial thinning and fuel hazard costs in the future.

Table 5-4. Acreage and Percentage by Vegetation Community, displays acreage and percentage for each Management Area found in the watershed and provides a brief goal for each community.

Table 5-4. Acreage and Percentage by Vegeta-tion Community		
Hardwood Community		
Management Area	Acreage	Percentage
Private	660	26

LSR	30	1
Mapped Riparian Reserve	580	23
Retention	<10	<1
Partial Retention	460	18
General Forest	820	32
Total	2550	100

Promote the development of hardwood species and structures that are adapted to harsh sites and frequent fires. Maintain more of a tree character, an open stand, with understory vegetation of scattered shrubs (manzanita, poison-oak) and a few forbs.

Hardwood/Conifer Community

Management Area	Acreage	Percentage
Private	4900	56
LSR	980	11
Mapped Riparian Reserve	880	10
Partial Retention	610	7
General Forest	1390	16
Total	8760	100

Promote the development of stands that historically were found in the community. Enhance the growth of conifers in areas that historically had, and are capable of maintaining a higher propor-tion of conifers than currently exist.

Mixed Conifer Community

Management Area	Acreage	Percentage
Private	12145	32
* Alienated Lands	3015	8
LSR	15965	41
Mapped Riparian Reserve	1605	4
Partial Retention	1625	4
General Forest	4160	11
Total	38515	100

* Lands that are inside the watershed boundary, but are outside of the Forest boundary.

Promote the development of mixed conifer species and stand structure that were historically sustainable in the watershed. Reintroduce fire at a frequency proportionate with historic frequencies into the community as an ecological process, to promote health and maintenance of the stands. Provide wildlife habitats that are appropriate for the community and the wildlife that has historically utilized the community.

True Fir Community

Management Area	Acreage	Percentage
Private	1870	17
RNA	280	3
LSR	7820	71
Mapped Riparian Reserve	150	1
Retention	30	<1
Partial Retention	430	4
General Forest	510	5
Total	11090	100

Return fire to the community as an ecological process. Promote the development and maintenance of true fir stands and structure that fit the needs of wildlife utilizing this habitat and are sustainable over time. Develop wildlife habitats appropriate to the vegetation and wildlife occurring in the community.

Shrub Community

Management Area	Acreage	Percentage
Private	1660	33
RNA	50	1
LSR	2250	45
Mapped Riparian Reserve	300	6

Shrub Community (Continued)

Management Area	Acreage	Percentage
Retention	40	<1
Partial Retention	480	9
General Forest	270	5

Total	5050	100
Promote, with frequent fire, a variety of densities and age classes of shrubs that are natural to the watershed.		
Grass/Forb Community		
Management Area	Acreage	Percentage
Private	990	34
RNA	10	<1
LSR	1620	55
Mapped Riparian Reserve	50	2
Retention	30	1
Partial Retention	50	2
General Forest	170	6
Total	2920	100
Promote the development of healthy meadows in the crest zone. Increase the size of openings in areas with true fir to near historic conditions. Improve habitats for riparian meadow dependent species, species dependent on the open meadows of the crest zone, and for species that depend on the habitats provided by patches of true fir stands found in and adjacent to open meadows.		

Key Question 2 - Under current management, what are the future trends in the condition of the plant communities?

Hardwood Community - With almost half of this community in private and mapped riparian reserve, very little management activity is planned or foreseen. This community will persist, despite management activity or inactivity, although lack of disturbance is probably least beneficial. Some areas that were hydraulic mined and received added disturbance from flooding, are still recovering, i.e., natural revegetation of these disturbed areas. Although locations that received high amounts of disturbance are usually slow to recover, this community is very stable, recovering quickly from natural disturbances such as fire.

Hardwood/Conifer Community - Two thousand acres of this community are in Partial Retention and General Forest. Management of these areas will promote growth of healthy, sustainable stands of conifers where feasible. The remaining 1,860 acres in LSR and RR will probably receive little to no manage-ment, other than fire suppression. These manage-ment practices have led to stand development which promote conditions for stand replacing fire.

Mixed Conifer Community - Past harvest activities and exclusion of large fires have allowed develop-ment of fuel conditions that will burn so intensely that much of this community will be type converted to a shrub or hardwood/shrub community. Current management practices will not correct this situation prior to occurrences of large high intensity fire.

True Fir Community - Much of this community is in a condition that will support an intense fire, setting it up to be type-converted to montane chaparral. Due to the historically longer fire return intervals and the shorter fire season that occurs at these upper elevations, this community is believed to be closer to its historically maintained condition than other

communities. Current management practices that encourage prescribed underburning could help to reduce the fire behavior potential in this community.

Shrub Community - Most of the shrubs in the watershed are in an older-seral or decadent condition. Green foliage is maintained above browse height, and lower layers are filled with dead limbs. These areas will burn readily. Current management practices encourage continued development of highly volatile fuels, leading to high intensity fires. Most areas of the community will be quick to revegetate from root crowns and seed caches. In areas with extremely high fire intensities, soils will become sterile and erode during winter and spring rains.

Grass/Forb Community - This community has developed on shallow or poor quality soils in the watershed. It is believed that these areas have been recovering since the removal of large numbers of livestock in the late 1940s. These areas will continue to recover and be encroached upon by shrubs and trees as soils develop. Current management practices, especially fire suppression, are expected to promote the continued encroachment by shrubs and trees.

Key Question 3 - What can be done to develop and maintain the desired structure and seral stages of the plant communities?

Determination of the desired structure and seral stages needs to be accomplished at the site. The determination needs to be all encompassing, taking into account current vegetative conditions and site potential, needs for wildlife, fisheries, fire protection, recreation, and commodities output potential. Historic-ally, frequent fire was a major determining factor for structure and age classes of vegetation throughout the watershed. The use of fire in combination with other silvicultural practices will be valuable in developing and maintaining desired conditions.

FIRE

Key Question 1 - What is the desired role of fire in the watershed?

Until recently (the fire suppression era) the fire regime for the watershed could be described as one of frequent low to moderate intensity fires. The vege-tation was adapted to this regime and was maintained in a mosaic of patch sizes, seral stages, and densities. During the past 75 years (the fire suppression era) the conditions which developed are large homogeneous vegetation patches that are not resistant nor in many cases resilient to fire and not sustainable over time.

The desire is to reintroduce fire, prescribed and natural, into the watershed (*Forest Plan* 1995). Using prescribed burning and various silvicultural techniques, restoration of this natural ecological process is possible. This restoration will develop vegetative conditions that are more resilient, resistant to disturbances, and sustainable over time. These conditions will be of greater value to wildlife and human activities.

