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November 15, 2002

Dear Amedee and James,

I am writing to comment on the *Simpson Resource Company Aquatic Habitat Conservation Plan/Candidate Conservation Agreement with Assurances and Draft Environmental Impact Statement, Del Norte and Humboldt Counties, California,* or as I will refer to it throughout this dissertation as the Simpson Aquatic HCP and Draft EIS. The Aquatic HCP and Draft EIS are fundamentally flawed in their approach to protecting coho salmon (Oncorhynchus kisutch), chinook salmon (O. tshawystcha), steelhead trout (O. mykiss) and coastal cutthroat trout (O. clarkii). The HCP and the companion document do not adequately address cumulative effects and will likely cause a continued decline of fish populations and forest health. What guidance there is provide for protection of resources is compromised by weak language and phraseology that makes the HCP unenforceable. I will provide background which the HCP and EIS failed to on Threatened and Endangered salmonid species and give evidence that shows specific problems not discussed or adequately handled. As the documents currently sit, they are insufficient under both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act.

The Simpson HCP and Draft EIS do not provide data related to the true conditions of fish habitat on their land. No data such as pool frequency by length, average and maximum pool depths were provided to judge the current condition of salmonid habitat. Simpson collected such data but has chosen not to release it because it shows the results of over-logging (see discussions of Canon Creek below). No clear monitoring plan is laid out to check for whether trends in habitat conditions are those expected by the HCP in terms of species and habitat recovery. To be credible, Simpson should offer standard tools for monitoring and a program to implement adaptive management (Walters, 1997) on their lands (see Monitoring section). There is also language in the HCP and Draft EIS that state that the National Marine Fisheries Service (NMFS) will no longer be routinely involved in timber harvest oversight once this HCP is ratified. Consequently, with the ratification of the Aquatic HCP, not only will there be no focused monitoring plan but also no enforcement mechanism for the Endangered Species Act.

Splitting off interior basins from this HCP should not be allowed and these streams were likely left out to avoid obvious problems with water temperatures associated with Simpson's riparian management. Discussions of riparian conditions and their impact on aquatic ecosystems in the Aquatic HCP and Draft EIS lack scientific credibility.

My Qualifications: I have been a consulting fisheries biologist working on Pacific salmon species and their restoration since 1988. I have written fisheries elements of restoration plans for the Klamath River (Kier Assoc., 1991), the South Fork Trinity River (Pacific Watershed Associates, 1994), the Garcia River (Monschke and Caldon, 1992) and San Mateo Creek and the Santa Margarita River in southern California (Higgins, 1992). I have also worked in the field for the California Department of Fish and Game, the U.S. Forest Service and as a private contractor. I was the lead author of Factors Threatening Stocks With Extinction in Northwestern California (Higgins et al., 1992), which characterized the risk of extinction of Pacific salmon species at that time.

Since 1994 I have been assimilating fisheries, water quality and watershed information into projects that are published both on CD and on the Internet. The Klamath Resource Information System (KRIS) was devised to support the Klamath Basin Fishery Restoration Program and the Trinity River Restoration Program and two versions of the database have been published. Since release of KRIS Version 2.0 for the Klamath/Trinity, I have been working on KRIS projects in a dozen basins for the California Department of Forestry, as part of the California Resources Agency North Coast Watershed Assessment Program (NCWAP), and the Sonoma County Water Agency. From 1994 to 2002 I served on the Klamath Provincial Advisory Committee, a Federally charted (FACA) group concerned with implementation of the Northwest Forest Plan in the Klamath Basin. It is on this broad based perspective and body of information that my comments on the Simpson Aquatic HCP and Draft EIS rely.

Status of Pacific Salmon Species: The Simpson Aquatic HCP and Draft EIS patently fail to characterize the dire condition of coho salmon and other anadromous salmonid species on their property and in the region. In fact, Simpson Timber's watershed management has contributed to the decline of anadromous salmonids, in some cases extirpating or nearly extirpating populations of coho and other Pacific salmon species (Kier Associates, 1999).

The Aquatic HCP and Draft EIS do not properly acknowledge the findings of recent National Marine Fisheries Service (NMFS, 2001) and California Department of Fish and Game (CDFG, 2002) status reviews that highlight the condition of coho populations in the Southern Oregon/Northern California (SONCC) area. The recently released California Department of Fish and Game (CDFG, 2002) *Status Review of Coho Salmon North of San Francisco* stated that:

- "California coho salmon populations have been individually and cumulatively depleted or extirpated and the natural linkages between them have been fragmented or severed.
- The analysis of presence-by-brood-year data indicates that coho salmon occupy only about 61% of the SONCC Coho ESU streams that were identified as historical coho salmon streams by Brown and Moyle (1991) so it does appear that there has been a fairly substantial decline in distribution within this ESU. This analysis and the 2001 presence surveys indicate that some streams in this ESU have may have lost one or more brood-year lineages.

?? The inability to detect coho salmon in streams that were historically documented to have contained them and are considered by biologists to contain suitable coho salmon habitat is significant, especially to the high degree that coho salmon were not found in these surveys (59% of all streams surveyed).

?? Because of the decline in distribution prior to the 1980s, the possibility of a severe reduction in distribution as indicated by the field surveys, and the downward trend of most abundance indicators, the Department believes that coho salmon populations in this ESU will likely become endangered in the foreseeable future in the absence of the special protection and management efforts required by CESA."

The latter note is significant in terms of the Simpson Aquatic HCP, which proposes continued logging practices similar to or less stringent in protection than current FPR's (see Cumulative Effects section). Coho salmon are likely to be listed under the California Endangered Species Act in the area covered by the HCP.

The fact is that there were only seven populations of coho salmon throughout northern California in the hundreds as of 1994 (Brown et al., 1994), with no robust and notable populations on Simpson Timber land. These populations are no longer immediately adjacent to one another and natural mechanisms of replenishment through straying are not likely to operate. Higgins et al. (1992) characterized stocks of Pacific salmon at risk in northwestern California for the Humboldt Chapter of the American Fisheries Society. The report found numerous at-risk populations of Pacific salmon on streams managed by Simpson Timber with categories of high risk of extinction (A), moderate risk of extinction (B), and stocks of concern (C) (Table 1). The Aquatic HCP and Draft EIS have discussions relevant to Higgins et al. (1992), which was reviewed by dozens of fisheries scientists throughout northern California.

Table 1. At-risk status for Pacific salmon species in streams flowing from watersheds managed by Simpson Timber from Higgins et al. (1992).

Stream/Basin	**Species**	**Status**
South Fork Trinity	Spring chinook	High Risk
South Fork Trinity	Fall chinook	Stock of Concern
South Fork Trinity River	Summer steelhead	High Risk
Lower Klamath	Coho	Stock of Concern
Lower Klamath	Fall chinook	Moderate Risk
Lower Klamath	Coastal cutthroat	Stock of Concern
Redwood Creek	Coho	Stock of Concern
Redwood Creek	Fall chinook	Stock of Concern
Redwood Creek	Summer steelhead	High Risk
Mad River	Fall chinook	Stock of Concern
Mad River	Coho	High Risk
Mad River	Summer steelhead	High Risk
Mad River	Coastal cutthroat	Stock of Concern
Little River	Fall chinook	Stock of Concern
Little River	Coho	Stock of Concern
Humboldt Bay Tributaries	Coho	Stock of Concern
Wilson Creek	Coho	Stock of Concern
Wilson Creek	Coastal cutthroat	Stock of Concern

Figure 1. Map showing the last populations of coho salmon in the hundreds in all of northwestern California, according Brown et al. (1994). Note that none of the streams on Simpson Timber land had hundreds of adults.

Higgins et al. (1992) noted that mainstem dwelling species such as green sturgeon (Acipenser transmontainous), candle fish (Thelichthys pacificus) and adult salmonids such as spring chinook and summer steelhead were also effected by deteriorated mainstem river conditions on large rivers such as the Klamath (see cumulative effects). These conditions in part are owing to logging and erosion in tributary basins (Kier Assoc., 1991; 1999). Coho populations that once spawned at the base of South Fork Trinity River tributaries such as Big Creek and Pelletreau Creek in Hyampom Valley were extirpated by debris torrents off South Fork Mountain, although damage to the watershed and loss of species was prior to Simpson ownership.

Simpson Timber and its consultants have not been forthcoming with the status of fisheries resources on their property and as a result have not provided a basis to judge whether their HCP is working to protect the target species. I will document below case studies from streams on Simpson Timber land where populations have been severely impacted by land use.

Lower Klamath Tributaries: U.S. Fish and Wildlife Service (1990) studied Lower Klamath basin tributaries by running a downstream migrant trap. They found fish communities dominated by warm water species (Figure 2) as opposed to salmonids, which were the main species prior to disturbance from logging. Rankel (1978) found that Terwer Creek, along with Blue Creek, which is partially owned by the U.S. Forest Service, were the last major producers of chinook salmon in the Lower Klamath Basin and recommended protection for the former. Terwer runs underground (Figure 3), after 80% watershed disturbance by Simpson, and 14 of 17 Lower Klamath Basin tributaries also lacked surface flow when surveyed by the Yurok Tribe (Voight and Gale, 1998) (see Cumulative Watershed Effects section). Brown et al. (1994) characterized the Lower Klamath as follows: "Many of the lower tributaries in the Klamath drainage have been degraded by logging and road-building, and their coho salmon runs diminished. For example, surveys in 1989 failed to find coho salmon in Tully and Pine Creeks."

