Chapter 5 - Current Conditions

This chapter presents the current conditions of resources relevant to the three issues identified in Chapter 3. These resources include vegetation and associated wildlife habitats, aquatic resources and resultant fish habitats. Current range, distribution, condition and trends of these resources are described. Lastly, a brief summary of current human uses and expected trends is included at the end of the chapter.

VEGETATION

The Indian/Deadwood watershed lies completely within the Western Hemlock (*Tsuga heterophylla)* Zone (Franklin and Dyrness 1988). Douglas-fir, western hemlock and western redcedar are the most common overstory tree species. The current dominant tree species is Douglas-fir because of the large fires in the 1850's and 1930's and intensive timber management during the last 30-40 years. Red alder regenerates readily in areas recently disturbed either by landslides or logging. Currently, it is most commonly found in wet areas, especially along valley bottoms and riparian zones.

Seral Stage Distribution

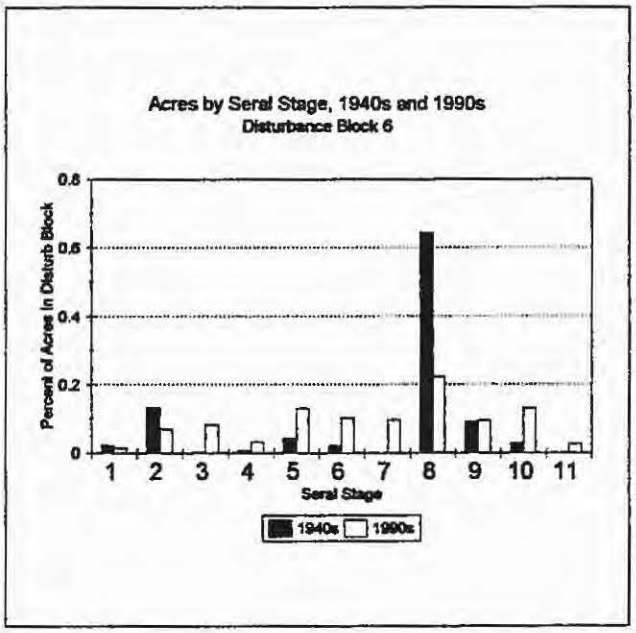
The watershed contains a wide distribution of seral stage vegetation types, as shown on Map 5.1. Since the 1950's, when intensive timber management began, there has been a decrease in mature conifer distribution and patch size, an increase in early seral and young conifer and conifer-mix, and an increase in pure deciduous stands. These changes are displayed in Table 5.1 and Figure 5.1. Figure 5.2 shows the differences in mean patch size of each seral stage. The trends in differences between the seral stage distribution of the 1940's and 1990's are similar to those described in the Federal Lands Assessment (USDA 1995b) and other watershed analyses on the Forest.

Mature conifer currently occupies the most area (24%), though this is much less than the 60% that existed in the 1940's. Past timber management activities, including harvesting mature conifers and soil compaction from road building, has probably increased the area occupied by deciduous stands on upper and mid slopes in wet environments. Alder is more competitive than conifer on these sites following disturbance and conifer regeneration has been poor. The southeast portion of the watershed contains pure deciduous stands, which may be due to numerous reburns and poor conifer seed source.

Table 5.1. Changes in Seral Stage Distribution from the 1940's to Current (Acres and Percent)

Legend	Seral Stage	1940's	Current
1	Grass/Forb	1,810 (2%)	1,148 (2%)
2	Very early seral	9,427 (13%)	4,942 (7%)
3	Early seral conifer	1,220 (2%)	4,856 (7%)
4	Conifer and deciduous-mix pole	782 (1%)	1,799 (2%)
5	Young conifer	5,578 (8%)	8,593 (12%)
6	Young conifer-mix	1,719 (2%)	5899 (8%)
7	Young & mature deciduous-mix	233 (0%)	7,129 (10%)
8	Mature conifer	43,819 (60%)	16,586 (24%)
9	Mature conifer-mix	6,432 (9%)	7009 (9%)
10	Pure deciduous	2,074 (3%)	10,242 (15%)
11	Multi-storied, late seral	Unknown	2,047 (3%)
	Total	73,094	70,250

Note: Data is for all landownerships, but does not include the Lower Lake parcel due to different vegetation mapping.



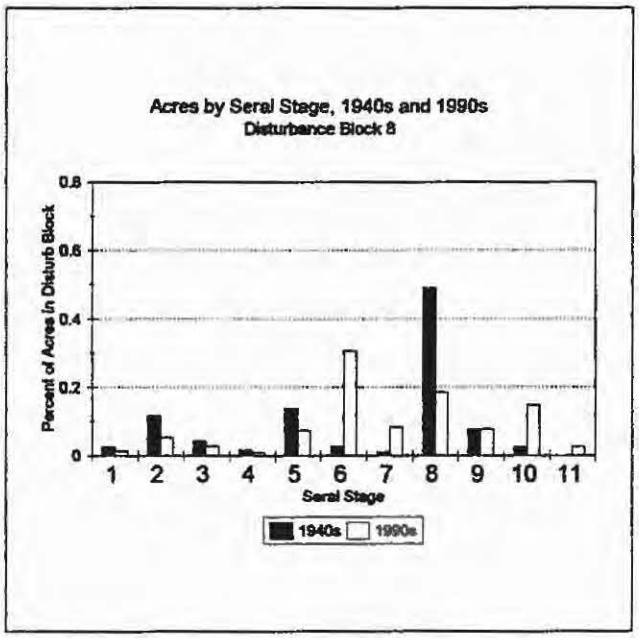
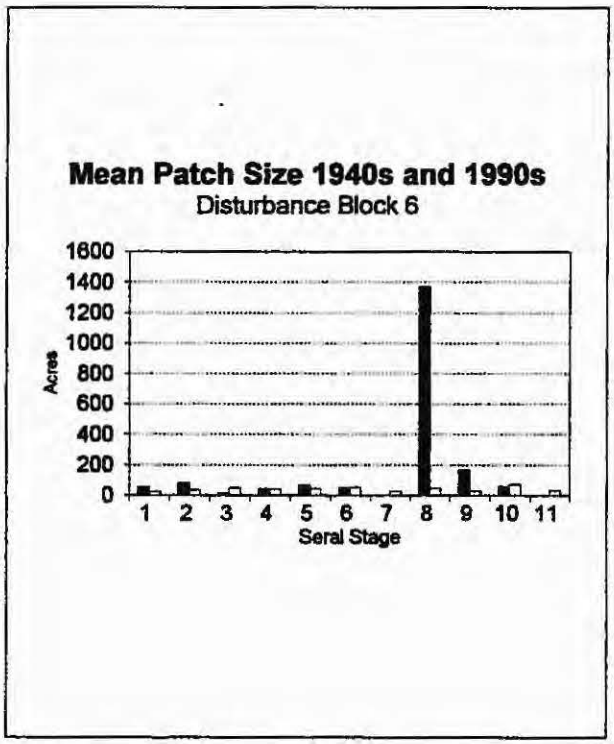


Figure 5.1. Percent seral stage acres in 1940's and 1990's; - Block 6 (left) and Block 8 (right)
(Refer to Table 5.1 for legend of seral stage numbers.)



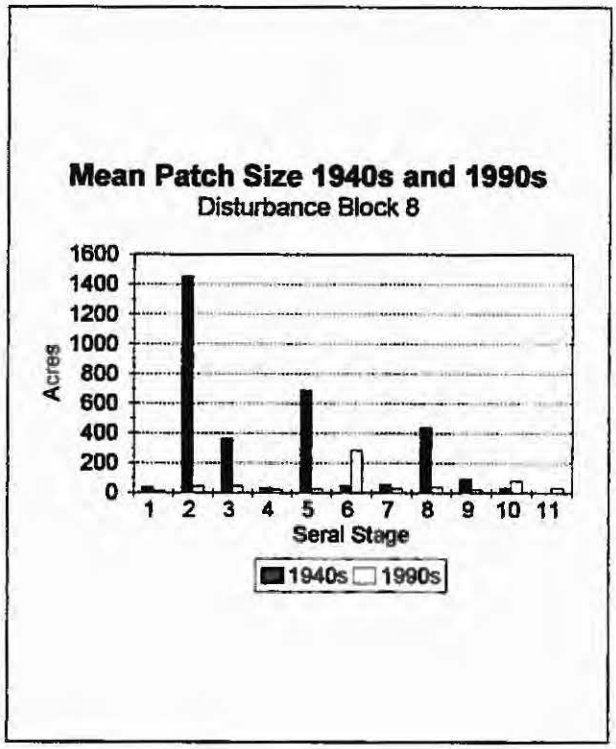


Figure 5.2. Mean patch sizes of seral stages for 1940's and 1990's
(Refer to Table 5.1 for legend of seral stage numbers.)