Key Question 2 - Under current management, what are the future trends for fire in the watershed?

Past fire suppression forces have been very successful in keeping fires small. With these successes, stand densities have increased, and duff, litter, and downed wood has increased. Some stands within the watershed are in a declining state of health. Recent mortality flights identified 22,000 acres within the watershed having moderate to high mortality.

Current forces available are at a historic low and the Forest's budget is expected to decline further. One of the first areas to be reduced as budgets decline will be fire prevention personnel. Reductions in prevention allows for less compliance with fire prevention regulations and a probable increase in human caused fires. Detection (the number of lookouts) will be cut with budget declines allowing fires to burn longer and become larger prior to suppression action. Mortality and heavy fuels build-up, combined with fewer pre-vention personnel, lookouts, and suppression forces will lead to stand-replacing fires. These fires will destroy wildlife habitat, commodities, and contribute to erosion and increased sedimentation to stream channels on both public and private lands.

Key Question 3 - How can fire be incorporated as an ecological process?

Due to early timber harvesting practices and the build-up of fuels during the last 75 years of fire suppression, reintroduction of fire alone will not be sufficient to restore desired vegetative conditions. A variety of site specific treatments need completing in order for fire to be reintroduced as an ecological process. Each site needs evaluation to determine appropriate vegetative condition and treatments that best move towards those conditions. A combination of treatments, and possibly repeat treatments in some areas, will be required to develop these conditions. Some areas may be determined capable of incorporating fire in their current condition. Areas currently consisting of dense conifer stands, may need a series of treatments to develop into stands resistant to fire. By treating strategic locations, it may be possible to isolate and protect other areas currently functioning as quality wildlife habitat, but are not resistant to fire. Treatment areas need defining with geological and/or vegetative boundaries. This requires private and public land managers to work together in planning and implement-ing projects.

Prescribed fire combined with thinning and other silvicultural techniques is successfully being utilized to develop healthy stands in small areas throughout the Forest. Conditions in these locations indicate these joint efforts are promoting healthier, fire resilient forest conditions. Recommendations are to utilize these techniques in the watershed.

By implementing thinning and prescribed fire projects on a larger scale, the threat of stand replacing fires can be replaced with healthy, mixed conifer stands, late-successional forest, and riparian habitat.

Once restoration or establishment of desired site conditions occur, the need for maintenance burns should be addressed. A schedule for maintenance burning can be developed by referencing the historic fire return interval for each vegetation community. Adjustments need to be made based upon desired species composition, aspect, and slope position. Table 5-5. Historic Fire Return Intervals, identifies the historic range of return intervals for each community.

Table 5-5. Historic Fire Return Intervals

Community	Estimated Range of Return in Years
Hardwood	5-15
Hardwood/Conifer	8-16
Mixed Conifer	8-30
True Fir	25-80
Shrub	5-35
Grass/Forb	2-10

WILDLIFE

Key Question 1- What are the desired species and habitat conditions?

Variety and populations of species are directly dependent upon the available habitat. The desired condition for the Beaver Creek watershed is to provide a variety of sustainable habitats that will be utilized by wildlife species which are and have been found in the watershed, and to sustain these species in viable populations over time.

Key Question 2- What are the future trends for the key species and their habitats?

For late-seral dependent species (northern spotted owl, northern goshawk, and pacific fisher) short term habitat improvements are expected as the second growth conifer stands take on more late-seral characteristics such as larger tree size, defects, large snags, and accumulations of large wood on the forest floor. But the long term consequences of 75 years of fire suppression and very dense timber stands most likely will mean a large scale stand replacing fire that will greatly reduce habitat. It would take 80 to 100 years to replace late-seral habitat lost to a stand replacing fire. The current amount and distribution of late-seral habitat will be very difficult to maintain over time without management to reduce fire risk and protection of blocks of late-seral habitat from insects, disease and high intensity fire.

American marten are most often found above 5,000 ft. and associated with true fir forests. As a result of 75 years of fire suppression, 94% of the true fir is greater than 17" dbh, with little diversity in seral stage distribution and stand structure. A natural true fir stand would have a mosaic of groups of even-aged trees, representing all seral stages. This lack of seral stage and structural diversity reduces habitat quality for marten and other wildlife associated with true fir. These conditions in the true fir stands also increase the likelihood of large scale losses of true fir to insects, disease, or especially fire.

Black-tailed deer habitat in the watershed has been in decline since the late 1960s, with poor winter range conditions believed to be the biggest factor. Summer range is declining on Forest

Service lands with the greatly reduced timber harvest and lack of fire; but summer range is being maintained by timber management on private timber lands. Winter range shrub fields are reaching conditions of age and density that greatly limit deer use and make them very susceptible to fire.

The black-tailed deer population seems to be relatively stable at a lower population density than in the past. Habitat conditions on summer and especially the winter range along with the high open road density are most likely the most important factors. Until habitat improvement projects are undertaken and open road densities are reduced, the deer population should remain fairly constant.

Elk populations in Beaver Creek should continue to expand sense current numbers are small in comparison to available habitat. If the elk continue to expand as expected, at some point in the future, open road density and competition for forage with range cattle will limit the elk population. Elk numbers and habitat utilization need to be monitored to determine the watersheds carrying capacity for elk.

The black bear population in Beaver Creek seems to be relatively stable. Under current management, bear numbers and amount of available habitat should not change very much. Timber harvest activities on private lands should continue to provide foraging habitat. But fire suppression and the age class of low elevation shrubs will continue to limit good habitat. The high open road density in the watershed will also continue to limit bear habitat effectiveness.

Little change is expected in the potential great gray owl habitat in Beaver Creek. Grazing pressure on alpine meadows is expected to remain low enough that it should not greatly effect the owls prey base and almost no logging is planned in the true fir stands near these meadows. There is not enough information currently available to even say for sure if great gray owls are even using the watershed much less if the population is stable or expected to expand or decline.

Key Question 3- What can be done to develop and maintain the desired key species and their habitats?

The high density of open roads in the watershed contributes to habitat fragmentation and reduces habitat quality for both riparian and terrestrial wildlife species. By reducing open road densities in critical wildlife areas, fragmentation is reduced and habitat quality increased. Road closures can be accomp-lished through seasonal and permanent closures. By developing road management areas, seasonal closures that are determined by species needs i.e., spotted owl nesting locations during their nesting period, deer fawning areas during the fawning time, could improve habitats while still providing access when necessary .