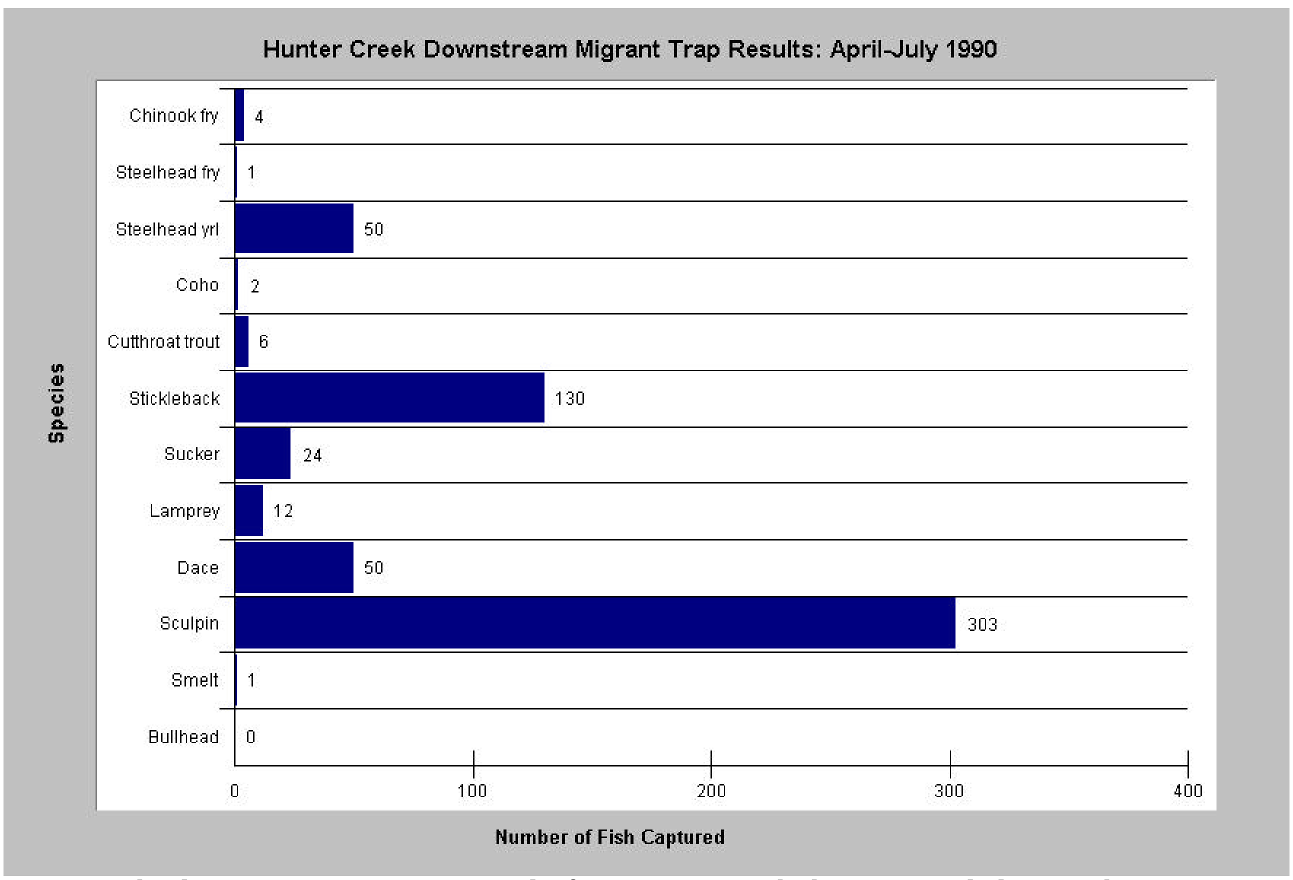

Figure 2. The downstream migrant trap results from Hunter Creek show extremely low numbers of salmonids, which is indicative of a shift in community structure in this creek to non-salmonids as a result of habitat loss. Data from USFWS (1990).

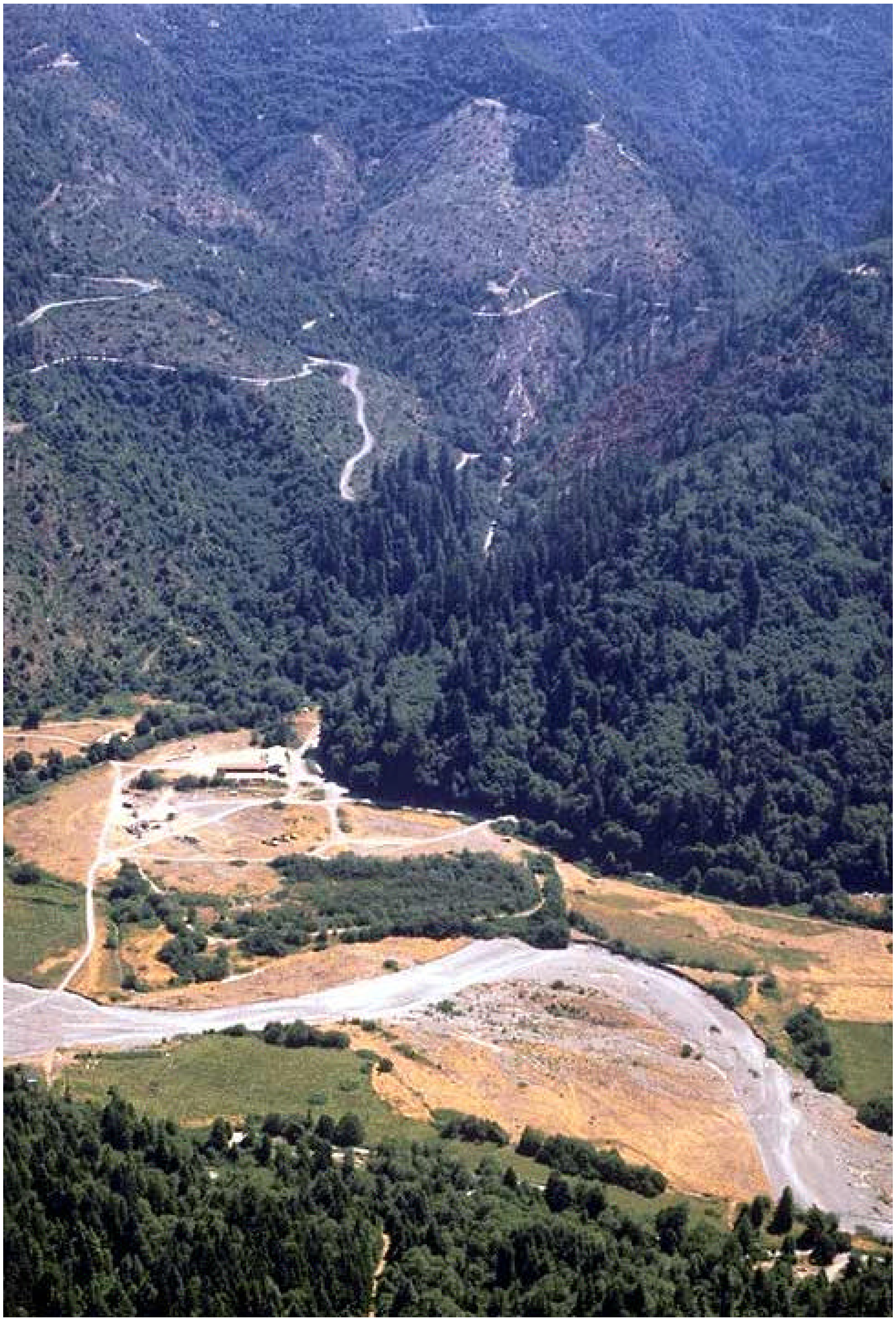

Figure 3. Lower Terwer Creek running underground in a reach that was prime coho and chinook salmon juvenile habitat (Rankel, 1980) prior to recent logging by Simpson (see Cumulative Effects section). Coats and Miller (1980) predicted likely cumulative watershed effects when just 32% of the basin had been logged.

The *Mid-term Evaluation of the Klamath River Basin Fisheries Restoration Program* (Kier Assoc., 1999) noted that chinook salmon populations in Hunter Creek in the Lower Klamath were failing despite operation of a hatchery by the Yurok Tribe:

> "Fewer than 100 fall chinook salmon have returned to Hunter Creek in recent years and half of those were from the small scale rearing program operated on Hunter Creek. There is no baseline information on historic salmonid populations; however, Hallock (1952) marked thousands of juvenile coho in this stream. It would seem that highly disturbed watershed conditions are confounding recovery in Hunter Creek despite expenditures of the Task Force on both in-stream habitat improvement structures and artificial culture to aid in the recovery of this watershed."

Hunter Creek like Terwer Creek runs underground for several miles as a result of high sediment supply. Wilson Creek just to the north of the Lower Klamath has had similar watershed management by Simpson Timber to Hunter and Terwer creeks and runs underground in summer.

<u>Redwood Creek</u>: Prairie Creek in the Redwood Creek basin is largely protected by Redwood National and State Parks and provides a refugia for coho salmon. The mainstem of Redwood Creek, however, is severely aggraded and coho and summer steelhead are at very low levels in the watershed above Prairie Creek. The mainstem of lower Redwood Creek is so aggraded that it loses surface flow in summer. Landowners in Redwood Creek, including Simpson Timber, have operated a downstream migrant trap that shows chinook salmon and steelhead production is recovering in the upper Redwood Creek watershed (Sparkman, 2000). The lack of coho salmon in these traps, however, shows that habitat is not fully recovered. Also, there is a high risk that aggradation in upper reaches will recur as a result of cumulative effects (see Cumulative Watershed Effects section).