Species Composition and Structure

Intensive timber management changed the natural range of species composition and structure that used to dominate the watershed. After a natural stand of mature timber was harvested, the combination of site preparation, genetically-improved nursery seedlings, and early use of herbicides contributed to the rapid reforestation of conifers. In natural conditions, early seral stages in wet to moist sites could have a large alder component that would persist for 30-50 years, before the Douglas-fir species would take over. Reforestation techniques shorten the time to 10-20 years. Additionally, the amount of coarse woody debris remaining on a site after harvest was a small fraction of that found in natural young stands (Spies and Cline 1988).

Plantations contain denser stands of trees than most early natural stands. Dense planting was intended to ensure survival and re-establishment of conifers to a given stocking level. The higher stocking levels were also planned as part of the management regime that contributed to intermediate thinning entries to increase total yields of timber. The species selected for regeneration was the shade intolerant Douglas-fir. With clearcutting as the predominant regeneration system, shade intolerant conifer species were planted to take advantage of site conditions. Shade-tolerant species (western hemlock and western red cedar) were expected to seed in naturally as site conditions became more favorable. Precommercial thinning of very young stands in the 1960's and 1970's favored the faster growing Douglas-fir as croptrees over the slower growing shade tolerant trees.

Today, about 39% of the federal lands in the watershed are in managed stands less than 45 years old. About half of these plantations are in the 25-45 year age class, potentially eligible for commercial thinning (Table 5.2).

Table 5.2. Acres of Plantations by Age Class

Age Class	Acres
1-10	2,991
11-20	4,900
21-26	4,587
> 26	9,177
Total	21,655

[1] Data based on 1994 inventory

Distribution of the managed and natural stands are shown on Map 5.2. About 2400 acres of the remaining natural stands, especially those close to roads or clearcuts, were thinned in the 1960's and 1970's in an effort to salvage commercial trees nearing mortality and improve tree growth of the remaining stock.

WILDLIFE SPECIES AND HABITATS

The Indian/Deadwood watershed contains a wide variety of habitats due to existing combinations of cover type and successional stage. Species for which there exists the most information include northern spotted owls, marbled murrelets, elk, deer, marten and pileated woodpecker. Most of these species reside in late succession conifer forests that contain specific types of structural components. Spotted owls, for example, do best in coniferous stands of multi-storied canopies and mixed tree species that contain large cavities for nesting, as well as habitat for preferred prey species such as the northern flying squirrel, red tree vole and bushytail woodrat. Marbled murrelets do best in large old growth trees as well, however their nesting habits require a flat secure nesting platform to lay an egg. Nesting platforms are often the result of moss growth on large horizontal limbs, debris accumulation, or clumps of mistletoe. Pileated woodpeckers require large standing dead trees to excavate a cavity for nesting. The overall amount (23,533 acres) of these habitats comprises only 32% of the watershed. Loss of these habitats is primarily due to timber harvest, however, natural events such as windthrow, disease, and landslide are also factors but to a lesser degree.

Big Game Habitat

Big game species (elk and deer) do best in landscapes that offer a variety of habitats. Naturally occurring or man-made openings and cover areas serve to meet the yearlong nutritional and security needs of dear and elk. The Oregon Department of Fish and Wildlife (ODFW) monitors big game trends in number and specific demographic parameters through harvest levels and post hunting season counts. The number of elk have steadily increased in the Indian/Deadwood watershed as a result of successful reintroductions after most elk were extripated from the Coast Range shortly after European settlement. The current condition of the watershed is very good for elk and deer due to a diverse mix of successional stages and cover conditions.

The capability of the landscape, based primarily on landform, was mapped cooperatively with ODFW and is part of the resource information base available to assist in planning of resource activities.

Capability is classified as high, medium or low and represents the opportunity level to effectively provide continued forage and cover for elk.

Indian/Deadwood watershed contains high and moderate elk habitat capability areas. North Indian, Maria, Rogers and Herman Creek subwatersheds are high, and the remaining lands moderate. Activities such as converting roads to stringer meadows when no longer needed for access or developing cooperative noxious weed programs to address containment or eradication are two activities that could be used in the Indian/Deadwood watershed to benefit big game.

Species Guilds

Analysis of habitat suitability across a landscape using a computer model, HABSCAPES, was conducted for four groups (guilds) of species (Austin 1996). The model considers amount, patch size and juxtaposition of required habitat, and the ability of a species to use patches of habitat (aggregates of habitat) even though the habitat may be separated by unsuitable habitat areas.

The four groups contain the following representative species:

Guild 1-(TLML) (Species that use large trees, have large home ranges, and are ABLE to aggregate patches of preferred habitat in a mosaic).

Northern spotted owl
Northern goshawk
Pacific fisher
Pileated woodpecker
Marten

Guild 2-(TSPL) (Species that use large trees, have small home ranges, and are UNABLE to aggregate patches of preferred habitat in a mosaic).

Marbled murrelet
Northern flying squirrel
Pacific-slope flycatcher
Red tree vole
Shrew-mole
Trowbridge's shrew

Guild 3-(TSMO) (Species that use open habitats, have small home ranges, and are ABLE to aggregate patches of preferred habitat in a mosaic).

Mountain quail
American goldfinch
Brewer's blackbird
Bushtit
Scrub jay

Guild 4-(TSPO) (Species that use open habitats, have medium-sized home ranges, and are UNABLE to aggregate patches of preferred habitat in a mosaic).

Common garter snake
Horned lark
White-crowned sparrow
Western bluebird
MacGillivray's warbler

Habitat that is currently suitable for each of the above Guilds is displayed on Map 5.3. Guilds 1, 2, 3, and 4 have current overall suitability ratings of 28%, 27%, 10%, and 10%, respectively. The suitability ratings are based on the amount of suitable habitat in the watershed expressed as a percentage of the entire watershed. For example, a 30% suitability rating for a given guild means that 30% of the watershed contains suitable habitat for species associated with that guild. Each guild suitability rating would be expected to fluctuate as habitat conditions in the watershed change. For example, guilds that use open habitats would have a high suitability after fire events at the same time guilds that use mature habitats would have a low suitability.

Mature Conifer Habitat

A few species that reside in the watershed and use primarily mature conifer habitat have been surveyed and monitored over the past 5-10 years as part of the timber sale program. Detailed information exists on spotted owl, marbled murrelet and bald eagle habitat in the watershed. The following habitat condition analyses address habitat amounts and location for each of these species and are integral to assessing the relative health of mature conifer habitats for many other species that reside in the watershed.

Spotted Owls -- There are all or portions of 29 spotted owl home ranges (26 pairs and 3 territorial singles) on federal lands in the watershed. The acreage of suitable habitat (conifer > 18 inches diameter) within the median home range (1.5 mile radius) for each owl pair or territorial single is shown in Appendix G, Table 1. The average amount of habitat within the owl pair home ranges is 1,448 acres, with a range from 368 to 2,438. Owl activity centers that are below 40% mature conifer habitat (1,906 acres) in the median home range radius are below the threshold used by the U.S. Fish and Wildlife Service (FWS) for "take". Of the 29 spotted owl home ranges in the watershed, 22 are currently below the threshold. (Appendix G, Table 1).

Interior mature conifer habitats (> 500' from the edge of mature stands) are critical to certain species sensitive to moisture, light, and ambient air movement for either their long term existence in one area or for mobility across the landscape for dispersal and genetic exchange with other individuals. Acreage of interior forest is presented in Appendix G, Table 2, and shown on Maps 1 (Appendix G) and Map 5.4. Percent of mature interior forest varied from 22% in the area of Rock/Buck/Elk Creeks to 0% in Panther Creek.

Based on HABSCAPES described above, the best habitat for species that use habitat similar to spotted owls occurs in the area of Rogers, Maria, Upper Indian and upper portion of Deadwood Creeks. Occupied habitat in other drainages is also valuable, however, because it is more scattered, the suitability on a larger sub-watershed scale is less.

In general, mature conifer connectivity between large, more intact conifer forest to the east and west is weakest in upper West Fork Deadwood, Misery and Herman Creeks. This creates a large gap within the Late-Successional Reserve lands in Indian/Deadwood.

Marbled Murrelets -- There are all or portions of 27 marbled murrelet reserves (area of contiguous suitable habitat within 0.5 mile of an occupied site and containing the occupied site) on federal lands in the Indian/Deadwood watershed. The amount of contiguous suitable habitat (conifer > 18 inches diameter) within each site is shown in Appendix G, Table 3. The average amount of habitat within each 0.5 mile circle is 181 acres, with a range from 37 to 382.

The murrelet habitat base consists of all mature conifer stands throughout the watershed regardless of size and surrounding habitat. The areas of upper Rogers, upper Maria, Upper Indian, North Indian and Upper Deadwood Creeks contain the most suitable habitat. Stand improvement activities aimed at aggregating stands to reduce fragmentation and increase contiguous mature conifer patches would in the long term directly benefit marbled murrelets.