The upper one-third of the watershed has been designated as part of the Mt Ashland LSR. This is a functioning LSR for late-seral dependent species. Important late-seral connectivity is being provided from the Mt Ashland LSR to the west and southwest through the watershed to adjoining watersheds. Some of this connectivity is through checkerboard ownership. Vegetation management needs to be practiced on both public and private lands to maintain connectivity through the watershed.

Within the LSR, dense conifer stands with high fuel loadings put large blocks of late-seral habitat at risk of being lost to high intensity fire. To keep fire from playing a destructive role,

recommendations for fire management that were outlined in the Mt Ashland LSR assessment should be employed. These recommend-ations include the development of fuel profile zones, which could be used as shaded fuel breaks. These breaks in fuel continuity help fire suppression forces keep fires small and provide points from which fire can be reintroduced into these stands. Recommendations in the assessment for underburning treatment rotations of 20-25 years will allow for the development and maintenance of late-seral habitat characteristics over time.

Due to the effects of fire suppression, areas of mid to late-seral habitat within the mixed conifer and true fir communities exceed stand densities that are appropriate to site capability. As a result, large blocks of late-seral habitat are at risk of being lost to disturbance. To maintain this habitat, stand densities and fuel loadings need to be decreased, creating conditions that are resistant to disturbance. By reducing the densities of smaller sized trees and reducing high fuel loadings that are impacting the health and ability of the larger trees to survive disturbances, this habitat can be maintained. As a result of these treatments, high quality habitat will be provided for goshawks and many other wildlife species.
Also due to a lack of fire, shrub habitats are decadent and are not providing quality habitat for deer summer and winter range. These shrub areas need to be rehabilitated to provide high quality habitat in a mosaic of patch sizes, shapes, and age classes. Opportunities and funding to rehabilitate old shrub-fields should be identified. The Hamburg Deer Herd Management Plan was developed in 1966, and many changes in both habitat and management have occurred in thirty years. An update of this plan should be done to incorporate these changes and identify habitat needs for the future. These plans might provide an opportunity to work collaboratively with Siskiyou County Sportsmen to help improve deer habitat.

Forest edges, meadow and glade areas along the Crest Zone are important for many wildlife species including some Forest Service sensitive species. Conifer encroachment is reducing the size of these meadows and glades. To maintain this important habitat, a management strategy should be developed. This strategy should consider use of natural and introduced fire to halt the encroachment of conifers and maintain sizes and health of meadows and glades.

Although improvements in habitat have been realized with stricter management of livestock grazing, potential conflicts may still exist between livestock grazing and many wildlife species that depend on healthy riparian shrubs and meadows. Little information exists regarding specific habitat needs for many species and the impacts of grazing upon these habitats. To minimize impacts to sensitive species in meadow areas, and riparian and aquatic habitats, habitat needs for these species must be identified. By continuing the inventory of bird species (neotropical program) and surveying for other riparian and aquatic dependent species, and identifying species/habitat relationships, potential grazing impacts can be identified.

A perception has developed both within and outside the Forest Service, that wildlife projects are expensive and cannot generate revenue. There are numerous opportunities to develop projects that will benefit wildlife habitats and that will also generate revenue (wood products). Commercial thinning or fuelwood removal projects can both accomplish wildlife habitat quality improvements and generate revenue. Priorities should be identified by wildlife habitat needs, but where appropriate, commodities can be generated.

HUMAN DIMENSION RESOURCES

HERITAGE (CULTURAL) RESOURCES

Key Question - None identified; background information developed for issue tracking.

Background Information - Historically, the focus of activity has been one of resource extraction. Mining, in particular, has left significant scars on the landscape. More recently, mining activities have been limited to recreational dredging with much of the previously mined land developed into private residences. Road sedimentation as a result of early mining still exists. Land ownership patterns have also shifted from the Southern Pacific Railroad to Fruit Growers Supply Company and Timber Products and management by the Forest Service. Wood products, which was initially provided to local miners and ranchers, was eventually shipped by rail to areas such as southern California and southern Oregon. Of the forty miles of railroad grades that existed, 36 miles have been converted into road systems. Areas previously railroad logged are now dense stands and reflect a change in specie composition (pine to Douglas-fir/white fir mix). Fuel-wood cutting is on the decline due to governmental restrictions and the use of pellet stoves and monitor heaters. Irrespective of past exploitations, humans continue to be instrumental in area ecology.

Information regarding contemporary American Indian issues and concerns is virtually nonexistent at this time. Also, there is the appearance that there is little interest by American Indians in the watershed analysis or in the area as a whole pertaining to traditional or contemporary values and resource use. There are no driving issues such as significant spiritual areas or the use of special forest products. What is known is that American Indians, at present, hunt deer and collect iknish and blackberries. As a result of such limited knowledge, an opportunity would be to conduct more ethnographic research to better define and delineate American Indian traditional and contemporary use areas that can be addressed in future land management activities. The Forest is already learning about indigenous land management and it is expected that more collaborative ecosystem management opportunities will occur in the future. To a certain extent, these issues may be addressed in an existing Memorandum of Understanding (MOU) with the Quartz Valley Reservation. Through the MOU, com-munication is improved and as more information is shared and traditional use areas better defined, it is anticipated that cooperative land steward partnerships with American Indians will increase.

Through the discourse of obtaining ethnographic information, knowledge of existing but unrecorded archaeological sites may be added to the current list of site types (see Step 3). The additional information may be helpful in future land management treatments where the probability of site locations would warrant further archaeological surveys and monitoring of any located sites at the project level. An opportunity would be the prioritization of recorded sites within the watershed for testing to be followed by a determination of significance.

Once the information is retrieved and it has been determined that site(s) are not significant, therefore ineligible for inclusion to the National Register of Historic Places, the area contained within the site can be returned to other Forest management treatments.

ACCESS & TRAVEL

Key Question 1- What resource and social concerns exist with the current road system?

The watershed has a high total road density greater than four miles per square mile averaged across the watershed. The extensive road network is beneficial for response time to fire emergency situations and in many cases, reduces travel time for other administrative needs. Woodcutters, hunters, recrea-tional users, and private landowners benefit from the extensive network. Major private timberland owners and the Forest Service have cooperated in development, maintenance and management of a joint transportation system to access intermingled timber lands. This cooperation serves the needs of all parties rather than each party developing a road system that only meets their individual needs.