<u>*Lower Mad River/Can∂n Creek*</u>: Simpson Timber's extensive timber harvest of the lower Mad River since 1985 has caused significant and chronic turbidity of the Mad River, which I have personally witnessed as an angler. It is common for the Mad River to become too turbid to fish after early rains and to remain too muddy to fish for months unless there is a prolonged drought or a cold storm with snow fall and freezing temperatures. Turbidity is known to inhibit steelhead feeding and growth (Sigler et al., 1984) and it is likely that elevated turbidities caused by Simpson activities are negatively affecting all native salmonids with a life history requiring winter, mainstem use.

Can∂n Creek is a tributary of the Mad River upstream of Blue Lake, with substantial Simpson Timber ownership. This stream was a coho salmon index stream for the Pacific Fisheries Management Council (Larry Preston, personal communication) but lost its run of coho salmon as a result of habitat loss. Sediment evulsions from this watershed after extensive Simpson clear cutting and road building created a delta at the mouth of this stream which prevented coho from even entering in low flow years in the early 1990's.

<u>*Humboldt Bay Watersheds*</u>: Although there are no data for Simpson Timber owned watersheds in Humboldt Bay, recent studies by Pacific Lumber Company (2002) on Freshwater Creek provide insight into response of coho salmon and other species to high rates of cutting. Higgins (2001) noted patterns in downstream migrant trapping data in Cloney Gulch and McGarvey Creek, where coho salmon dropped by an order of magnitude after timber harvest in 80% and 50% of

these watersheds, respectively. Graham Gulch was so impacted by timber harvest and landslides that it produced only a few dozen juvenile salmonids over several months of trapping. It is likely that Simpson watersheds managed with equal intensity would yield a similar response.

Howe Creek: This Lower Eel tributary has lost its coho salmon and exhibits extreme, chronic high water temperatures (Figure 4), which make it unviable for the species. In fact coho salmon have been extirpated or nearly extirpated in the Lower Eel River, lower Van Duzen and Yager Creek as a result of excessive logging (Higgins, 1998). Howe Creek is characterized by the Aquatic HCP as properly functioning for temperature and no problems are acknowledged off Simpson's ownership. In fact Howe Creek has suffered debris torrents, which have dramatically changed the width to depth of the stream, resulting in the high water temperatures. The torrents also filled pools that will not scour out for decades.

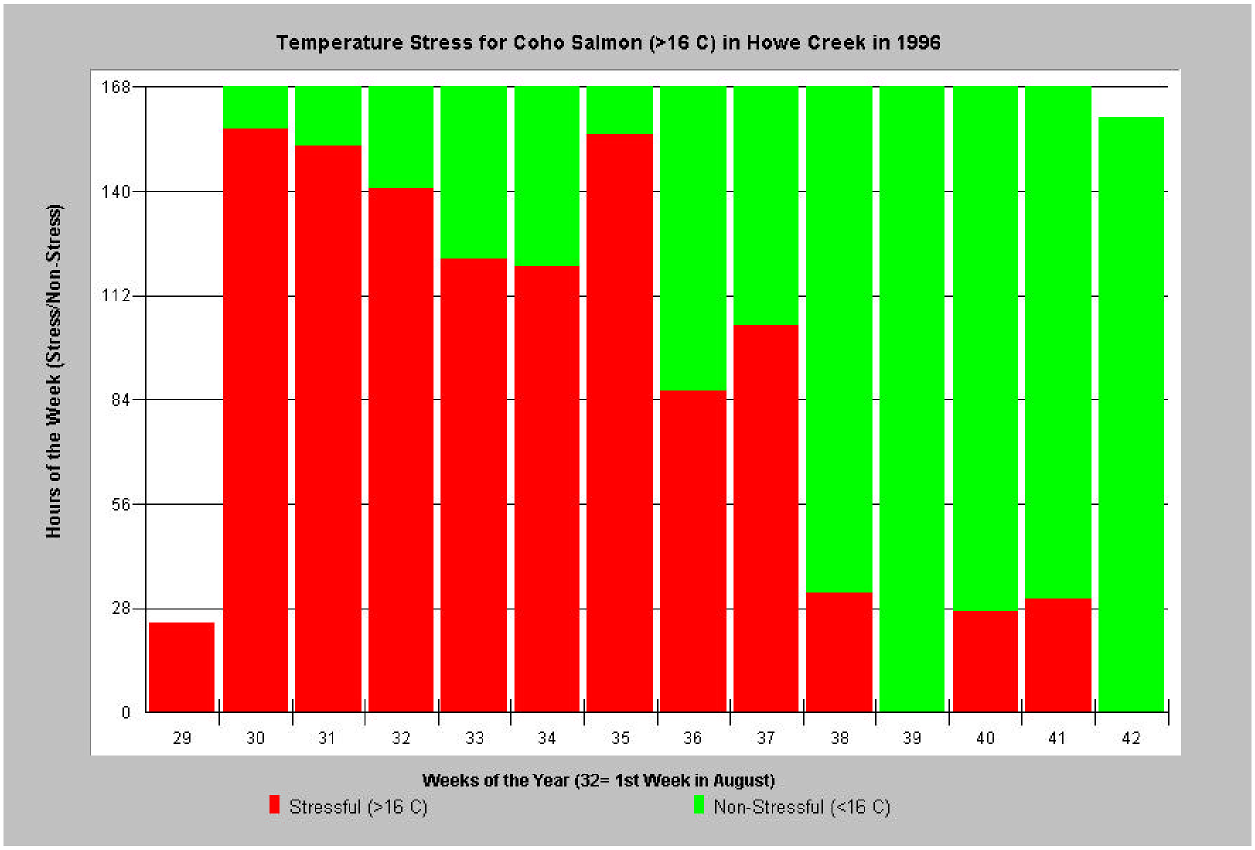

Figure 4. This chart shows the hours in the week above 16 degrees C, which is used as an indicator for the stressful range for coho salmon.

Cumulative Watershed Effects: Both Ligon et al. (1999) and Dunne et al. (2001) recently found that California Forest Practice Rules were not preventing the decline of anadromous salmonid species nor were they adequately dealing with cumulative watershed effects. Similarly, the Simpson Aquatic HCP and Draft EIS do not discuss prudent limits for timber harvest, which is the crux of the cumulative effects issue, nor make use of essential indices of disturbance such as road densities. The documents do not consider influence of managed streams on larger downstream tributaries (Klamath, Mad, Eel and Redwood Creek), many of which are recognized as impaired under TMDL. It also fails to factor in land management by other owners.

Reeves et al. (1993) studied eight basins on the Oregon Coast that were less than 25% timber harvested and compared them to adjacent watersheds with higher timber harvest levels. They found that streams draining watersheds cut in over 25% of their area were usually dominated by one salmonid species, while basins with less disturbance maintained several species. Reeves et al. (1993) traced the root cause to channel simplification associated with pools filling in and large wood depletion.

Dunne et al. (2001) explain that large land surface disturbances, such as the recent extensive timber harvests surrounding and within Simpson Timber land, cause effects which are sometimes hard to quantify but known to occur:

> "Generally speaking, the larger the proportion of the land surface that is disturbed at any time, and the larger the proportion of the land that is sensitive to severe disturbance, the larger is the downstream impact. These land-surface and channel changes can: increase runoff, degrade water quality, and alter channel and riparian conditions to make them less favorable for a large number of species that are valued by society. The impacts are typically most severe along channels immediately downstream of land surface disturbances and at the junctions of tributaries, where the effects of disturbances on many upstream sites can interact."

Simpson Timber Company has timber harvest levels of over 80% of some basins within a 20-year period, such as **Terwer Creek** (Figure 5), **Hunter Creek** and **Wilson Creek**. Coats and Miller (1981) used Terwer Creek in the Lower Klamath Basin as a cumulative effects case-study, when harvesting in the basin had taken place in 32.5% of the basin and about 12% of its watershed area compacted by roads and landings:

> "Given the extent of recent soil disruption in Turwar Creek, the probability of continued timber harvest activities and the documented impacts in watersheds of comparable climate and geology, it appears that the stage has been set for significant accretion of sediment from hillslopes to tributaries and to the main channel of Turwar Creek. The timing of such impacts, however, depends to a large extent on the timing of future storm events."

Kier Associates (1999) found that: "The January 1997 flood transported very large quantities of gravel through lower Terwer Creek, negatively impacting private agricultural land and threatening a community water supply (Mark Meissner, NRCS Eureka)."

In adjacent Hunter Creek, which has a similar level of harvest and impacts to Terwer Creek, Kier Associates (1999) indicated that the streambed was so unstable that habitat restoration and rebuilding of chinook populations with a hatchery was failing:

> "Hopelain (in press) found that Hunter Creek has one of the lowest scores for habitat restoration success in northern California. High watershed disturbance is confounding habitat restoration efforts in the entire Lower Klamath Basin. The Yurok small-scale fish rearing program did not succeed in rebuilding salmon numbers because the stream habitat was too poor to support natural spawning."

Figure 5. Terwer Creek from the air in 1990 after extensive clear cutting and salvage logging. Note steep terrain with high landslide risk and dense tractor skid trails on less steep slopes.

Other Simpson Timber tributaries of the lower Klamath were characterized by Kier Associates (1999) as follows:

> "Channels of most Lower Klamath tributaries have continued to fill in as sediment yield in the watersheds remains high. Timber harvest in all Lower Klamath watersheds exceeds cumulative effect thresholds and all streams (except upper Blue Creek) have been severely damaged during the evaluation period. Clear-cut timber harvest in riparian zones on the mainstem of lower **Blue Creek** and the mainstem Klamath River occurred in 1998 in inner gorge locations. Aggradation in salmon spawning reaches can be expected to persist for decades."
>
> "Lower Blue Creek on private, industrial timber lands has been extensively logged, including in the riparian zone during the course of the Restoration Program (Figure 6); consequently, fish habitat has deteriorated since 1986. The channel of lower Blue Creek has widened substantially in response to an over-supply of sediment related to logging activities. USFWS (1993) has expressed concern over gravel quality and stability in lower Blue Creek with regard to survival of fall chinook salmon redds. The West Fork of Blue Creek has been heavily logged and has an extensive road network. Although a complete survey has not been conducted, weirs in the West Fork of Blue Creek were at least partially destroyed by the 1997 storm. Difficulty maintaining in-stream structures would be expected because most of the West Fork is in early seral conditions and there is an extensive un-maintained road network. Logging on private lands in inner gorge areas of lower Blue Creek was continuing during winter 1997."