Bald Eagles -- There are two bald eagle management areas in the watershed. One is active and located on lower Indian Creek. The other is an inactive territory, located along lower Lake Creek. Both are among the 23 territories in the Coast Range required to attain recovery of the bald eagle in the Pacific Northwest (USFWS 1986).

Manipulation of stands within these management areas to enhance bald eagle habitat is not a high priority. Any adjustments to stand density need to address each area individually to assure that the goals of the management area are met. Some manipulation may be beneficial to develop dominant/co-dominant, multi-layered stands for future nest sites and roosting habitat.

Centers of Biodiversity

Scattered throughout the Indian/Deadwood watershed are a few conifer stands that are multi-storied and contain a wide diversity of plant species. These stands are some of the oldest and most complex of all the forested land in the watershed. They are called "biodiversity hotspots" for this analysis. Upper Rogers, upper Maria, Indian and Upper Deadwood Creeks contain the most residual late seral conditions in the watershed. The largest area of residual late seral forest is in the Elk Creek drainage (Map 5.4).

These stands have a higher number of late seral vascular and nonvascular plants when compared to plantations or other younger natural stands. In addition, some vertebrate species may also reside in such habitats that do not occur in similar less complex types. The species richness in these stands is due primarily to the lack of a recent stand-replacing fire or the occurrence of an intermediate non stand-replacing fire. This in turn allowed development of older conifer forest conditions.

Special Habitats

Special, or unique, habitats include cliffs, talus slopes, caves, rock faces, lakes, marshes and sloughs. There are none of these known in the watershed at present. However, beaver activity produces many habitat features that are associated with wetland environments. There are many streamcourses in the watershed that have beaver activity and have special wetland habitats as a result. See Map 5.7 for location of some of these features.

Botanical Resources

The known botanical resources in the watershed include vascular plants that are on the Regional Forester's Sensitive Species list (Appendix H) as well as selected mosses and lichens that are part of a multi-forest air monitoring program. Fungi and many other non-vascular plants have suitable habitat in the watershed but species specific surveys or inventories have not been performed.

Vascular plants-- Surveys for all Regional Forester's sensitive plants were performed prior to past ground disturbing activities. Loose flowered bluegrass (Poa laxiflora) is the most common of the sensitive plants with 13 separate locations documented in the watershed. A management strategy and monitoring plan has been developed for loose flowered bluegrass on the Forest. This strategy provides adequate protection to the species and permitted removal from the R-6 Sensitive Species List. The Indian/Deadwood watershed contains four sites key to the Forest management strategy. One is a 'no impact site' and the remaining three are 'protected' sites with a 400-foot buffer that require adjustments in management if necessary. Map 5.4 shows locations of Poa laxiflora management sites.

Opportunities to enhance botanical resources through stand level manipulation is very limited. Recovery and management is best accomplished through close coordination with other resources.

Nonvascular plants-- The only nonvascular plants that have been sampled in the watershed are epiphytic macrolichens. The sampling, done in 1994 and 1995, is part of monitoring over a large area of the Siuslaw Forest. Other nonvascular plants certainly exist in the watershed but have not been collected and identified. The biodiversity of lichens is highly positively correlated with the percent gaps, wolf trees, and old-growth remnants in the stands. The 17 species of macrolichens documented in the watershed are in Appendix G, Table 4.

Range

Range resources vary throughout the watershed from transitory range, created as a result of timber harvest during the past 1-8 years, to permanent forage found in meadows and along roadsides. Permitted grazing on federal lands is located along the North Fork of Indian Creek on approximately 30 acres via a temporary permit for up to 17 cow/calf pairs, in addition to a two special use permits for small pasture lands.

The range condition in the allotment is poor. Stream bank stability is a concern as is the encroachment of noxious weeds, mainly yellow tansy, thistle and blackberry.

Riparian Reserves

The Northwest Forest Plan established Riparian Reserves on federal land to provide areas along all streams, wetlands, ponds, lakes and unstable and potentially unstable areas where riparian-dependent resources receive primary emphasis. Riparian Reserves are important to the terrestrial ecosystem as well as serving, for example, as dispersal habitat for certain terrestrial species.

Riparian Reserve health and condition is an intergral component of a fully functioning ecosystem. Plantations and other environments manipulated by man do not provide the full range of habitat components (vertical and horizontal structure, large woody debris, etc.) that are needed to support the full complement of riparian-dependent species. The existing makeup of Riparian Reserves on federal

land is 54,840 acres of which 60% is in natural stands. The remaining acres are in plantations (managed stands). Assuming that natural stands provide fully functioning habitat, the Riparian Reserves in the watershed are currently functioning at 60% or greater of potential for terrestrial species, reptiles and amphibians.

The area of weakest Riparian Reserve connectivity for terrestrial species between upper and lower portions of a drainage occurs in Failor Creek. Connectivity between subwatersheds is weakest from North Indian Creek to Upper Indian Creek. Other areas of poorly functioning Riparian Reserves occur throughout the watershed.

Summary

- The least fragmented mature conifer stands, especially those with remnants of very old trees and multi-storied late seral conditions (called "biodiversity hotspots"), are found in the upper western and eastern edges of the watershed (in Elk/Buck/Rock and in Rogers/Maria subwatersheds). HABSCAPES model indicates that these two areas contain the best habitat for species associated with a large tree, large home range habitat, e.g., northern spotted owl and pileated woodpecker.

- The most fragmented mature conifer within Riparian Reserves is found in the middle portion of the watershed (i.e., within Failor and Misery Creek drainages) and between Upper Indian Creek and W. Fork Indian Creek drainages. Connectivity habitat for species traveling between natural stands and between drainages is in poor condition.

- Good habitat within the bald eagle management areas is limited to a few small patches near the present nesting sites.

- Poor connectivity for late-successional species is found in the middle of the northern portion of the watershed (within Herman to West Fork Deadwood). To improve connectivity between the western and eastern sections of the Late-Successional Reserve lands within the watershed, the vegetation structure and diversity should be improved in this area.

AQUATIC ENVIRONMENT

Human Disturbances

A variety of land use practices have affected channel and fish habitat conditions in the Indian/Deadwood area since the late 1800's. Because we have a mix of old and new management practices on the landscape any disturbance, flood or landslide, has a strong component of historical legacies composed of both human actions and natural events. Various land use practices have been concentrated on different areas of the landscape therefore affecting different parts of the channel network. Because of the dynamic nature of stream systems and the movement of sediment and wood through the system with high flow events there is a cumulative effect of the landuses often in the mainstem stream reaches. The following discussion highlights the major effects of various land use practices since Euroamerican settlement. The combination of these 'human disturbances" and natural disturbances result in the current conditions of the aquatic system.

Valley Settlement

Settlement of valley bottoms and the many associated activities that began in the 1880's and continue today have had significant impacts to the low gradient mainstem creeks. The result is stream corridors with little or no large wood in the riparian areas, infrequent stream interaction with the floodplain, channel entrenchment and reduction in the amount of side channels and alcoves (rearing coho, steelhead). Widespread removal of riparian vegetation has contributed to the reduction of shade resulting in increased stream water temperatures.

Splash Dams and Log Drives

Much of the channel entrenchment that typifies the mainstems of Indian and Deadwood Creeks may have originated from the splash dams and log drives that took place in the early 1900's (see Chapter 4, "Logging and Road Building" for history of these.) The Siuslaw Navigability report (Farnell 1979) describes various entities using explosives to clear out logs and blow out boulders in order to clear the channel for logs to move more easily down the creeks. By removing roughness elements from the channel, water velocity increases and causes the creek to scour, cutting both down and laterally. This is likely the initial reason that the majority of mainstem streams in this watershed are scoured down to bedrock. These events have impacted primarily the spawning and winter-rearing habitat for chinook and summer and winter-rearing habitat for coho. Additional impacts are increased water temperatures with reduced subsurface flow.

Road Building

Roads have a significant impact on slope stability and water routing. Road location and design determine their potential to destabilize watersheds. The position of a road on the slope (ridgetop, mid-slope, valley bottom) influences both the amount of water that is intercepted and rerouted, and in valley bottoms restricts natural channel migration. Some roads may increase the timing and magnitude of peak flows by effectively increasing the 1st-order channel network. The road construction method influences its potential for failure. Unstable sidecast portions have and will continue to fail during large storms. Until the mid-1970's, most roads were constructed using sidecast methods which made them more prone to failure than roads constructed by "compacted-fill" technique. A large proportion of the existing roads in the watershed were sidecast constructed. Appendix I lists construction characteristics of the roads. (See also Chapter 4, "History of Human Settlement", and Map 4.10 and Map 5.9.) In general, the road network has increased the efficency of water and sediment delivery and routing through the watershed.