The Siskiyou Crest Road, Forest Road 20 and 40S01, travels in and out of the watershed along the northern boundary between Mt. Ashland and Condrey Mtn. This road provides a great opportunity for sightseeing of alpine type forest, wild flowers (especially from June to early-July), wildlife, rock formations, cattle grazing, and fantastic views of the vast countryside on both sides of the Siskiyou Crest. The Siskiyou Crest Road also provides access for hunting and hiking opportunities. The main access routes low in the drainage, Beaver Creek Road 11, West Fork Road 47N01, and Long John Road 40S16, are located near major streams where one can fish, camp, or just enjoy scenic streams.

The high open road density in the watershed is a concern for the potential effects on wildlife. The large number of roads contributes to increased edge habitat and reduced forest patch size. This can have a detrimental affect on many wildlife species and has been shown to reduce avian diversity (McIntyre 1995). High open road density can also lead to wildlife disturbance during critical nesting and fawning times. During hunting season, the high open road density greatly reduces escape and hiding areas.

Historically, the road system in Beaver Creek was maintained by Forest Service road maintenance crews, road cooperators, and timber sale contractors as part of timber sale contracts. With declining road maintenance budgets and reduced Forest Service harvest, most road maintenance is being accomplished by cooperators in conjunction with their land management activities. The result is now many roads open to public travel can go years without needed maintenance (clearing shrub and obstructions, culvert cleaning, and drainage structure repair). This lack of maintenance can lead to resource damage and liability claims against the government from vehicle accidents. Another potential road system problem is that some drainage structures are reaching their life expectancy and could need repair or replacement to prevent resource damage.

Travel and access management over the current road system is a primary concern of many Forest users. Many groups and individuals prefer the roads opened and maintained for access for hunting or other activities. Others are in favor of closing roads, from seasonal closures to decommissioning roads, to improve wildlife habitat conditions and watershed health. Although most roads in the watershed are currently open, travel access management strategies are used in some locations with the intent of minimizing resource-use conflicts. However, vandalism and unauthorized removal of travel control structures (gates and barriers) has limited the ability of the Forest Service to manage the road system.

Key Question 2- What are the future trends in road uses, needs, and management?

Recreational uses of the road system are likely to continue similar to the existing situation (see Recreation section). The needs of the road system for resource management will change. Roads within the northern third of the watershed, in the Late Seral Reserve (LSR), will not be needed to access timber resources because the area is no longer open for programmed timber harvest. The road system will still be needed for maintenance of the LSR (prescribed fire, fire suppression, thinning, etc.) but all of the current roads will not be needed. Roads accessing private lands, and National Forest lands open for scheduled timber harvest will be utilized as in the past.

Future management of the road system will involve maintaining open roads for recreation and forest management. However, money for road maintenance will probably continue to decline. Much of the road management money in the past was provided through timber sales. With few National Forest timber sales expected in the future, especially in the LSR, timber sales will not provide maintenance dollars. The result is minimal repair of road related erosion and road closures through lack of maintenance rather than by design.

COMMUNITY VALUES & PRIVATE LAND USES

Key Question 1- How does the landownership use pattern affect management of lands within the watershed?

With the passage of the *Pacific Railway Act of 1864*, every other section (approximately fifty percent of the land) in Beaver Creek was deeded to the Southern Pacific Railroad, thereby creating a "checkerboard" effect of land ownership. Approximately 14% of these lands in the northern half of the watershed were later exchanged with the Forest Service, leaving 36% (25,000 acres) in private ownership.

Some of the lands that were mined for gold, were later patented. Today these lands continue to be utilized for mineral extraction or have developed into private residences. Those lands with residences are located in high fire behavior potential areas, and would therefore require special considerations for fire prevention and suppression. A desired condition is that cooperative fire prevention inspections are regularly conducted to minimize fire hazard.

There are numerous domestic water users in the area. Water is diverted from Beaver Creek via two irrigation ditches. These ditches supply numerous homes with water, as long as they maintain flows, though few utilize them as their primary water source year-round. They also provide aquatic habitat for terrestrial species, especially during summer months. Its likely that impacts to the aquatic resources in Beaver Creek from ditches are minimal during high water years. A potential for impacts to aquatic habitat exist during drought years if annual utilization exceed flows.

The Beaver Creek watershed provides important habitat connectivity for many late-seral dependent wildlife species. Much of this connectivity habitat is through areas of interspersed Forest Service and private timber lands. Cooperation between Forest Service and private foresters on land management practices is needed to maintain this connectivity.

With large areas of interspersed lands in the watershed, management needs and desires of public and private land managers can possibly be at odds. Fuels reduction and road management are two examples. In order to effectively manage the resources at the watershed

level, cooperation between public and private land managers is essential to reduce danger of catastrophic fire and to reduce road related sediment sources.

It is anticipated upon completion of the Environmental Education Center in Beaver Creek that Yreka High School will be a player in collaborative resource management. Jobs created for youths during field seasons will contribute to well-being and financial gain of students and provide a means to implement Forest and watershed restoration and management projects. Activities could include effectiveness monitoring of long-term projects and/or activities to move towards desired conditions and provide opportunities for stu-dents to be exposed to Forest Service researchers and statisticians.

RECREATION

Key Question 1- What are the future trends for recreation uses in the watershed?

Dispersed recreation, both day use and camping, take place in many undesignated locations along Beaver Creek. These uses may cause damage to riparian vegetation and affect water quality through surface erosion and lack of toilet facilities.

While traditional activities in the watershed, e.g., scenic drives to the Crest Zone, camping, dredging, swimming and waterplay, fishing, hiking, and hunting will remain popular, mountain biking, and winter activities are expected to increase.

Winter recreation activities exponentially increase with use on Mt Ashland Ski Area. Nordic skiers, snow-mobile clubs, and others are requesting designation of use areas that are within the watershed and away from the area along the crest utilized by cross-country skiers. As recreational utilization increases, a strategy will need to be develop to accommodate all users. Collaboration with the Rogue River National Forest will facilitate development of a recreational strategy for future winter activities along the Crest Zone.

Hunting is a prominent use of the watershed. Previous public meetings about road management raised opposition from hunters who wish to maintain current access routes.

As the rural lifestyle and associated natural setting prevalent to the watershed become increasingly rare, recreational opportunities in the area will increase in value.

As recreation use increases, so will volume of traffic on local roads. This will increase the need to actively coordinate with other landowners to manage the road system for its recreational value and public safety.

There will continue to be a limited seasonal influx of people into the area as a result of mineral prospecting activities.