Figure 6. Inner gorge of Blue Creek in 1990 with clear cuts adjacent to the stream and a wide gravel bar signifying an over-supply of sediment from logging, landslides and failed roads.

The Aquatic HCP data on age of trees show only 7% of the landscape in Simpson holdings in Blue Creek is in trees older than 60 years, and 25% of the trees are less than 20 years old (Figure 7). This indicates a very high disturbance index related to logging for the last 20 years and the previous 20 years was more intensive. Age class distribution of timber on Simpson's property as a whole indicate a similar conditions (Figure 8).

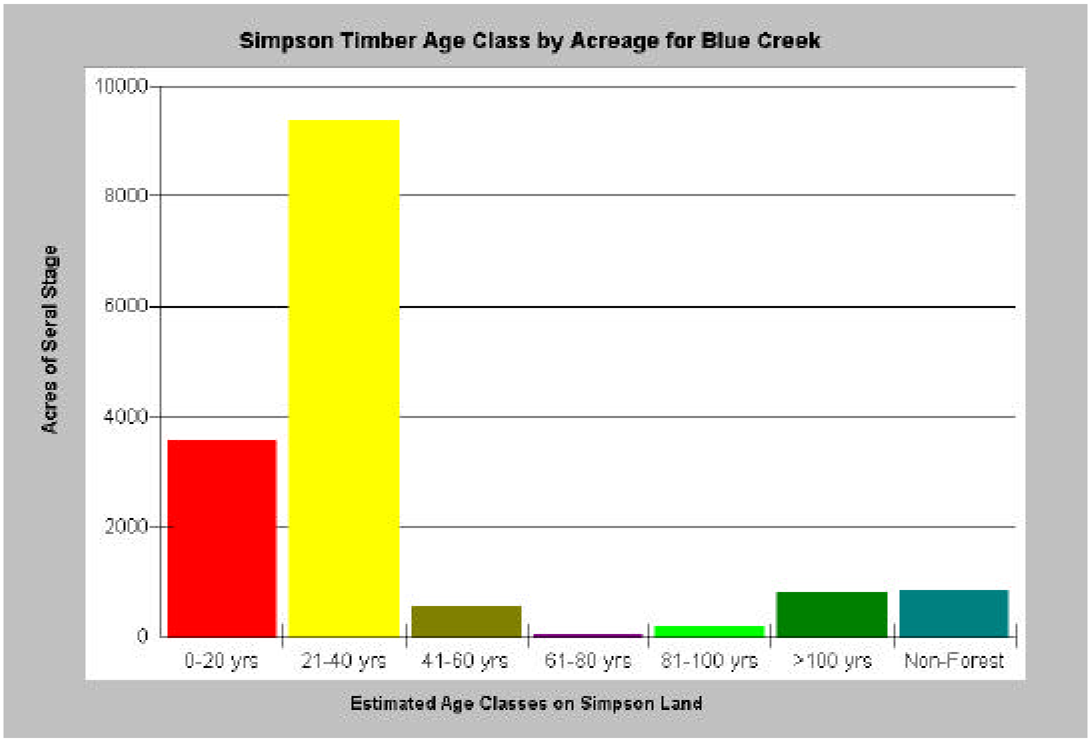

Figure 7. Distribution of age classes of timber in the Blue Creek drainage on Simpson's holdings. Note the lack of late seral trees or even those over 60 years. Data from HCP.

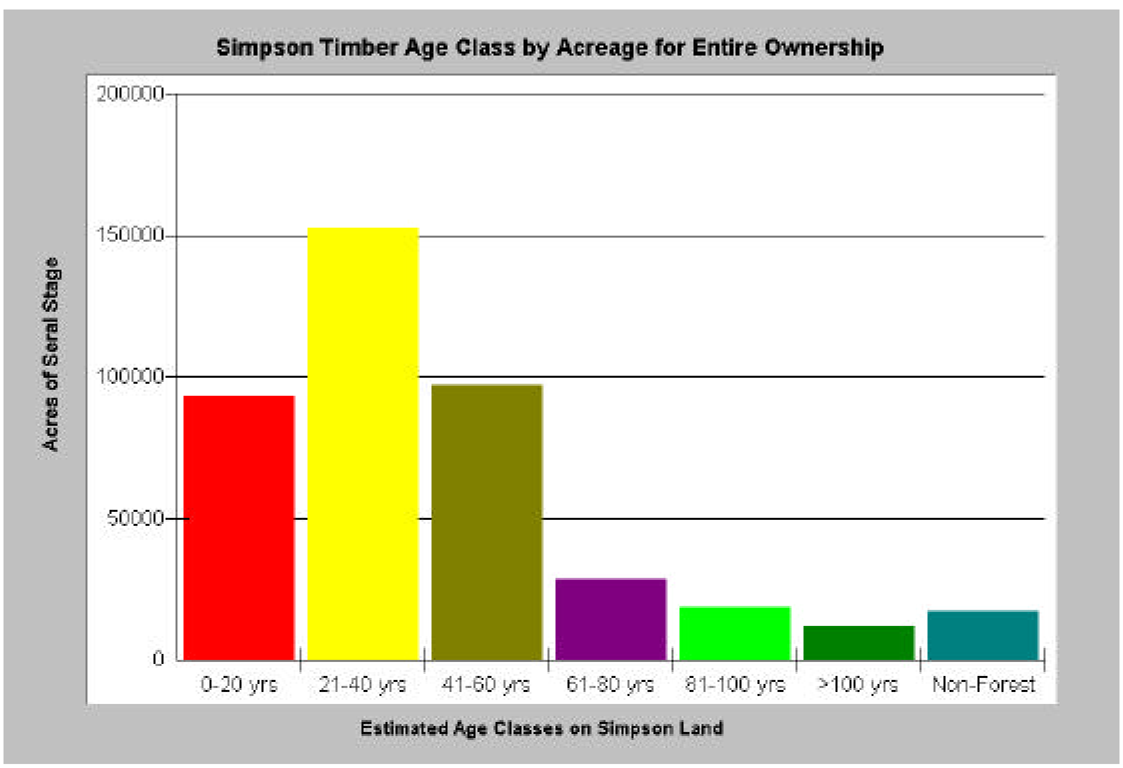

Figure 8. The high proportion of young trees across Simpson's ownership indicates high rates of entry in recent years. There are few mature trees across the landscape on their ownership.

Can∂n Creek, tributary of the lower Mad River, was discussed at a seminar on sediment sponsored by Simpson Timber and the National Marine Fisheries Service in 1999 at Humboldt State University. A statistician presented results of shifts in thalweg profiles in Can∂n Creek and showed a chart indicating that the width of the creek had gone from 50 feet wide to 150 feet wide during the course of the study. This type of channel change can take decades to recover (Lisle, 1981), and represents a major setback in carrying capacity for salmonids. The sediment transported through this reach, which caused the channel widening, formed a delta at the mouth, which prevents access to anadromous fish, including coho salmon, in low flow years.

The portion of the **lower Mad River** owned by Simpson Timber Company has 31% of its forests harvested in the last 20 years, while 26% of stands less than that age are in the **North Fork Mad River** watershed (Figure 9). When a 40-year period is assessed for the North Fork, tree age data suggest that 49% of the watershed was logged over that time. This far exceeds thresholds recognized by Reeves et al. (1993) as likely to retain diverse salmonid communities. The disturbance levels in particular small sub-basins may be much higher (Figure 10). There are further problems in the North Fork Mad River from a forest health perspective (see Forest Health section).

I have fished **Little River**, Humboldt County, since I moved here in 1972. Although Simpson Timber purchased land in this watershed after Louisiana Pacific had cut over 70% of the forest