In the process of designing and building roads, impacts to the aquatic resources were not always recognized or accounted for. Many roads and associated culvert installations were placed in such a manner that passage for fish, amphibians, and possibly other aquatic organisms was impeded. This is especially true in many of the smaller tributaries that were, at that time, believed to not contain or not be important for aquatic resources maintenance. Much has been done to alleviate this problem although there are still roads and culverts that preclude passage to available habitat.

The ability of the Forest to maintain roads has dwindled because road maintenance was funded mostly through collections from timber sales. By the early 1990's, the Forest was no longer able to maintain all of the roads to standards that would insure stability during major storms. As a temporary measure to reduce excess surface runoff that could degrade roads and nearby streams, some roads were waterbarred (predominantly in Key Watersheds). Since 1992, the Siuslaw NF has waterbarred

approximately one-fourth (812 miles) of the existing Forest road network, including about 1 mile in Indian/Deadwood. In addition, approximately 30 miles have been decomissioned on the Forest (J.Dillingham personal communication, 4/96). These treated roads appear to have "survived" the 1996 flood far better than the untreated roads.

Timber Harvest Activities

The effects of early logging along the mainstem valleys were to remove some riparian vegetation and probably increase fine sediments into the aquatic environment. As logging moved upslope, soil and woody debris were dragged downhill and often entered streams. After 1950, when timber harvests began increasing dramatically, clearcuts became larger and extended to the streams in many areas. Impacts to tributaries that contained habitat for cutthroat, coho, and steelhead included vegetation loss to the stream edges and larger amounts of sediments being introduced into the streams, clogging gravels and filling pools.

In the late 1970's, the practice of leaving trees in unstable or potentially unstable areas was adopted. These leave areas serve to maintain normal root strength and windfirmness, primarily in steep headwall areas above intermittent streams. Riparian buffers were implemented in the 1970's as well and reduced the direct impacts to the perennial streams in a harvest unit but did little or nothing to protect the intermittent tributaries to the perennial streams, which are the sources of material used for habitat in the perennials. Additionally, wood debris and large wood were cleared from many of the creeks that were believed to impede fish passage. This caused winter and summer rearing habitat for juvenile fish to be degraded. This practice continued until the early 1980's.

Landslides are a natural erosion process and only becomes a concern when the rate of landsliding is above natural levels. Removal of vegetation results in a loss of root strength and an increase in the potential for landslides to occur until root strength is re-established. In the Coast Range it takes about 15 years for re-establishment. Harvest units younger than 15 years located in areas of high risk for debris slides are especially at risk. When debris slides occur, the amount of sediment added to a stream may overwhelm the stream's ability to transport and distribute the sediment. Research has shown that landsliding increases several fold for one to two decades after clearcutting and even higher rates of sliding occur per acre of road than per acre of forested or clearcut area. Various landslide surveys of the Mapleton Ranger District indicate that debris slides and torrents have increased in frequency due to past timber harvest and road building practices.

Timber harvest also affects water yield and timing. The differences between harvested and forested basins vary by season and the amount of rain that falls. Clearcutting and roads increase the size of small and moderate peak flows in small watersheds (< 250 acres). Although large (>25 sq mi) watersheds and large floods have received less attention, a recent study (Water Resources Research, 1996) suggests that effects of clearcutting and roads in large watersheds may be greater than previously thought. Summer baseflows also increase for a short amount of time when 15-20% of small watersheds have been logged. Changes in the hydrologic regime from timber harvest lessen as vegetation re-grows and evapotranspiration rates are re-established.

Fishing, Estuary Modification, and Exotics

Factors affecting the populations of fish species that are being monitored include those described above as well as commercial and recreational fishing, ocean conditions, and natural climatic events (floods, fire, landslides). Commercial and recreational fishing can remove a significant portion of a

fish run, especially when the populations are in decline. Unfortunately, this is also the time when fishermen value fish the most. Historically, coho salmon were the main targets of commercial and recreational fishery, and chinook salmon were the next most targeted. There were impacts to chinook and coho habitat early in the 1900's as discussed above. Based on commercial catch numbers the populations of chinook and coho both declined throughout the first half of the century (ODFW 1995). Then in the 1970's the coho populations plummeted. Although the major impacts to coho habitat happened throughout the 1950's, 1960's and 1970's, drastic population declines of coho were not noted until the 1970's.

Recent theories have demonstrated that ocean conditions may have been responsible for the delayed response of coho. Ocean conditions were favorable for coho during these periods until there was a regime shift in 1976, when ocean conditions changed for the worse for coho. The combination of poor ocean conditions and poor instream habitat conditions may have caused dramatic declines in the coho populations (NMFS and OSU 1996.)

Estuaries have also changed dramatically since settlement. Dredging of channels, removal of large wood, and human development on floodplains have all affected the intertidal environment that smolts must pass through on their way to the ocean. Introduction of exotic fish, (e.g., shad and others) may also have affected the anadromous fish populations

Current Conditions

All of the subwatersheds in Indian/Deadwood have had some logging and road building--some have had log drives and others are dotted with homes. Both the concentration of different land use practices on various parts of the landscape and differences in the processes impacted by these practices have influenced the aquatic ecosystem we see today.

Current aquatic conditions are best described by subwatershed since events that affect aquatic resources stay within watershed boundaries. Table 5.3 provides a summary of land uses by subwatershed. Appendix J contains subwatershed summaries that provide more detail on each subwatershed, including aquatic habitat conditions and recommendations, inherent physical and terrestrial characteristics, and summaries of the management legacies. These were developed to provide managers and field personnel a quick reference description of each subwatershed and a general description of the potential direction of the subwatershed.

Results of the changes in regimes of water, sediment and wood vary by stream function segments (identified and discussed in Chapter 4). These are summarized in Table 5.4. The steep, confined source segments of the stream network have been influenced predominantly by logging and road building. The location and age of plantations or roads have implications for the type and extent of past and potential future impacts to the aquatic resources. Processes that have been substantially altered in the source segments are an increase in the rate of landslides, a decrease in the current source of large woody debris (LWD) and a change in the water yield and timing.

The moderately steep, moderately confined transport segments of the stream network have also been influenced predominately by logging and road building. With an increase in road-related debris torrents, the nature of the material delivered to streams may be more sediment-rich. Changes in composition and structure of the riparian vegetation along many of these segments to younger conifers and hardwoods have altered the nature and rate of LWD input. Although transport segments are generally more resistent to changes in flow, sediment and wood inputs, increased rates of landslides

and several years of below average precipitation (before the 1995-96 water year) may have periodically overwhelmed these segments with sediment.

The cumulative effects of valley settlement, log drives, logging, stream cleanout, valley bottom roads, and effects from upstream and upslope land uses are significant in the depositional segments of the stream network. In some cases the overall function of the stream reach has changed from one of deposition to one of transport due to diking and entrenchment. The unconfined lowest gradient depositional segments are the most sensitive to change and the most highly altered since Euroamerican settlement. These areas are also the prime agricultural and residential sites. The objectives of different landowners have directly influenced the nature of land use practices. Therefore, landownership of different stream function segments is important and displayed in Figure 5.3.

Table 5.3. Summary of Land Use by Subwatershed

Watershed	Subwatershed	Total Mgd %[1/]	Mgd ac <15 yrs	Road Density Mi/sq mi	Log Drives & Splash Dams[2/]	Valley Settlement
Indian	North Indian	51.6	369	2.19	yes	mod
	Upper Indian	30.5	435	3.53	yes	extensive
	Herman	44.9	159	2.4	no	low
	Mainstem Indian	28.2	93	2.76	yes	extensive
	Maria	22.1	315	1.73	no	none
	Rogers	31.8	123	2.95	no	low
	Long	30.0	221	2.85	no	low
	Elk2	42.7	574	2.24	yes	low
	Lower Indian	38.1	529	2.55	yes	extensive
Deadwood	Upper Deadwood	36.4	505	2.56	yes	mod
	North Panther	45.3	205	2.12	yes	low
	Panther2	39.9	398	2.94	yes	mod
	Elk	22.4	47	1.16	yes	mod
	Buck	46.9	252	3.56	no	low
	Rock3	24.1	135	1.42	no	low
	North Bear	11.7	336	1.15	no	mod
	Alpha	20.3	361	1.85	yes	extensive
	Misery	47.0	315	2.55	no	mod
	West Fk Deadwood	43.5	586	2.47	no	mod
	Failor	63.7	275	2.17	no	none
Lower Lake	Green Creek	52.7	72	4.13	no	mod
	Lower Lake	34.8	NA	1.94	yes	extensive

[1/] Total managed acres does not include pure deciduous or mixed deciduous seral stage stands
[2/] Yes = log drives and/or splash dams distributed through subwatershed; no = none or very limited use