There are three botanical and one geologic Special Interest Areas (SIAs) located along the Crest Zone. Man-agement of these areas promote education, research, interpretation, and enjoyment of the special interest values when such activities do not harm the values for which the area was designated. Minimal signs of management activities, other than to provide public access should occur in these areas. Where these SIAs exist, viewing areas could provide interpretive displays to promote public education. If a crest zone management strategy is developed, it could include the SIAs and potential interpretive or research management, since

it is unknown whether the botan-ical SIAs require fire to act as a natural ecological process. The Crest Zone SIAs are identified as the number one priority for a management plan on the Forest.

Visual resource management is to meet or where possible strive for higher adopted visual quality objectives (VQOs). Management strategies to reha-bilitate landscapes that do not currently meet adopted VQOs should be developed for areas of concentrated use.

COMMODITIES

Key Question 1- What are the future trends in the utilization of commodity resources in the water-shed?

Fuelwood - Over the past five years, personal use fuelwood cutting has been declining, a trend that may continue. Because of the restrictions imposed on firewood cutting and smoke emissions, it will become more difficult to find cutting areas. Consequently, the work involved to find these areas will deter many users from cutting. Modern technology has introduced more efficient alternatives to wood cutting, such as pellet stoves and monitor heaters. The gathering of fuelwood will continue to decline.

Commercial Use - Due to harvest methods used in the past, the watershed now has potential commercial size wood products. There are many areas that will need precommercial thinning. The size of material presently fits the specifications needed for use as commercial firewood, post, and pole areas. There are other areas that could be utilized as commercial Christmas tree cutting areas, although elevation has the potential to limit this use. Winter road use, especially those on decomposed granite, can have an impact. Early winter snows have prevented commercial Christmas tree harvesting in the past. Commercial use should continue in the area at the present rate, and may increase in the future with new technology.

Special Forest Products - Requests for special forest products have increased tremendously over the past five years as individuals today become more resourceful. This is a trend which is expected to continue in the future. The extended Christmas season for example, brings requests for boughs and cones earlier and extending later in the season than before. Because of the extended season/holiday, and other events the requests for decorative products will be increasing in the future.

Timber - Over the last ninety years timber harvest has been an important activity and driving force in the development of this area. The community of Hilt, Yreka, and Happy Camp evolved around this industry and an extensive transportation network was developed that accesses this area. Current wood products (i.e., chips, sawlogs) help support the timber industry in the communities of Medford, Oregon and Yreka and McCloud, California.

In the late 1980s, harvest levels plummeted as the market dropped. Some sales were overbid by timber companies and bought back by the federal govern-ment. Many companies were not re-tooled (for second growth) or decided to wait for more old-growth sales. Hence local companies did not purchase commercial thinning sales offered in the watershed in the 1980s. Timber removal from the watershed continued to decline through the early 1990s with the spotted owl controversy. Many of the previous commercial thin sale areas are now included in

the Ashland LSR. Today the *Forest Plan* estimates an average annual timber sale volume of one MMBF for the Beaver Creek watershed.

Current timber management direction is guided by laws, regulations, and the *Forest Plan*. About 25% of the public lands in Beaver Creek are available for regularly scheduled timber harvest, as outlined in the *Forest Plan*. The land allocations available for scheduled timber harvest in Beaver Creek include Retention Visual Quality Objective (VQO), Partial Retention VQO, and General Forest. The total for these three areas in Beaver Creek is 11,100 acres, based on updated mapping. The majority of the acreage is in the Partial Retention and General Forest land allocations with only a small portion (about 100 acres) in Retention. The Retention land allocation is expected to provide for low levels (approximately five percent of standing timber volume per decade) of timber harvest; Partial Rentetion and General Forest are expected to provide moderate levels (approx-imately 16% of standing timber volume per decade) of timber harvest.

This analysis refined from the *Forest Plan* the amount of lands available for scheduled timber harvest. The *Forest Plan* estimate of available land allocations is 12,800 acres, somewhat higher than the refined estimate. The difference is primarily due to updated Riparian Reserve mapping and the plotting of 100 acre LSRs (100 acres surrounding known spotted owl activity centers outside of the large Late-Successional Reserve).

Other factors influence the timber harvest land base. The *Forest Plan* put temporary timber harvest restrictions on Areas with Watershed Concerns (AWWCs). This includes about 7,600 acres of available lands as determined in the *Forest Plan*. An allowance is also made for "harsh sites", areas within available land allocations that do not and probably cannot support conifers at sufficient stocking for sustained timber harvest and regeneration. This includes about 1,400 acres of available lands outside of the AWWCs. Finally, another 42% of the subtotal is assumed to be unmapped Riparian Reserves, streams and wet areas that have not been mapped and may not be discovered until projects are laid out. The refined total for this analysis is about 2,200 acres available, capable, and suitable of supporting a sustained timber program. This is displayed in Table 5-6. *Forest Plan* and Updated Lands Available for Scheduled Timber Harvest (see Figure 5-4 Lands Available for Scheduled Timber Harvest).

An updated timber harvest land base includes more changes than the available land allocations already mentioned. A reevaluation of Areas with Watershed Concerns has changed areas with timber harvest restrictions resulting from watershed concerns (see Aquatic Resources section). Current AWWCs include 1,500 acres of available timber harvest land alloca-tions. Harsh site areas have not been refined from the *Forest Plan,* although refinement is necessary for accurate estimates. Time limitations did not allow for refinement of harsh sites in this analysis. The acres of harsh site in the updated land base estimate is 1,700 acres, greater than *Forest Plan* estimate due to masking of some harsh site by *Forest Plan* AWWCs. Finally, no additional area is estimated to be unmapped Riparian Reserve because the updated mapping is assumed to closely approximate actual Riparian Reserves. The total for updated available, capable, and suitable lands is 7,900 acres displayed in the following table.

Table 5-6. *Forest Plan* and Updated Lands Avail- able for Scheduled Timber Harvest

Land Allocation or Modification	*Forest*	Updated

	*Pla*n Acreage	Acreage
Lands Available for Timber Harvest	12,800	11,100
Available Lands in AWWCs	-7,600	-1,500
Harsh Sites Outside AWWCs	-1,400	-1,700
Subtotal	3,800	7,900
Unmapped Riparian Reserves	1,600 *	0
TOTAL	2,200	7,900

* assuming 42% of subtotal is unmapped Riparian Reserve

TRENDS: Due to the amount of land in the watershed that is taken up by LSRs or Riparian Reserves, commercial timber production should increase to one MMBF on remaining lands.