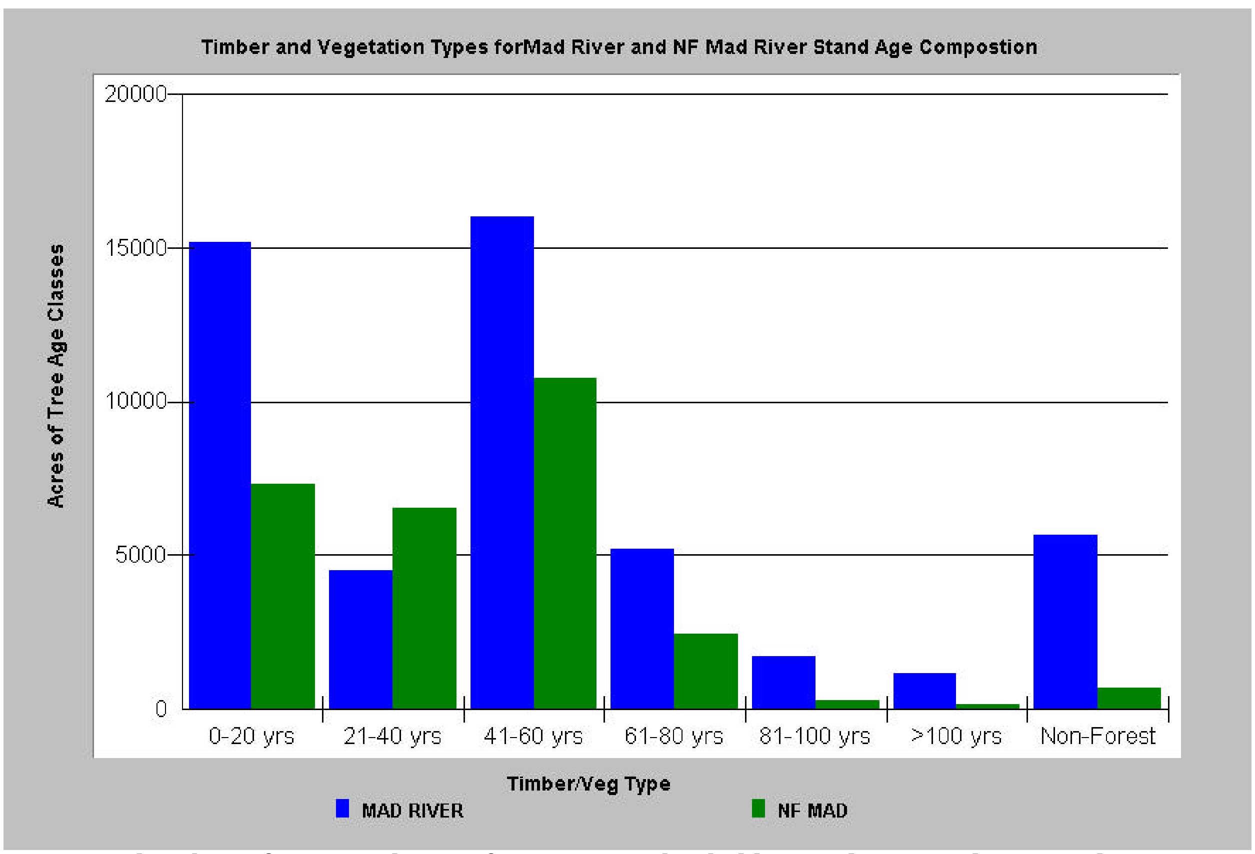

Figure 9. This chart of tree age classes of Simpson Timber holdings in lower Mad River and North Fork Mad River show a paucity of trees over 80 years old and indicate extensive timber harvest in recent decades, especially in the last two in Mad River.

Figure 10. This photo shows the North Fork Mad River with large patch cuts amid over-stocked stands of 40-60 year old trees. Extensive clear cutting is likely to promote hydrologic change.

after 1985, they continue to harvest timber. I watched the stream go from a premier fishery for coho, steelhead, chinook and coastal cutthroat trout to one that is rarely fishable because of turbidity. The estuary, which was an excellent salmonid nursery and harbored adult cutthroat trout all summer, has filled in by at least six feet. I noticed that the bed of Little River below Crannel went from one with deep pockets to one with few areas over three feet deep. I also witnessed substantial fluctuation in bed elevation where a car body around which a pool was formed was three feet above grade the following year and sticking up in the air. Changes of this magnitude in bed elevation indicate high likelihood of redd scour (Nawa and Frissell, 1990). The flood frequency of Little River has increased substantially and even moderate rainfall with saturated ground swells Little River into the low lands above Highway 101.

Simpson Timber Company has major holdings in **Redwood Creek**, which was well noted for the catastrophic sediment yield associated with the first wave of logging and the 1964 flood (Janda, 1977). While sediment yield in upper Redwood Creek has been reduced and the channel has cut down, extensive clear cutting and high road densities now are increasing risk that new evulsions will occur. Some Calwater Planning Watersheds in Redwood Creek have been harvested in over 60% of their area in just 15 years (Figure 11). The Minor Creek Calwater shown and harvest activity are largely by owners other than Simpson, but their activities also need to be added to HCP cumulative watershed effects discussions.

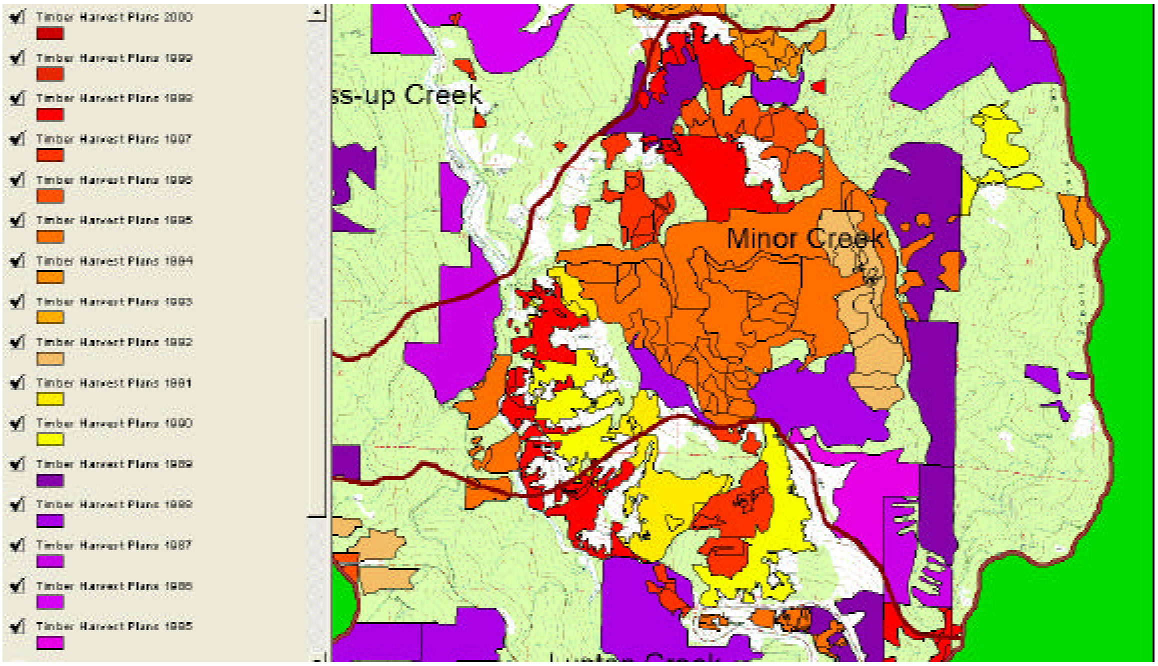

Figure 11. This shows the amount of logging in the Minor Creek Calwater Planning Watershed with disturbance of over 60% of the watershed in 15 years.

Cross sections and longitudinal profiles from Redwood National Park (Madej, 1999) show that the channel of lower Redwood Creek has filled as upper reaches in the watershed have recovered from the 1964 flood. The result is reaches of lower Redwood Creek losing surface flow, which greatly diminishes rearing habitat capability for salmonids (Figure 12). This change in the channel has made lower Redwood Creek unviable for spawning and has severely restricted summer steelhead habitat to just a few reaches in middle Redwood Creek. If a new wave of sediment is unleashed from land use activities in upslope areas, negative effects on fish populations will extend for decades. Channel filling may also cause loss of giant redwoods in Redwood National Park. Impacts to RNP are not properly covered in the HCP and DEIS.

The **Redwood Creek estuary** is recognized as a very important habitat for anadromous salmonids, but with its carrying capacity severely restricted due to sedimentation and levee construction (Anderson, 2000). Sediment that would affect lower Redwood Creek would also be flushed through the estuary. Consequently, the Aquatic HCP and DEIS should cover potential impacts of Simpson's activity, in combination with other land owners, to the estuary of Redwood Creek. It is likely that sediment problems and diminished salmonid carrying capacity for salmonids in the estuary would persist for decades in the event of another pulse of sediment.

Simpson is also not dealing with potential rain on snow in the Redwood Creek basin and the additional potential of peak flows resulting from increased discharge from clear cuts (Harr, 1979). Simpson is using regeneration silviculture on ridges in Redwood Creek that make them more susceptible to build up of snowfall. Harr (1979) found that peak flow increases occurred when snowfall built up in clear cuts and melted with subsequent warm rain events. Snow falling in areas with canopy has greater chance for ablation. Recent past and planned clear cuts in Redwood Creek and high road densities further exacerbate the risk of extremely high peak flows and catastrophic channel changes. Other owners are showing similar patterns of land use.

Figure 12. Lower Redwood Creek, above its convergence with Prairie Creek (at left) running dry as a result of major bedload transport. Loss of surface flows greatly reduces beneficial uses of water, including fisheries. Another wave of sediment generated by too much watershed disturbance would prolong this problem.

Figure 13. Lower Klamath, Sept. 2002.

Simpson Timber has very substantial cumulative effects on the **Lower Klamath River**. If each of the tributaries flowing from Simpson land had cool clear water and sufficient depth for adult salmonids to enter, then many of the 30,000 dead chinook, coho and steelhead (Figure 13) might have had a source of refuge. The mouth of Blue Creek had one pool with over 2,000 adult salmonids at the time of the fish kill (Craig Bell, personal communication). This tributary has extensive headwaters with ecological health because of United Stated Forest Service ownership. Voight and Gale (1998) found 14 of 17 tributaries in the Lower Klamath Basin lacked surface flows at their juncture with the Klamath. Most of these basins are managed wholly by Simpson. Other species such as green sturgeon, candle fish (Larson and Belchik, 1998), and Pacific lamprey are also affected by mainstem function.

Roads: Simpson owns 416,531 acres or roughly 650.4 square miles and has 3800 miles of roads or 5.84 mile per square mile (mi/sq mile) on their property as a whole. That figure does not address the skid trails (Figure 14), temporary roads or abandoned roads from previous waves of logging. The Aquatic HCP and Draft EIS do not address recommendations in Cedarholm et al. (1983) and NMFS (1996) that maximum road densities should not exceed 2.5 miles per square mile in order to maintain properly functioning watershed condition and to prevent harmful levels of fine sediment from entering streams. Road crossing failure is one of the principal sources of sediment (Hagans et al., 1986) and Simpson has no plan to replace culverts and upgrade or decommission roads except in watersheds where it plans further logging. Culverts have an expected life of 25 years and many culverts in inactive timberlands can be expected to fail. There are many watersheds where there are stacked culverts as roads criss-crossing drainages (Figure 15). These are the most dangerous as one blown crossing near a headwall brings other pipes and fill into a major debris torrent.