Table 5.4 Confinement and Gradient Summary

Stream Function Segment (Confinement & Gradient)	Sediment	Wood	Water
C,M >8% (82.7%)	SOURCE pulses with debris slides	SOURCE pulses with debris slides	Cool Temperature low-intermittent flow in summer flashy in winter
changes caused by: logging & road building	↑ instability ↑ landslide rate	↓ supply	altered flow pattern
M,C 4-8% (3.4 %)	TRANSPORT amount & distribution dependent on debris slides and major storm events	TRANSPORT individuals move to complex accumulations, highly variable, spotty floodplain interaction	Cool temperatures, perennial flow
changes caused by: logging, road building,, homesteading, splash dams & log drives	some entrenchment & channelization ↑ landslide rate	↓ source from upslope and floodplain	↑ temperature
C,M,U 2-4% (4.3%)	C = TRANSPORT M,U = DEPOSITION of coarse material and areas of transport Dam break pulses and some bank erosion	periodic accumulations with debris slides, expect lots of wood both singles and complexes	temperature more variable; some groundwater control to low flow
changes caused by: logging, road building, homesteads, splash dams, grazing	↑ fines from bank erosion, channelization and entrenchment	↓ source existing structure removed	↑ temperature

Confinement: C = confined, M = moderately confined, U = unconfined
Gradient classes: >8%, 4-8%, 2-4% and 0-2%

Table 5.4 Cont. Confinement and Gradient Summary

Riparian Vegetation	Aquatics
Narrow hardwood strip, conifers close to stream (variable by PAG)	Poor rearing, few pools, some steelhead and cutthroat spawning
↓ root strength in young plantations ↓ shade	↓ pools sediment filling and/or removal of habitat with ↑ landslide rates ↑ bedrock dominated channels with ↑ mass wasting
Narrow hardwood strip & conifers more variable; some stream movement and some beaver activity	Rearing associated with wood and beavers; Spawning for coho, steelhead and cutthroat; short-term nutrient storage
↓ shade ↓ amount, structure, species composition	↓ spawning and rearing, simplified habitat
more hardwood patches, i.e., various-aged alder; variable patches of conifer (spatial and structural)	C = some spawning and rearing in association with wood M,U = spawning and rearing, variable habitat floodplain interaction
↓ amount of conifers and hardwood	↓ spawning and rearing, simplified habitat

Table 5.4 Cont. Confinement and Gradient Summary

Stream Function Segment (Confinement & Gradient)	Sediment	Wood	Water
M 0-2% (5.8%)	DEPOSITION of coarse and fines; bank erosion and debris slides from confined steep tributaries may directly influence channel	DEPOSITION (in general) some input of valley floor individuals, expect lots of wood from debris slides and upstream	Warmer temperatures (cool temp controls from subsurface/ small tribs.- shading); Larger storm events influence stream movement in valley & wood accumulations
changes caused by: logging, rd. bldg., homesteads, grazing, log drives	↑ fines ↑ entrenchment and channelization, large storm events ↑ confinement from some valleybottom roads	↓ supply from upslope, valley bottom and in-stream	↑ temperature ↓ H20 quality
U 0-2% (3.8%)	DEPOSITION fines and some coarse bank erosion, change with big storm events	DEPOSITION (in general) some valley floor contribution, down wood present on floodplain	Temperature strongly influenced by shading and subsurface contribution
changes caused by: homesteading, grazing, road bldg., log drives	↑ fines, ↑ channelization and entrenchment, Change from DEPOSITION to TRANSPORT ↑ bedrock dominated channels	↓ supply from valley floor and in-channel	↑ temperature ↓ H2O quality

Confinement: C = confined, M = moderately confined, U = unconfined
Gradient classes: >8%, 4-8%, 2-4%, and 0-2%

Table 5.4 Cont. Confinement and Gradient Summary

Riparian Vegetation	Aquatics
Important hardwood component, scattered conifers, nurse logs important for conifer establishment, floodplain interaction throughout spotty wetlands, beavers active	Chinook, coho, steelhead spawning, some resident cutthroat, good rearing with complex habitat and sidechannels, abundant food
↓ stream shading, nutrient input, floodplain roughness, change in species composition	↓ spawning and rearing ↓ complexity from ↓ floodplain interaction ↑ bedrock dominated channels
scattered large conifers, hardwood dominated, nurse logs important, wetland, willows	Chinook spawning, good rearing habitat deep pools, lots of food, side channels, high diversity of other aquatic species
↓ structural and species diversity	↓ diversity of in-channel habitat ↓ side channels ↓ pools (number, depth and complexity)

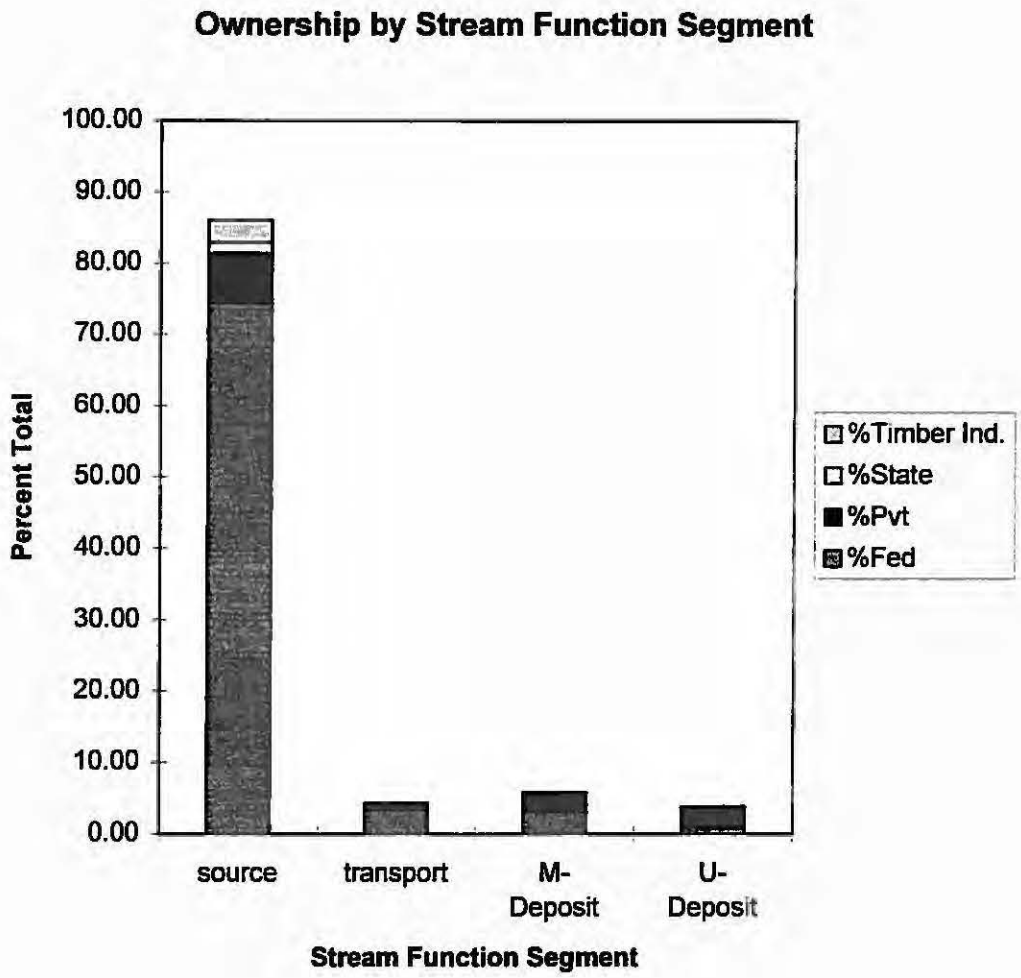


Figure 5.3. Ownership by stream function segment

Riparian Vegetation

Riparian vegetation species composition and seral stage distribution have changed since Euroamerican settlement. Overall the composition has shifted to a more deciduous-dominated riparian area from an area that was either dominated by conifer or at least had individual recruitment of conifer into deciduous stands. The current seral stage is dominated by early seral stage and smaller diameter trees, whereas historically a greater component of older seral stage larger trees were present. Settlement of the unconfined and moderately confined valley bottoms has also reduced the amount of woody riparian vegetation, both standing and down wood, that line the streams.

The current condition of the vegetation that directly influences the stream environment (riparian area) was considered. Riparian area widths were chosen to be:

- for confined channels: the height of 1 site-potential tree on each side of the creek
- for moderately confined channels: the height of 1 site-potential tree plus 50 feet
- for unconfined channels: the height of 1 site-potential tree plus 100 feet

The total acreage that falls within the riparian vegetation areas is approximately 42,456 acres (57% of the total watershed). This includes:

- 34,303 acres in confined valleys (81% of the watershed)
- 5,149 acres in moderately confined valleys (7%) and
- 3,004 acres in unconfined valleys (4%).

Two functions of riparian vegetation were analyzed: 1) the potential of large woody debris supply to the stream system and 2) the amount of current stream shading.