Future sales will consist of volumes between one and two MMBF (Million Board Feet), every two to five years. The prescriptions which will be used for the area will include salvage and sanitation.

One trend will be an increase in existing and potential commercial thinning opportunities. Basically, thinning will be the major future commercial timber output for the watershed. Although thinning needs to be accomplished in the LSR, it will not contribute to the Forest's Programmed Sale Quantity.

Timber harvest activities will be focused on forest health for the next five to ten years. Significant mortality of the white fir in mixed conifer communities will provide salvage opportunities. Much of the short term programmed timber harvest will emphasize salvage.

Thinning overstocked stands for forest health will also provide both short and long-term timber harvest opportunities. The timber industry utilizes commercial thinnings for dimensional lumber from small sawlogs.

Mining - Gold mining, primarily placer deposits, in Beaver Creek drainage began in the late 1800s. By 1900 the majority of the gold bearing gravel had been mined out.

Today, there are only a few recreation miners operating small diameter suction dredges and pick/shovel and panning operations with no major surface disturbance occurring.

Current mining operations within the analysis area are short-term, small scale, and recreational in nature. The projected future trend is no change.

Livestock Grazing - Extensive cattle, sheep, horse and mule grazing historically occurred within the analysis areas. The land affected by grazing today is a much smaller portion of the watershed/landscape. Allotment boundaries have been changed and the demand for grazing on forest lands had decreased since the late 1800s when miners and other settlers needed lands to feed their animal throughout the year.

Potential areas of high risk from localized impacts to the aquatic environment (grazeable areas less than five percent gradient) occur in Beaver Creek, and tributaries. Sixteen miles of stream within the area are within the anadromous fish distribution range and overlap with potential cattle use. Impacts to steelhead from livestock moving up the creek may exist in Cow, Grouse, and Lower W Fork of Beaver Creeks. Since cattle of permittee #2 turnout June 15 as fry are emerging from gravel impacts may exist in the lower portions of W Fork where slope is between 0-5% (see Figure 3-13 Grazing Allotment/Livestock Distribution, contained in the Map Packet located at the end of this document). These are very small percentages of the stream.

Permittee #1 livestock may impact redds and fry on years of low water because of earlier turnout dates at Dutch Creek. Impacts will probably only occur where slopes are 0-5% around stream beds since that is where cattle tend to congregate. Most years the young fish will be out of the gravel before the cattle reach the higher elevation spawning areas.

Permittee #1 livestock may impact steelhead redds and fry in Cow and Grouse Creeks due to turn-out dates of that allotment. During years of high water and cooler temperatures impacts will be lower since cows will move through creek areas later in the spring; see more discussion on fisheries resource in the Aquatics section.

The trends occurring in relation to streambank stability, channel morphology, soil compaction, or erosion rates are unknown at this time. To determine trends in regard to grazing effects on these concerns, additional study and monitoring is needed. However, it is assumed from available information on mining, roading, and logging, grazing impacts on the aquatic environment are minor in scale.

Trends in rangelands in the watershed on average are improving since grazing seasons have been shortened and livestock numbers have been reduced to coincide with these short-end seasons and the change in available grazing acres due to fire suppression and private land development.

Most key areas within foraging areas within the allotments in this watershed analysis area are meeting direction provided in the ACS and *Forest Plan*. There are a few areas of concern regarding past livestock management on a specific allotment. These areas are listed by allotment below and discussed.

Dry Lake Allotment - Open areas on ridges near Dry Lake lookout; These areas are sparsely vegetated due to severe soil conditions including little soil moisture. Cattle move through the area, but rarely graze there. Site capability is extremely limited and management changes will not effect the vegetation condition of the area. Further discussion of these "barren" areas is included the Terrestrial Section.

A joint strategy with the Rogue National Forest will be implemented through range permit administration. The last couple of seasons this strategy has been incorporated into the range permits issued by both forests. Another strategy is to manage the crest zone as a single management unit while maintaining allotments for both forests would be allowed and manage forage utilization instead of livestock distribution. Management strategy is to graze up to permitted utilization standards, this strategy could be included in the future SIA Management Strategy.

Currently a corral is being built at Siskiyou Gap to facilitate permittee gathering to move cattle back down into the watershed to utilize other forage opportunities.
Dead Cow Creek at the headwaters of Jaynes Creek is an area of concern because three permittees cattle are concurring utilizing this area. The forage and riparian resources are being over utilized by livestock. The solution to this situation is corrective actions through range permit administration and thus proper utilization of forage levels.

East Beaver Allotment - East Long John; This area is a favorite site for livestock and receives high use in most years. The 1994 utilization measurement in the wet site was 70%. The dry types in the same area, however, are 22% and 25% (Horse Creek/Beaver Creek/Haystack Watershed Analysis 1996). Cattle need to be moved out of the area periodically to achieve lower utilization levels. A corral located near Meridian would facilitate this process.

This area is east of Siskiyou Gap and is an area where cows congregate and move into McDonald Basin on the Rogue National Forest. This basin was not issued a range permit due to the numerous sensitive plants located there. So cattle trespassing from the Klamath side, to springs for water in the basin, continues to be an undesirable situation and no real on-the-ground solution exists due to terrain and open road densities.

DESIRED CONDITIONS

Desired conditions consider ecological principles and processes along with planning direction. The ecosystem approach integrates all resources, including the demands and effects of people, as components of the ecosystem. The desired conditions for this document are presented by Issue, as introduced in Step 2. The desired conditions are derived from planning direction as modified by the results of the analysis presented earlier in this document.

The planning direction for determining desired conditions is derived from all appropriate laws and administrative direction, including the *Record of Decision of the Northwest Forest Plan* (*ROD*). The *ROD* provides standards and guidelines for management of habitat for late-successional and late-seral forest related species within the range of the northern spotted owl. The *ROD* established a system of Late-Successional Reserves (LSRs) to provide habitat and connectivity for late-seral species. The *ROD* also established the Aquatic Conservation Strategy to restore and maintain the ecological health of watersheds and aquatic ecosystems. This strategy includes the establishment and management of Riparian Reserves and key watersheds, completion of watershed analysis, and watershed restoration.

The *Forest Plan* incorporates the *ROD* and Aquatic Conservation Strategy. It identifies land allocations, desired conditions, and standards and guidelines for Klamath National Forest lands. This analysis incorporates and relies on the *Forest Plan*. A brief summary of *Forest Plan* land allocations and desired conditions follows to provide a basis for the desired conditions presented later in this chapter.