Not only are there no targets for reduction of road density, the emphasis of the roads program is more on upgrading than decommissioning. Simpson admits that it will maintain only 45% percent of its roads annually, which poses a higher risk of crossing failure where trash may build up on culvert inlets or stream capture occur because of unmaintained drainage structures. *Since the road densities on Simpson land are about double recommended (NMFS, 1996) and twice what they can maintain, it suggests that their road density needs to be cut by half.*

Figure 14. Recent clear cut in Redwood Creek watershed showing extensive tractor skid trails or temporary haul roads, which are not considered part of the road network but do add to changes in hydrologic function.

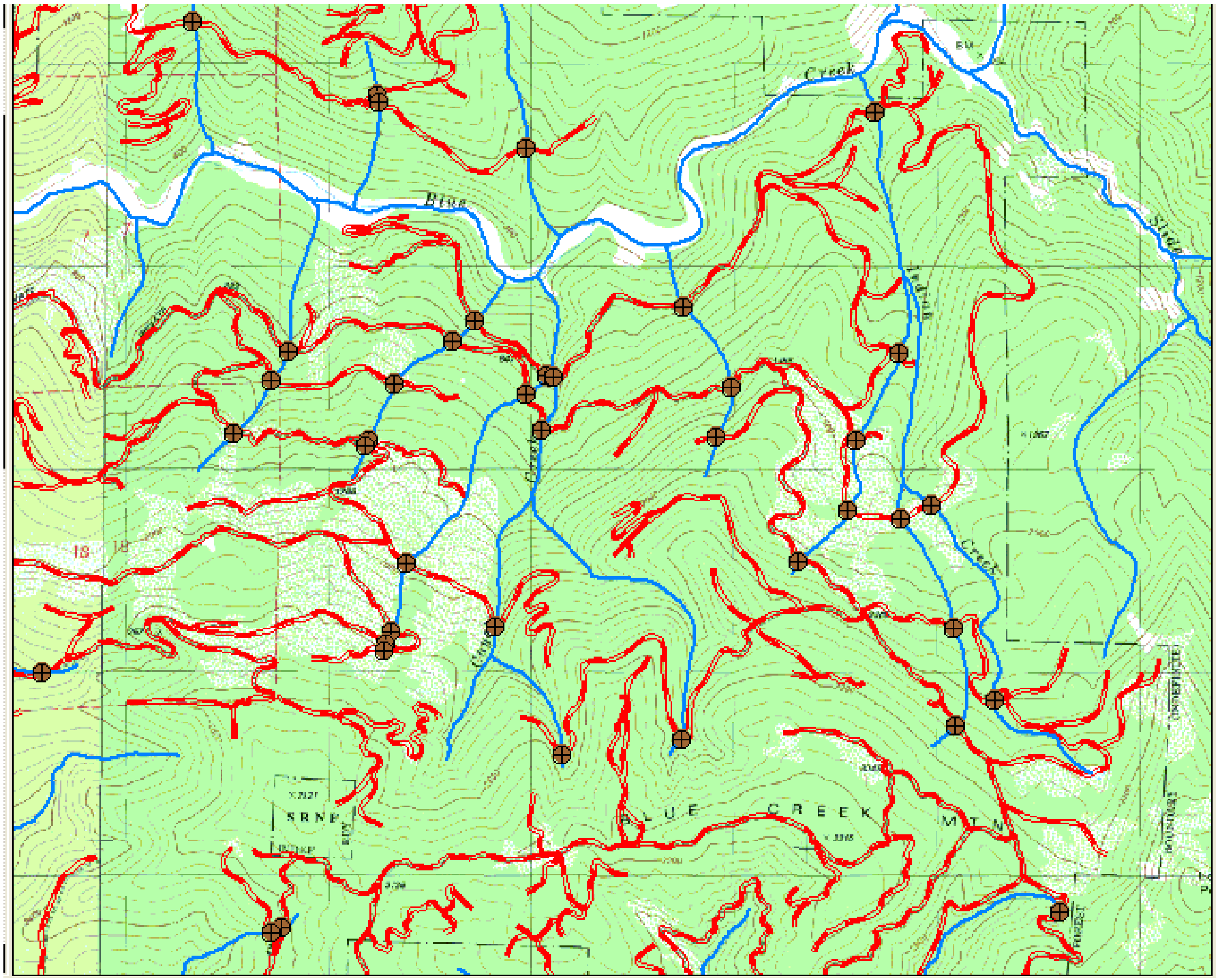

Figure 15. This USGS topographic map is overlaid with hydrology and timber haul roads in middle reaches of Blue Creek on Simpson Timber land. There are many mid-slope roads and roads crossing headwalls, which have high failure risk. Stacked roads pose risk of multiple crossing failures. All these roads except those on ridges should be decommissioned.

Riparian Conditions: The Aquatic HCP and Draft EIS confuse canopy and riparian health and function (Chen, 1991). Science associated with the Northwest Forest Plan (FEMAT, 1993) indicates that the zone of riparian influence is two site potential tree heights or more (Figure 16). In fact water temperature buffering, in the form of cool air temperatures and high humidity over the stream, rapidly deteriorates under one site potential tree height protection, which in redwood country is 200 feet or more (Spence et al. (1996). Consequently, the riparian buffers and management plans are fundamentally flawed. The Aquatic HCP ignores best science on this issue and continues to promote harvest of large trees in riparian zones. Harvest restrictions are only equal to, if not less than, those required under the California FPRs (Table 2).

The protection for streamside areas is extremely inadequate when contrasted with the scientific assessment of riparian function from Federal scientists in the FEMAT (1993). They recommended protection of two site potential tree heights on perennial streams and one site potential tree height on ephemeral streams. Figure 17 shows how Bartholow (1989)

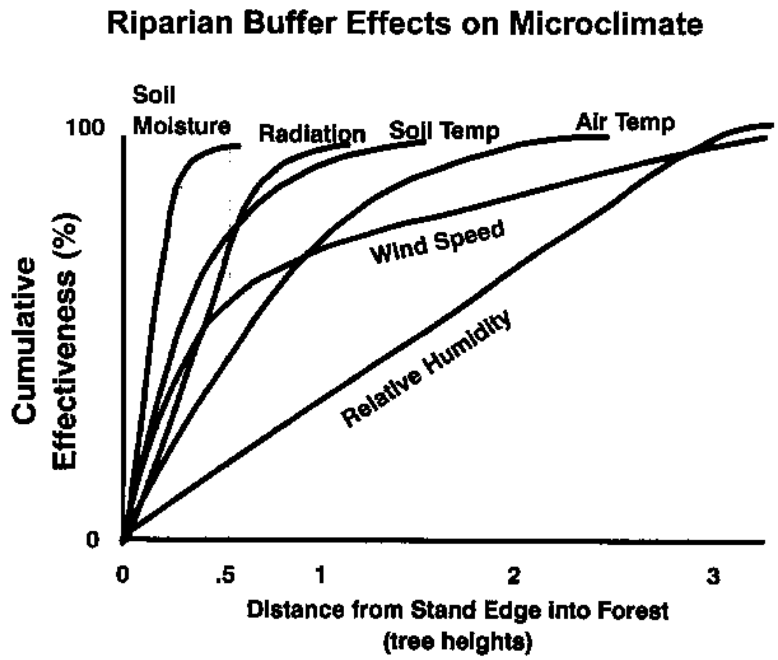

Figure 16. Chart based on Chen (1991) taken from FEMAT (1993) showing that riparian function drops off rapidly inside one site potential tree height. Simpson proposes only 50 foot no cut zones with some protection out to 150', which is less than one site potential tree height.

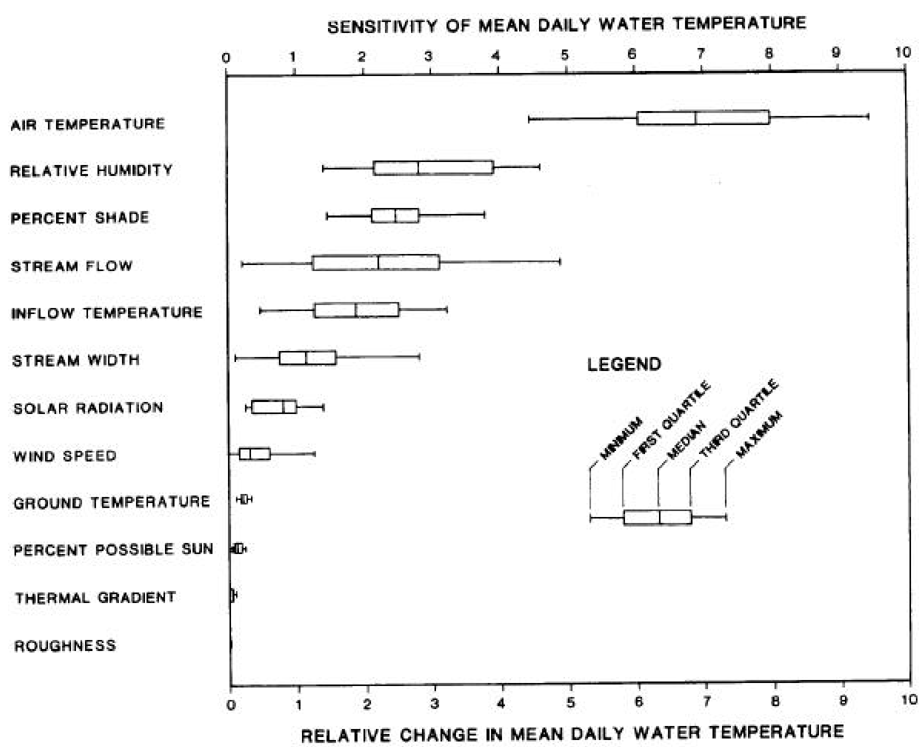

Figure 17. This chart taken from Bartholow (1989) shows the order of influence of factors on mean daily water temperature, with air temperature having the greatest impact followed by relative humidity and shade.

demonstrated that mean daily water temperature is influenced most by air temperature over the stream, then relative humidity and shade, respectively. This well recognized relationship of air temperature and water temperature (Poole and Berman, 2000; Essig, 1999) is ignored in the Aquatic HCP and Draft EIS.