Large Woody Debris (LWD)– Shifts in riparian vegetation affect both stream function and aquatic habitat condition, primarily by affecting the amount of large wood entering a stream. The wood supply and routing story has two parts. The majority of the wood in a stream comes from debris torrent deposits. Logging has had the greatest impact on amount of large debris that enters lower segments of streams from the source areas.

The second part is the recruitment of individual large wood pieces from adjacent riparian areas into streams which provide the building blocks for creating fish habitat. A deciduous-dominated riparian area supplies smaller woody debris to a stream than a conifer-dominated riparian area. The smaller wood supplied from a deciduous stand means that the wood does not last as long in the stream and therefore, does not provide stable, formative features in the stream and the associated fish habitat that forms with wood additions. Combining this information with the current seral stages of riparian vegetation in Indian/Deadwood should mean that as the existing wood that is currently affecting the stream channel decomposes there will be reduced amounts of large wood that will be entering the stream. Without any changes in management woody debris in the creeks and associated floodplains will continue to decline in quantity as will the associated fish habitat.

In order to determine the adequacy of LWD supply potential that currently exists in Indian/Deadwood riparian areas, current seral stages were grouped into the following categories:

- Currently adequate riparian areas - mature conifer-mix, mature conifer, or multi-late seral stage vegetation.

- Near term adequate riparian areas - young conifer, young conifer-mix, and young deciduous-mix seral stages (generally those seral stages with conifer between 9-21 inches DBH).

- Not adequate riparian areas - grass/forb, very early , early, deciduous-mix pole, conifer-mix pole, pure deciduous, and mature deciduous-mix seral stages.

The current condition of LWD supply from these source areas is 35% adequate, 21% near-term adequate and 44% not adequate.

Map 5.5 shows the distribution of the three categories for potential large wood supply across the Indian/Deadwood watershed along moderately confined and unconfined valley areas. Most of the adequate areas in the moderately and unconfined reaches are in small patches distributed throughout the riparian network. There are a few concentrations of adequate, including the lowest reach of the mainstem of Indian Creek and a couple sections of West Fork Deadwood drainage. Some of the least adequate areas are the mainstems of Deadwood and Indian Creeks, Green Creek and Panther Creek. Some areas that have a combination of near-term adequate and adequate are Failor, West Fork Deadwood, Herman and Taylor Creeks. In general, there is some potential for LWD inputs from the source areas dependent on debris torrent frequency and little functional LWD will be recruited from the stream-adjacent stands in moderately to unconfined valleys for several decades.

Shade--Stream temperature is a function of several factors including solar intensity, climate, channel morphology, vegetative/topographic shade, channel shape and the amount of stream surface area exposed to solar radiation. Large storms and human activities (harvest and roads) have the potential to influence stream temperature by altering the amount of shade-producing vegetation and channel shape. Along the unconfined valleys of the mainstems of Indian and Deadwood Creeks, deciduous trees are not sufficient in height to adequately shade the mainstem during the summer. The loss of trees and channel changes has resulted in an increase in summer stream temperatures on the mainstems. With the loss of some of the mainstem shade provided by conifers, tributaries with cool water are critical in helping to lower mainstem temperatures.

In order to determine the adequacy of the shade that currently exists in Indian/Deadwood, current seral stages were grouped into categories of adequate and not-adequate for stream shading. The type of tree--conifer or deciduous--, width of valley bottom and actual stream channel width were considered in determining shading adequacy.

In confined valleys:

- inadequate shading in riparian areas - grass/forb, very early, early, conifer-mix pole, and deciduous-mix pole seral stages.

- adequate shading in riparian areas - mature conifer-mix, mature deciduous-mix, mature conifer, multi-late, pure deciduous, young conifer, young conifer-mix, and young deciduous-mix seral stages.

In moderately confined valleys:

- inadequate shading in riparian areas - grass/forb, very early, early, conifer-mix pole, deciduous-mix pole, young conifer, young conifer-mix, and young deciduous-mix seral stages.

- adequate shading in riparian areas - mature conifer-mix, mature deciduous-mix, mature conifer, multi-late, and pure deciduous seral stages.

In unconfined valleys:

- inadequate shading in riparian areas - grass/forb, very early, early, conifer-mix pole, deciduous-mix pole, young conifer, young conifer-mix, young deciduous-mix, and pure deciduous seral stages.

- adequate shading in riparian areas - mature conifer-mix, mature deciduous-mix, mature conifer, and multi-late seral stages.

Map 5.6 displays the shade adequacy along the moderately confined and unconfined valley areas. The majority of the confined valleys (83%) have vegetation that adequately shades the streams. A substantial proportion of the moderately confined valleys (74%) are adequately shaded. Only 20% of the unconfined valleys currently have riparian vegetation that provides adequate shade to the streams. As shown on Figure 5.3, the majority of the lands in unconfined valleys is in private landownership. The adequately covered areas are scattered throughout the moderately and unconfined valleys. This distribution influences the cumulative solar heating. Some of the best areas are Maria, Rogers, Upper Deadwood and Panther Creeks. Some of the worst areas are the middle mainstem of Indian, the middle mainstem of Deadwood, Green, upper reaches of Failor, North Indian and Upper Indian Creeks. The combination of inadequate vegetative cover and reduced subsurface water retention and flow help to explain the water temperatures discussed below.

Appendix C, "Riparian Vegetation", includes an analysis of the types of riparian vegetation found in wet, moist and dry environments and the relationship to stream confinement classes. The analysis indicates that many of the mature and late-successional natural stands in moist and dry environments have a large deciduous component. Managed stands were expected to contain smaller proportions of deciduous species than natural stands in wet environments. This was found to be true, but the current deciduous component was found to be well within the natural range for wet and moist environments in early stages of succession. Management practices appear to have obscured, rather than accentuated, the differences in species composition among the PAGs.

Water Temperature

Water temperature is a determining factor in the composition and productivity of the aquatic ecosystem in streams. Water temperatures can control or direct the fish and other aquatic organism distribution within a watershed. Warm water species (primarily non-game species such as shiners and dace) can outcompete cold water species (salmonids) when temperatures rise. Subsequently, tributaries that are able to maintain cooler temperatures become more critical to maintain as refugia.

Increased water temperature directly affects fish stress levels. When under stress, fish populations may have reduced fitness, greater susceptibility to disease, decreased growth, and changes in time of migration and reproduction. Optimum temperatures for survival and growth are at or below 58 degrees F. Above 64 degrees F fish begin to be stressed. Survivability and growth decrease as the temperature continues to rise. Sustained temperatures above 70 degrees F will result in mortality for

anadromous salmonids. Availability of thermal refuges, such as cooler stratified layers in deep pools, or undergravel seeps can partially compensate for such effects. However, higher water temperatures reduce water oxygen capacity and this, combined with increased metabolic demands from decomposition of organic matter associated with increased temperature, leads to greater stress on fish within the thermal refuges.

Water temperatures have been monitored for the summer months on half-hour intervals in several streams on the Forest for the past few years. One site midway down the West Fork of Indian Creek was monitored in the summers of 1991, 1992 and 1993. In the summer of 1995, ten temperature meters were used to characterize the water temperature regime of the Indian/Deadwood drainages. Table 5.5 presents some summary information. The high temperatures found for these long durations are a stress to the juvenile coho and steelhead and the resident cutthroat trout that are in the streams at this time of year.

Table 5.5 Water Temperatures for Subwatersheds

ID	Location	Baseflow '95 (cfs)	7-Day Avg Max	Dates of Max temp	Days >58* F	Days > 64*F
I3	W. Fk Indian - 1991	NA	66	8/16/91 - 8/22/91	37	14
I3	W. Fk Indian - 1992	NA	65	7/25/92 - 7/31/92	55	20
I3	W. Fk Indian - 1993	NA	65	7/31/93 - 8/6/93	53	5
I1	Upper N.Fk Indian - 1995	4.78	65	7/15/95 - 7/21/95	74	14
I2	Lower N.Fk Indian	5.83	64	7/15/95 - 7/21/95	70	5
I3	W. Fk Indian ***	1.33	60	7/14/95 - 7/20/95	1	0
I4	Lower Indian	44.77	74	7/15/95 - 7/21/95	78	58
D2	Upper Deadwood -1995	11.36	68	7/30/95 - 8/5/95	66	27
D3	Upper West Fk Deadwood	3.75	66	7/30/95 - 8/5 95	66	11
D4	Lower West Fk Deadwood	7.97	69	7/30/95 - 8/5/95	70	45
D5	Failor Ck	3.42	67	7/30/95 - 8/5/95	66	8
D6	Lower Deadwood	36.11	73	8/1/95 - 8/7/95	64	49

*** W. Fk Indian monitoring site was moved downstream (below a tributary) in 1995, that may contribute to the lower 7-Day Avg Max compared to previous years.