The analysis area contains seven *Forest Plan* Management Areas on National Forest lands; Research Natural Areas, Late-Successional Reserves, Special Interest Areas , Riparian Reserves, Retention VQO, Partial Retention VQO, and General Forest. Table 5-7. Management Area Acreage, Percentage, and Scheduled Timber Harvest Level, shows acreage, percentages of National Forest lands within the watershed, and the Scheduled Timber Harvest Level by Management Area; see Figure 5-5 *Forest Plan* Land Allocations, contained in the Map Packet located at the end of this document, for visual distribution.

Table 5-7. Management Area Acreage, Percent-age, and Scheduled Timber Harvest Level

Management Area	Acreage *	%NF Lands	Scheduled Harvest Level
LSR **	29,060	66	None
Special Interest Areas	360	1	None
Riparian Reserves	3,560	8	None
Retention VQO	110	<1	Low
Partial Retention VQO	3,690	8	Moderate
General Forest	7,330	17	Moderate
TOTAL	44,110	100	

* The reported acreage is updated from the *Forest Plan* data layers and does not include the 25,560 acres of private and BLM lands in the watershed. ** Includes RNA acreage.

The Mt. Ashland **Late-Successional Reserve** occu-pies the largest portion of the National Forest land in Beaver Creek. Included in this acreage are 100 acre LSRs depicted as circles around existing northern spotted owl activity centers outside of the larger LSR. The actual boundaries of the 100 acre LSRs will be determined upon completion of surveys. The goal of LSR management is to provide habitat for late-seral dependent wildlife over the long-term.

Special Interest Areas in the analysis area are the Mt. Ashland/Siskiyou Peak, Observation Peak, and Red Mountain botanical areas, and the Condrey Mtn. Blueschist geologic area. The three botanical areas have plants endemic to the Crest Zone and, in the case of Red Mountain, serpentine areas. They encompass a total of 1,690 acres within the Mt. Ashland LSR and are a part of that management area. They are designated to provide recreational and educational experiences consistent with LSR objectives. The Condrey Mtn. Blueschist geologic area provides an example of rock formed at very high temperature and pressure in the Klamath Mountains. The management area is designated to provide for education and interpretation of the unique geologic feature for Forest visitor appreciation.

Riparian Reserves are for the protection of aquatic dependent species. They are approximated for this analysis as described in Step 3 - Riparian. The actual Riparian Reserve boundaries are to be determined on- the-ground as described in the *Forest Plan* and in this document. The acreage reported in Table 5-1 is only the land allocation so does not include riparian areas in the LSRs.

The **Retention VQO**, **Partial Retention VQO**, and **General Forest** areas have timber harvest expectations and scheduled yields. The primary difference is the visual quality objectives. The Retention VQO areas provide attractive scenery by maintaining natural or natural-

appearing conditions adjacent to the Pacific Crest Trail or the Klamath River Road. The expectation for timber output is low because of the visual considerations. Partial Retention provides an attractive landscape where management activities remain visually subordinate to the natural character of the landscape. General Forest areas have less restrictive VQOs of either modification and maximum modification. Timber outputs are considered moderate for the Partial Retention and General Forest areas, approximately 16% of the standing timber volume harvested per decade.

Some portions of Beaver Creek are labeled "Harsh Sites" in the Forest Data Base. This includes about 1,700 acres in the Retention, Partial Retention and General Forest management areas. The "Harsh Site" label does not change the underlying management area, rather it is used to approximate the areas which will not have scheduled timber harvest due to site limitations.

Issue-Roads - Beaver Creek has a very high road density, about 4.1 miles per square mile as a watershed average. The majority of these roads remain open year-round, unless closed by snow as is common in the higher elevations. The roads provide easy access for fire suppression and have contributed to nearly complete wildfire exclusion over the last forty years. They also provide roaded access to nearly the entire watershed for recreation, commodities, and private land access. Continuing reductions in the road maintenance budget have reduced the number of road miles that can be maintained. The detriments of the road system include stream sedimentation (roads are the primary sediment source in Beaver Creek), impacts to riparian areas, and impacts to wildlife through habitat fragmentation and harassment.

Some of the roads in the watershed are primary access routes (arterial, collector, and important local roads) and need to remain open to the public. Other cooperative roads provide access to private lands and need to remain open unless agreement is reached with the cooperators. Many local roads not heavily used currently will need to be used in the future for management activities. This is especially true in the General Forest and Partial Retention management areas where programmed timber yields are expected.

DESIRED CONDITIONS

Road sediment delivery to stream channels is minimized.

Roads in the Riparian Reserves are managed to meet Aquatic Conservation Strategy objectives.

The miles of open roads are managed at a level that does not contribute to reduced habitat quality.

Fire suppression access is maintained commen- surate with risk and fire behavior potential.

Access routes to high-use recreational areas are provided. A transportation system is in place for commodities extraction and forest management.

The network of roads providing access to private lands are in a condition that minimize resource damage.

Issue-Terrestrial Wildlife Habitat - Beaver Creek provides habitat for many wildlife species; from northern spotted owls to deer, elk, and neotropical landbirds. Beaver Creek is an important link in the late seral connectivity from the Oregon Cascades to the Klamath Mountains. Maintaining good habitat condi-tions in the LSR and riparian reserves is critical to late seral connectivity. This habitat has been fragmented by past timber harvest and road construction. Currently much of the existing late seral habitat is at risk of being lost to catastrophic disturbance.

Habitat quality for many other wildlife species has also been impacted by past management and fire suppression. Key winter range for deer has greatly reduced forage value due to dense decadent shrub fields, conifer encroachment has reduced crest zone meadow habitat and the extensive road network exposes many wildlife species to habitat fragmentation and harassment.

DESIRED CONDITIONS

Late seral connectivity to adjacent watersheds is perpetuated over time.

Late seral habitat is maintained in conditions that are resistant to large scale disturbance.

High quality habitat for all wildlife species exists in a mosaic of patch sizes, shapes and age classes.

Crest zone habitat of forest edges, meadows and glades is maintained over time.

The open road system is managed at a level that does not contribute to reduced wildlife habitat quality.

Wildlife habitat improvement projects are used to foster cooperation with other agencies and local groups and also where appropriate generate commodities.

Issue-Fire Management - Current vegetative condi- tions in the watershed are identified in this analysis through fuel modeling as having mostly high fire behavior potential (53% of the watershed). Moderate fire behavior potential is identified in 39% of the watershed. The fire behavior potential ratings identified in this analysis are directly related to high fuel loadings in the conifer communities and decadent conditions in the hardwood/shrub communities.