The Aquatic HCP and Draft EIS use stream shade or canopy as if they were the main governor of water temperature, when they are not. Data provided in the Aquatic HCP shows that even canopy is fairly open on some reaches of streams in Simpson's ownership and the amount of shade provided by conifers is very low in most cases (Figure 18). This is consistent with the findings from Landsat (Figure 19), which shows that mostly small diameter trees dominate the 90 meter buffer zone. These small diameter trees are often hardwoods. A canopy of hardwoods often signifies that the overstory of conifers have been removed, opening air flow and the chance for stream warming. Hardwoods also offer very little value as habitat structures when recruited to the stream, because they only last about five years before rotting (Cedarholm et al., 1997).

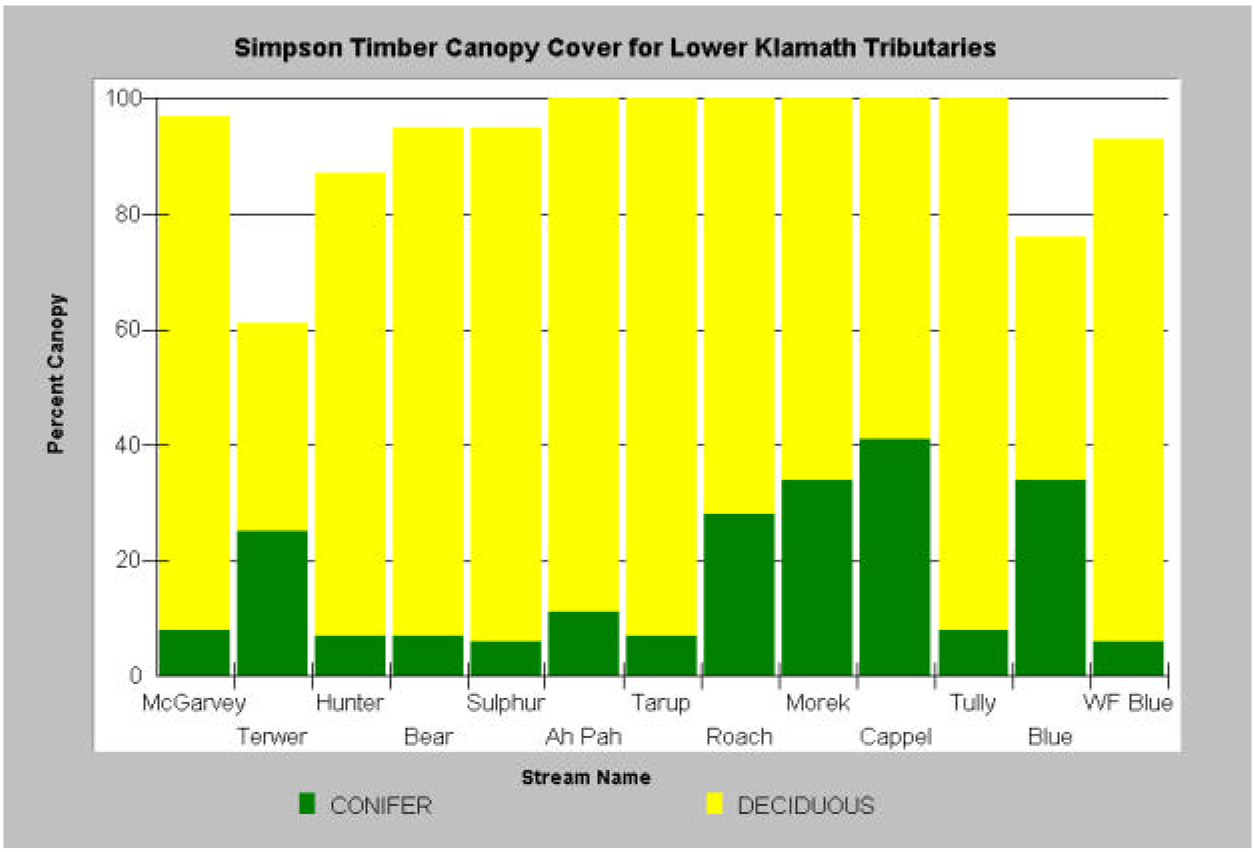

Figure 18. This figure takes canopy measurements of Lower Klamath tributaries taken from the Simpson Aquatic HCP. All of these streams show major signs of riparian logging and have depleted conditions relative to potential recruitment of conifers into the stream channel.

The riparian zones on Simpson Timber lands are as lacking in large trees similar to upland conditions, as shown by their data of tree age classes (Figure 8). Landsat imagery from 1994 as interpreted by Dr. Larry Fox at Humboldt State University shows that there are almost no late seral trees in the riparian zone of Lower Klamath tributaries (Derksen et al., 1996). Figure 19 shows vegetation and size of trees in a 90-meter buffer the riparian zone in lower Blue Creek and the West Fork Blue Creek. The Landsat has a 30-meter resolution and may miss individual trees,

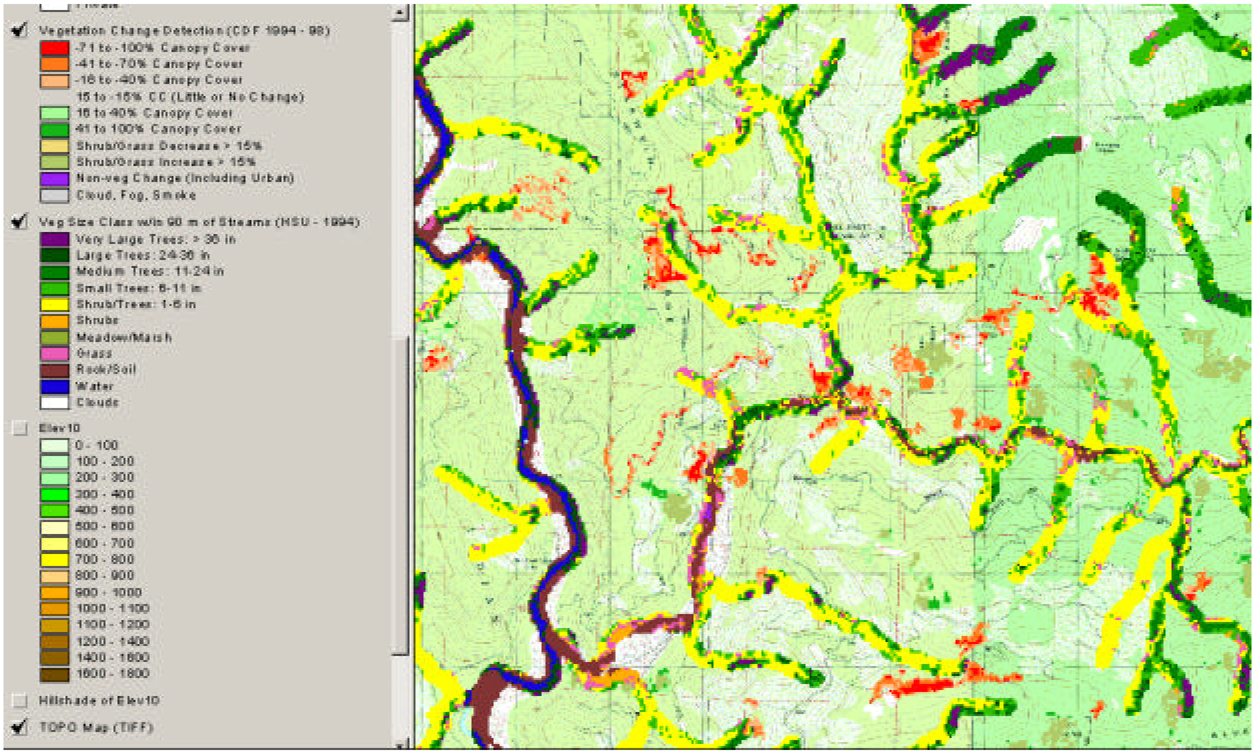

Figure 19. This map shows the 90 meter riparian buffer for lower Blue Creek and the West Fork Blue Creek (upper center) with the zone dominated by trees less than 12 inches in diameter. Change scene detection shows removal of trees in riparian zones or in inner gorge areas.

but most of the riparian zone is in very early seral conditions with the majority of trees under 12 inches. This indicates that large wood supply in these reaches is likely to be hindered for 50-100 years as conifers grow large enough to provide lasting value as habitat elements in streams. The 1994-1998 change scene detection overlay on the map shows significant tree removal in riparian zones and in uplands immediately adjacent. Large conifers may last decades or even hundreds of years, in the case of old growth redwood. Simpson plans far less protection for riparian zones than recommended for ecosystem function in FEMAT (1993) (Table 2). In light of the current conditions in Simpson's riparian zones, there should be no harvest of large diameter trees out to 200 feet for at least 50 years.