Aquatic Habitat

Current conditions of fish habitat within the Indian/Deadwood watershed were determined through the use of existing Level II stream habitat surveys conducted by the Forest Service and other existing survey information from a variety of sources. Habitat was rated for potential for rearing anadromous salmonids (primarily coho). Four habitat components were used to determine the quality of the habitat including percent of stream in pools, percent of deep pools, percent of complex pools and amount of large woody debris per mile. Another component that was used in the rating scheme was the presence of beavers in a stream reach. If there was an extensive beaver population or activity in a stream reach, then a higher rating was given to this reach, because beaver dams have been shown to be very productive for coho rearing. The ratings for each component are shown in Table 5.6.

If a stream reach met all or most of the highest levels for the four components in Table 5.6, that reach was determined to be 'fully functioning'. If most of the components did not meet the lowest levels for those habitat components, that stream reach was determined to be 'not functioning'. Stream reaches that fell in the middle of those determinations were labeled 'partially functioning'. Map 5.7 shows the stream reaches that have completed surveys and the ratings for anadromous rearing habitat given to those stream reaches. Appendix K lists the ratings for each stream reach.

Table 5.6. Fish Habitat Objectives and Rating Criteria

FISH HABITAT	*FUNCTIONING*	*PARTIALLY FUNCTIONING*	*NOT FUNCTIONING*
Large Woody Debris Pieces Per Mile (Greater than 24 in. diameter and 50 ft.long)	>80	40-79	<40
Percent of Stream in Pools			
(0-2% Gradient Streams)	>55%	40-55%	<40%
(2-5% Gradient Streams)	>40%	30-40%	<30%
(> 5% Gradient Streams)	>30%	20-30%	<20%
Percentage of Pools that are Deep Pools* (Number of deep pools/total number of pools)	>20%	10-20%	<10%
Percentage of Pools that are Complex Pools** (Number of complex pools/total number pools)	>20%	10-20%	<10%

*Deep pools are >3 feet deep in streams averaging >10 feet wide and 1.5 feet deep in streams averaging <10 feet wide.

**Complex are deep pools with 3 pieces of woody debris associated with the pool.

Current Condition vs Potential Condition--Over the entire watershed the stream associated habitat conditions are far below their potential. However this does not mean that some of the creeks are not producing good numbers of fish. Creeks like Rogers, Maria, Failor, and the upper headwaters of Deadwood Creek have reaches that are functioning as good rearing habitat and have great potential for fairly quick gains in aquatic habitat conditions. Stream reaches determined to be 'functioning' totalled 7.1 miles. Stream reaches determined to be 'non-functioning' are the worst areas for salmonid rearing. Many of these areas are in the higher gradient more confined streams where rearing habitat is not expected, but there are also some 'non-functioning' areas in places that have had historic

potential for salmonid rearing. The total miles of 'non-functioning' stream reaches in these surveyed streams is 12.8 miles. Herman Creek and Elk Creek (Indian) have reaches that fall into this category.

The remaining 53.9 miles of surveyed stream reaches are determined to be 'partially functioning'. This category by far has the widest variation of condition ratings. Most of these stream reaches lack large woody debris in the stream channel and lack associated deep complex pools. Many of the reaches meet the criteria for percentage of pools per mile, but unless they are deep pools they have little value for rearing salmonids and providing cover. West Fork of Deadwood and Taylor Creek are examples of streams that are primarily in this category.

Summary

All of the subwatersheds in Indian/Deadwood have been influenced by logging (ranging from 12% to 64% of the subwatershed) and road building. Landsliding increases several fold for one to two decades after clearcutting and road building. Roads have a significant impact on slope stability and water routing. Road location and design determine their potential to destabilize watersheds. A large portion of the existing road network was sidecast constructed and therefore more prone to failure.

The riparian areas along the mainstems of Indian and Deadwood Creeks are deficient in large conifer trees and other woody vegetation that could contribute woody structure and organic nutrients to the streams and provide shade to reduce temperatures. The riparian areas along most of the tributaries of Indian and Deadwood Creeks are also deficient in large conifer trees, and the upslope areas immediately adjacent to the riparian zones are lacking in large conifer trees needed as future sources of large wood for the streams. The eastern portion of the watershed can support higher concentrations of conifer within the riparian areas, compared to the western portion.

The lands adjacent the mainstems of Indian and Deadwood Creeks are primarily in private ownership. Opportunities to improve the condition of riparian vegetation and stream habitat in the mainstems will depend on the interest and energy of the various landowners.

HUMAN USES

Overview of Siuslaw River Basin

The Siuslaw River Basin is comprised primarily of forest land with a small amount of agricultural land. Land ownership is dominated by federal lands (the Siuslaw National Forest and the Eugene District of the BLM), with some state forest land. The western part of the basin is comprised of large blocks of national forest surrounding smaller tracts of private land, while the eastern half has a "checkerboard" pattern of private ownership interspersed with the national forest, BLM and state lands (see Fig. 2.1). A few industrial sites are located within the basin, with many more located outside of the subbasin to the east in Veneta, Eugene/Springfield and Cottage Grove.

A majority of the approximately 18,300 residents of the Siuslaw River Basin live within and near Florence, located near the coast at the mouth of the Siuslaw River. Over one-third (6,185) of the basin's residents live within the City of Florence. The rest of the river basin is lightly populated with most residents living along the valley floors and along major roads (State Routes 36 and 126). There are several small communities in the basin: Mapleton, Swisshome, Deadwood, Greenleaf, Walton, and Lorane. Mapleton is the largest with a population of near 1,000.

Indian/Deadwood Watershed

The Indian/Deadwood watershed comprises about 74,000 acres within the greater Siuslaw River Basin. Over 80% of the land is under federal management, 2% is managed by the state and the remainder is in private ownership. The state would like to exchange their scattered forested parcels in the Deadwood watershed for other parcels outside the watershed, for example to the east, in order to consolidate their forest lands for more efficient management.

The privately owned lands have four basic uses: industrial forest lands, non-industrial woodlots (many with residences), residential tracts, and farms (see Table 5.7 and Map 5.8). To contrast the two drainages, Deadwood Creek watershed has higher percentages of federally and state managed lands, and more acreage in non-industrial woodlots; Indian Creek has a higher percentage of industrial forest lands. The timber industry landowners in both drainages include Davidson Industries, Diamond B, International Paper, John Hancock Mutual Insurance, Northwest Hardwoods, Seneca Timber, Swanson-Superior, Willamette Industries and Weyerhauser.

Table 5.7. Acres of Private Land by Land Use

Use Category	Indian Creek	Deadwood Creek
Residential tract	90	620
Farm [1/]	-	70
Private woodlot	2300	4100
Industrial forest	2600	3000

[1/] Classified as exclusive or non-exclusive farm use by the county tax assessor's office.

There are approximately 35 residences on the tax rolls in the Indian Creek drainage, 95 in Deadwood Creek, and another 60 in the community of Swisshome. About one-fourth of residential property owners have mailing addresses outside the area, so these may represent either vacation homes or rentals. Most homes are on residential tracts, but in the Deadwood drainage over one-third are on farms or private woodlots. Commercial farming is found only in Deadwood on a small number of acres.

Roads

The Indian/Deadwood watershed currently contains about 285 miles of road, including 27.4 miles of county maintained roads. There are some additional timber operator spurs off the roads, which are closed within a few years of a harvest operation. Since the early 1990's, the Forest's road maintenance budget has declined significantly, primarily due to reduced timber harvest activity. The strategy for addressing this situation is to reduce the Forest road system to a smaller network that can meet access and travel needs of the public and be affordable to maintain. The recent emphasis on watershed restoration also indicates a need for road reductions, and a need to stabilize the roads that will no longer be on the maintained network.

The Forest's access and travel management (ATM) planning effort identified about 78.5 miles of road to be maintained for public access in the Indian/Deadwood watershed. Map 5.9 displays the 'ATM' roads and other Forest system roads in the watershed. Information from this watershed analysis should be used to help identify which roads have high potential for failure due to inherent geologic instability, and thus will be costly to maintain over the long-term.

Grazing

From the 1930's through the 1960's, the Indian Creek drainage supported an estimated 500 cattle and 25 horses. The Deadwood valley supported an estimated 600-650 cattle and 20 horses. Dairying was the primary grazing use until about 1950, when the market became too competitive for small farmers.

Today, the watershed supports a modest amount of beef cattle grazing, primarily along the valley bottom of Indian Creek and the West Fork of Indian Creek. The Indian Creek drainage is supporting about 255 cattle and 34 sheep, in addition to a scattering of horses and hogs. Deadwood Creek drainage has about 35 cattle, 30 horse and a few llamas. The number of cattle has remained fairly constant since the 1970's. Most of the once-grazed pastures are now growing rank grass, briars and brush.