Available fire suppression forces, adequate detection, and good road access throughout the watershed are credited for effective fire suppression in the watershed. With reductions in the Forest budget have come reductions in the numbers of suppression, prevention, and detection personnel. Current vegetative conditions combined with reductions in fire personnel and road closures sets the stage for large high intensity fires that will destroy wildlife habitat and commodities on both public and private lands. These fires will also contribute to erosion and increased sedimentation to stream channels on both public and private lands.

Current prescribed fire uses in the watershed are tied to timber sale areas on both public and private lands. The burn areas are delineated within landownership boundaries, not by geographic and/or vegetative conditions. This type of burning does not utilize fire as a natural ecological process and thus the benefits are less than what could be realized if fire was utilized as an ecological process.

DESIRED CONDITIONS

A majority of the watershed in a condition where fires exhibit low to moderate fire behavior. Conifer communities and hardwood/shrub communities are perpetuated with frequent low to moderate intensity fire.

Fire is allowed to function as an ecological process across landownership boundaries.

The needs of aquatic and terrestrial species are balanced with fire behavior potential to perpetuate functioning Riparian Reserves.

Fires play a nondestructive and natural role allowing for the development and maintenance of late-seral habitat characteristics over time.

An organization capable of 1) maintaining a prevention presence and reducing the occurrence of human caused fires, 2) providing fuels treatment to significant amounts of acres in order to reduce fuel loadings, improve wildlife habitat, protect commodities, and allow fire to act as a natural ecological process, 3) monitoring prescribed natural fires, and 4) detecting and suppressing fires when necessary.

Issue-Timber Outputs - Current *Forest Plan* estimates are an average annual timber sale volume of about one million board feet per year. This estimate is based on total acres of land in the Retention, Partial Retention, or General Forest land allocations and not mapped as harsh sites, Areas with Watershed Concerns, or assumed to be unmapped Riparian Reserves. Updated mapping and analysis have modified the acreage available for scheduled timber harvest.

Short-term and periodic future timber yields are expected from salvage of dead and dying trees. Salvage and thinning may occur in the LSR and other lands not available for scheduled timber harvest. The long-term sustainable yield is expected only from the Retention, Partial Retention, and General Forest land allocations. Future timber harvest may provide benefits to other resources (wildlife, aquatics, visuals, etc.) or should not impact other resources to undesirable levels.

DESIRED CONDITIONS

Lands labeled as available for scheduled timber harvest in forest planning reflect as near as possible the actual watershed conditions for available and capable lands.

Beaver Creek contributes to a Forest wide ecologically sustainable timber program that provides an even flow of wood products.

Unavailable land allocations provide some periodic timber yields through salvage and commercial thinning consistent with the land allocation objectives.

Timber output opportunities are consistent with land allocation goals.

Issue-Forest Health - From the 1920s through the '50s, much of the Beaver Creek watershed was logged first by railroad and later with tractors. Most of the high value ponderosa pines and sugar pines were removed. Without an adequate seed source for pine regeneration and the removal of fire as a thinning agent, what has developed are dense stands of Douglas-fir and white fir on most sites with a much smaller component of ponderosa and sugar pine. These stand densities are leading to inter-tree competition for moisture and space, which can result in increased mortality and little resistance to catastrophic disturbances such as high intensity fire. The areas of greatest risk are the drier south and west aspects that were historically open pine dominated stands adapted to frequent low intensity fires.

DESIRED CONDITIONS

Stand densities in mixed conifer and true fir types are commensurate with site capability, and conifer mortality is maintained to near endemic levels.

The mixed conifer type contains a component of pine species closer to historic ranges and densities.

Issue-Human Uses - The Beaver Creek watershed is used for a variety of human uses besides timber harvest. Various types of recreation occur, special forest products are collected, and contemporary American Indian uses occur. The watershed contains two range allotments, an almost completed Environmental Education center, several archeological sites, and an intermix of private commercial forest and smaller private properties.

Some conflicts or potential conflicts between various human uses or human uses and other resources. Grazing has potential to impact habitat for aquatic or riparian dependent wildlife. Cattle grazing outside of allotment boundaries has caused conflict with other forest users or resource managers. Dispersed recreation in riparian areas has had some impacts on streams and riparian vegetation.

DESIRED CONDITIONS

The livestock grazing levels and distribution in the watershed do not significantly impact aquatic and riparian habitat. Livestock do not stray from the designated grazing allotments.

Dispersed recreation sites in riparian areas are managed in a manner consistent with Aquatic Conservation Strategy objectives.

The Environmental Education Center is fully functional, providing educational opportunities for local youths and cooperators with the Forest Service in accomplishing management goals.

Winter recreation access and opportunities are provided commensurate with public needs.

Archaeological sites are protected as needed. Forest Service managers have a good understanding of American Indian traditional and contemporary values.

Activities on private and public lands are complementary toward mutually agreed objectives.

Issue-Riparian/Aquatic Habitat - The riparian and aquatic habitat in Beaver Creek is currently affected by roads in the Riparian Reserves, upslope roads and other disturbances that cause erosion and stream sedimentation, and residual effects of past mining, grazing, and logging in riparian areas. Cumulative watershed impacts have resulted in impaired fish and amphibian habitat quality, mostly excessive fine sediment in streambeds. To improve aquatic habitat, the most important need is reducing sediment input to streams.

The Riparian Reserves are important for terrestrial wildlife corridors as well as riparian and aquatic habitat. The Riparian Reserves in Beaver Creek provide some late seral habitat outside of the LSR but due to a lack of potential habitat south and east of the watershed, late seral connectivity between LSRs is only important in the Jaynes Canyon subwatershed. Existing riparian area vegetation is mostly in good shape except for smaller than historic average tree sizes and some barren areas.

DESIRED CONDITIONS

Riparian Reserves are maintained in a condition that provides dispersal habitat for a wide variety of terrestrial and aquatic species.

A variety of plant species and seral stages in Riparian Reserves are perpetuated to support neotropical migrants and other riparian dependent species.

Late-seral Forest habitat in Riparian Reserves is adequate to provide CWM recruitment and stream shade. Continuous vegetation exists along streams.

Habitat is sufficient for sustainable populations of indigenous aquatic species. Fine sediment in streams is reduced to levels consistent with good quality aquatic habitat.

All subwatersheds in Beaver Creek are functioning properly so none are considered AWWCs. Upslope effects to aquatic habitats are minimized.