The Siuslaw NF has only one grazing permit located adjacent the North Fork of Indian Creek, and grazing is permitted for up to 17 cow/calf pairs. Two other grazing permits are also issued--one for 15-20 cattle in conjunction with adjacent private pasture near the mouth of Elk Creek on Indian Creek; and the other for one horse near the mouth of Gibson Creek.

Recreation

A few undeveloped recreational sites are located in Indian Creek drainage, including primitive campsites along Indian Creek about 2 and 3 miles upstream from Lake Creek. An old growth trail above Gibson Creek is currently used by local residents and occasional Elderhostel groups.

A residential group in Deadwood is interested in developing an old growth trail up Buck Creek ridge and into the Elk Creek drainage east of Deadwood Creek. In addition, the BLM has been developing plans for a loop trail to Windy Peak through the Raleigh and Bear Creek drainages.

Hunting and Fishing

Big game (deer, elk, bear and cougar) are hunted during various regulated hunts. All big game harvest in the Indian/Deadwood watershed is part of the Alsea Unit #18 (1996 Oregon Big Game Regualtions, Oregon Department of Fish and Wildlife, 60pp.). Each species has its specific season and harvest level. The following examples are for the 1995-96 season:

Species	Hunting Season
Deer:	Fall rifle and bow general hunt Fall antlerless controlled hunt with 4,000 tags
Elk:	Fall rifle and bow general hunt Fall antlerless contolled hunt west of Deadwood with 20 tags Fall anterless controlled hunt east of Deadwood with 25 tags Fall controlled bow hunt with 1,000 tags
Black bear:	Fall general hunt Spring controlled hunt with 100 tags.
Cougar:	Fall general hunt

Activities associated with hunting (camping, increased traffic, shooting, etc.) can be disruptive to the normal use patterns of Indian and Deadwood Creek residents and other year round recreationists accustomed to low activity levels.

Early residents of Indian and Deadwood Creeks recall excellent fishing spots that are no longer available. One resident recalls catching 96 trout in one afternoon along a 1/4 mile stretch of Indian Creek.

Today, recreational fishing for resident and sea-run cutthroat trout and steelhead occurs in the watershed, though the catching may be sporadic. Numerous reports indicate that poaching of chinook, coho and steelhead may be a problem in the upper portions of the watershed, especially in years when escapements are at very low numbers.

Special Forest Products

Four areas are currently available on Siuslaw Forest lands for greenery leases, though these areas change periodically. There are three standing-green alder wood cutting areas. Fee permits are issued for various greenery materials for floral use and transplanting. The greenery species include salal, huckleberry, ferns, rhododendron, elderberry and vine maple. Permits are sold primarily for mushrooms, moss, cascara bark, cones of various tree species and firewood. No permits are issued today for cedar due to limited quantities, but this product was in high demand for shakes, boards and rails in earlier times.

Demographic Characteristics

Table 5.8 displays demographic data, tallied from census reports (US Department of Commerce, 1993) for both the Siuslaw River Basin and for the area around the Indian/Deadwood watershed.

Table 5.8. Demographic Characteristics of the Siuslaw River Basin and Indian/Deadwood watershed

	Siuslaw River Basin[1]	Indian/Deadwood Watershed
Population	12,141	500 (approx.)
Median Age	40	34.6
Age 15 and under	21%	27%
Age 65 and over	22%	13%
Education:		
H.S. Graduate	81%	77%
B.A. or higher	14%	11%
Race:		
White	97%	96%
All other races	3%	4%
Employment:		
Farm, Frsty, Fisheries	9%	15%
Exec, Prof., Technical	21%	19%
Manufac., Transport.	25%	38%
Sales, Administration	29%	14%
Services	16%	14%
Unemployment	5.8%	5.6%
Income:		
Family Median	$24,331	$24,341
Per capita	$10,811	$9,994
Families below poverty level	12.7%	9.3%
Housing:		
Owner-occupied	69%	71%
Median value	$62,550	$50,300

[1] The City of Florence is not included in these tallies, because as a coastal town with fishing, tourism and retirement dominating the economy, it is significantly different from the rest of the basin.

Based on analysis of 1990 census data (US Department of Commerce 1993) and 1994 tax classification information (Lane County, 1995), the population of Indian/Deadwood, including the community of Swisshome, is estimated at 500 persons (see Table 5.8). Demographically, the Indian/Deadwood area is fairly similar to the entire Siuslaw River Basin, but there are some notable differences:

- The population of Indian/Deadwood is younger in all measures. This suggests a population with a higher percentage of children and a higher percentage in the work force.
- Residents of Indian/Deadwood are employed in relatively more jobs (15% versus 9%) in natural resource related areas (farming, forestry and fisheries), and in manufacturing. Fewer residents (47% versus 66%) work in professional, sales and service type jobs. Relative proximity to the natural resources and relative distance to the EugeneSpringfield area affects employment opportunities.
- Median house value is significantly lower in Indian/Deadwood. This may be due to the more rural nature of the area (i.e., longer commute time to the Eugene/Springfield area).

Notwithstanding the employment differences outlined above, the unemployment rates and family median incomes are quite similar between the two areas. In fact, Indian/Deadwood has relatively fewer families living below the poverty level than the entire basin.

Table 5.9 displays information about location of work and commutes for the residents of Indian/Deadwood. Most of the local workforce (64%) work in rural Lane County (which includes the Indian/Deadwood area along with other parts of Lane County outside of cities). The remaining 36% of workers are employed outside the rural area, in Eugene, Florence, and other cities, or in rural Linn, Benton or Douglas counties.

Those who work at home or walk to work (13% of the local workforce) derive their income from resources in the watershed. In addition, some of those who work in rural Lane County also work in the watershed. However, the mean commuting time of 31.2 minutes suggests a drive of 15-20 miles, which would take workers out of the watershed area. Many of those workers may likely be employed in nearby Mapleton, which is about ten miles down Highway 36 from the southern end of the watershed.

Table 5.9. Location of Employment and Commuting Data

Location of Employment:	
Rural Lane County	64%
Eugene, Springfield, Cottage Grove Junction City, Corvallis	18%
Florence	14%
Rural Linn, Benton & Douglas Counties	4%
Mean commuting time	31.2 minutes
Work at home	9%
Walk to work	4%

Several Deadwood residents derive some income from a variety of "cottage industries" using natural resources from the area. These include mushroom harvesting, twig furniture making, and bark and herb collecting for special crafts. A few artists live and work in the Deadwood community, perhaps to gain creative inspiration from the forest scenery and solitude. There are a few small income-producing farm properties in the Deadwood drainage, but none remain along Indian Creek. A few residents in Indian Creek derive income from their own logging operations, but not nearly as many as prior to the 1950's.

The above data suggest a picture of a rural community which is somewhat, but not entirely, dependent upon local natural resources for economic opportunities. Most families own their own homes, and the median income is enough to support a family. Many workers are in natural resource-based or manufacturing jobs, and most appear to leave the immediate area to work.

Residents of Deadwood have developed a sense of community and connection to the land over the past 15-20 years. Many place a high value on retention of the scenic, rural character of the watershed and assurance that the natural ecosystems will be restored to a healthy and long-term sustainable condition. Residents of Indian Creek desire similar conditions, but perhaps feel the resources can withstand more intensive management for the economic benefits to be gained.

Trends

Lane County has been experiencing rapid growth over the past five years (Oregon Employment Dept. 1996). In the Eugene/Springfield area, several high-tech manufacturers have recently located new manufacturing facilities or announced plans for expansion. These developments, combined with low interest rates in 1992 and 1993, spurred growth in the construction and real estate industries. Lumber and wood products employment in the county decreased, but because of the increase in construction, the decrease was at a lower rate than was initially expected. State economists project that the growth in the Lane County area will continue for some time, but that it seems unlikely the current rapid growth rate can be sustained into the next century.

As noted earlier, the Indian/Deadwood watershed is not directly comparable to the rest of the Siuslaw River Basin or the rest of Lane County. Because of its distance from the Eugene/Springfield metropolitan area, it is unlikely that the watershed will experience the same rapid growth rate. However, the strong construction and real estate industry may result in steady employment for those in the lumber and wood products industries. Also, the current boom in the retirement industry in Florence bodes well for those who commute to Florence for jobs in service or construction industries. Within the Indian/Deadwood area itself, it is likely that local cottage industries using special forest products will continue, as other uses of the forest become more restricted.

As urban areas such as Eugene/Springfield, Portland, and perhaps even Florence become ever more crowded, there will likely be increasing demand for rural homesites as people seek country lifestyles to escape urban crowding, traffic and crime. The result will be increasing values of residential properties and increasing property taxes, possibly "taxing" some current low-income residents out of the watershed. The area has already seen some gentrification as higher priced homes have been constructed, and as fewer residents are farming on their properties. These trends can be expected to continue through the next decade, resulting in further changes in the resident population.