Stream Class	FEMAT	Simpson	Simpson No-Cut
Class I	360-400	150	50-70
Class II	360-400	70-100	30
Class III	180-200	30	0-30

Table 2. The CDF stream classification refers to perennial streams with fish (Class I) and without (Class II) and ephemeral streams (Class III). The FEMAT distances for site potential tree heights reflect the taller trees expected in redwood forests (Spence et al., 1996). The Aquatic HCP tiers cuts inside bands within their riparian management zones.

Disturbance of Steep Slopes and Sediment Yield: The Aquatic HCP and Draft EIS recognize unstable areas but then fail to make appropriate prescriptions. The inner gorge zones are recognized as unstable but restrictions on harvest do not rise to the break in slope but only arbitrary distances, depending on stream class. Roads will still be allowed to be built across high risk geomorphic features, such as headwater swales and slides, if there is no other "feasible" path for the road. Timber harvest will still be taking place in inner gorges, at headwalls and within 25 to 50 feet from the top of active slides. The whole system of sediment prevention from mass wasting rests on the opinion of a licensed engineering geologist (in the company's employ). This is the same system that has been used under California FPRs and has been shown to be an abysmal failure in preventing sediment yield on Simpson's land and elsewhere (Pacific Watershed Associates, 1998).

The harvest of trees on steep slopes destabilizes them, increasing the risk of landslides. When slides occur, they lack large wood and, therefore, cause extensive damage to streams due to long run out distances of debris torrents (PWA, 1998). The Aquatic HCP should have to use and share results from the shallow landslide stability model (SHALSTAB) (Deitrich et al., 1998), which gauges the risk of slope failure. The Fox Unit Study on the South Fork Smith River (LaVen et al., 1974) showed that harvest of timber on unstable lands, particularly inner gorges, leads to a huge increase in sediment yield. Simpson Timber has already disturbed numerous slopes with high risk of failure (Figure 4). Sediment yield after timber harvest or road building may have a lag time before contributing sediment to streams (Frissell, 1992). Inner gorge areas and those shown as high risk zones by SHALSTAB should be completely avoided, with no timber harvest or road building.

Effects of Sediment on Aquatic Habitat: A very major deficiency of the Aquatic HCP and Draft EIS are their failure to discuss the linkage of sediment yield, due to harvest and road building activities, and subsequent impacts on aquatic habitat downstream. Reeves et al. (1993) had the following findings in paired comparisons in Oregon Coastal basins with greater or less than 25% prior timber harvesting:

> "Stream habitats in basins with low timber harvest levels were more diverse than habitats in basins with high levels of harvest. In the paired comparisons, streams in low-harvest basins had significantly more pieces of wood per 100 m – 2 1/2 times more than streams in high-harvest basins. Streams in low-harvest basins also had 10 to 47% more pools per 100 m than did streams in high harvest basins."

Harvest of between 50-80% of Freshwater Creek sub-basins caused a major decrease in pool frequency and depth, and a simultaneous decrease in coho juvenile production (Higgins, 2001). Results from V* in upper Freshwater Creek showed pools filled from roughly 15-20% filled in 1992-93 and 46% filled in 1999, after more than 40% of the basin was logged. Similar patterns of loss of pool frequency and depth after logging are also evident in the Noyo, Ten Mile, Big and Gualala rivers in Mendocino county after extensive logging (IFR, 2000; 2002; In review). The loss of pool habitat was associated with loss of coho salmon or their diminishment in all the aforementioned basins. Brown et al. (1994) noted the following about why coho had declined in California:

> "Optimal habitat for juveniles seems to be deep pools (>1 m) containing logs, root wads, or boulders in heavily shaded sections of stream. These habitat characteristics are typical

of streams in old-growth forests, and for that reason, the decline of coho salmon stocks in California can be tied to the widespread elimination of old-growth forest on the California north coast."

Simpson Timber Company has collected data on fish habitat and measures of bed change, such as cross sections and longitudinal profiles, and should be made to share it openly as part of their Aquatic HCP. Average and maximum pool depth need to be monitored over time to gauge recovery (see Monitoring section).

Restoration and Salmonid Recovery: In order to recover coho salmon and other Pacific salmon species, restoration needs to be targeted in areas adjacent to existing refugia to expand them and protect gene resources and allow for colonization of healthy stocks into restored watersheds (Bradbury et al., 1996). The Aquatic HCP gives priority to road maintenance and decommissioning to watersheds where Simpson will be actively logging. If the HCP were following a science based strategy for recovery of coho, it would protect those watersheds in the company's holdings where they are most abundant. This strategy would target road decommissioning in the West Fork of Blue Creek and their other holdings in middle and lower Blue Creek. Blue Creek is recognized as a refugia by the USFS and has been given Key Watershed status under the Northwest Forest Plan (FEMAT Aquatic Conservation Strategy, 1993). Voight and Gale (1998) found the highest densities of coho in the Lower Klamath Basin in the Crescent City Fork of Blue Creek.

The Little River has been known as a coho salmon producer and also has a strain of large, short-run coastal chinook, which is not found in many other watersheds. Simpson in combination with the former owner Louisiana Pacific has now logged over 80% of the basin since 1985, and instead of protecting Little River as a refugia, timber harvest plans continue to be filed.

The inability of the Simpson Aquatic HCP to craft a plan suitable for salmonid recovery is that the company will not allow for watershed rest. Kauffmann et al. (1998) point out that: "The first and most critical step in ecological restoration is passive restoration, the cessation of those anthropogenic activities that are causing degradation or preventing recovery." The high levels of watershed disturbance described above indicate a widespread need for Simpson owned watersheds to rest in order to allow true hydrologic recovery and return to channel diversity.

Freshwater Creek had almost fully recovered its function as prime coho habitat after 50 years of watershed rest following logging in the 1930s and 1940s (Higgins, 2001). Original logging in Freshwater, however, used trains and cable yarding and did not have a high density of roads. Recovery of logging from 30 to 50 years ago may be progressing more slowly because of chronic road failures on abandoned road networks. Watersheds will not heal and channels will not recover, if these legacy problems are not addressed.

Monitoring: Simpson has collected data since at least 1994 in preparation of the HCP yet these data are not available to the public, to NMFS or other agencies. The NMFS should reject the Aquatic HCP and Draft EIS and make Simpson share all data in raw as well as summarized or analyzed form before the next draft is released.

The Aquatic HCP and Draft EIS do not provide sufficient data to characterize present stream habitat and fish populations; consequently, the documents do not provide a basis for judging success over time. A sufficient monitoring program should use easily understood tools, that can be cost-effectively applied, and that can be compared to regional results. Such tools are V* (Hilton and Lisle, 1992; Knopp, 1993), bulk gravel samples or gravel permeability (McBain and Trush, 2000; PALCO, 1998; Barnard, 1992), cross sections and longitudinal profiles (Madej, 1999) and turbidity. Such data would allow the HCP to potentially come into compliance with TMDL (U.S. EPA, 1999). Instead the Aquatic HCP and the Draft EIS do not deal substantively with the TMDL process.

There had been far too little fisheries data collected and shared on Simpson Timber owned streams, although downstream migrant traps have been operated on occasion and electrofishing and spawner surveys conducted periodically. What is needed is consistently collected fisheries data that the company is bound to collect and share. Index electrofishing stations with block nets carried out over many years can have some utility. NMFS should require that Simpson fund operation of the downstream migrant trap every year under the life of the HCP.

The need to share data in raw form for independent analysis extends to water temperature data. The Aquatic HCP and Draft EIS used color codes for temperature ratings instead of references to locally based literature. Welsh et al. (2001) found that coho salmon in the Mattole River were only present when the floating weekly average water temperature remained under 16.8 C and floating weekly maximum under 18.3 C. This is consistent with findings of Hines and Ambrose (in review), who noted similar water temperature tolerance and patterns of distribution for coho juveniles in the South Fork Eel, Ten Mile, Big, and Noyo rivers. Essig (1999) pointed out that it is most effective to use temperature tolerance for one species in a program to monitor and abate water quality problems. Coho salmon are the keystone aquatic species for all northern California coastal streams, including those managed by Simpson Timber. Consequently, all data analysis related to ESA compliance or compliance with the Clean Water Act and meeting "beneficial uses" should reference known tolerances for coho. Stream temperature monitoring should also be required of receiving waters, larger downstream tributaries, such as the mainstem Klamath River. Consideration of acceptable tributary impacts must consider the status and needs of impaired water bodies downstream.

Forest Health: In serving for over six years on the Klamath Provincial Advisory Committee, I have become a student of forest health, and Simpson manages some very unhealthy forests. Unfortunately, under the Aquatic HCP forest health conditions are likely to deteriorate. My experience within the Klamath Basin leads me to believe that fire risk is elevated on managed lands. Figure 20 shows Simpson property on the North Fork Mad River where herbicides have been applied. The major amount of dead material represents immense fuel loading and, along with even aged conifer forest, present an elevated risk of fire.

Clear cutting has disrupted the natural succession mechanisms for much Simpson's coniferous forests and many sites often come back in Ceonothus, hardwoods and invasive species. Simpson's attempts to restore conifers by repeated clear cut and spraying with herbicides have been futile (Figure 21). Thinning from below would be a compatible solution to both forest health concerns and improving watershed health. Instead the Aquatic HCP perpetuates a cycle least-cost forest management, using chemicals to promote growth as opposed to more labor intensive methods that would yield larger diameter trees and substantial returns in the future.

Figure 20. While the conifers in this photo look vigorous, the dead plants around them are hardwoods and successional species such as Ceonothus. This dead plant material represent fuels and increased fire risk. The spraying of herbicides on aquatic biota are unknown.

Figure 21. Recent regeneration clear-cut just off Highway 299 in Redwood Creek growing more Ceonothus and hardwood species. This management style is a failed paradigm.

Conclusion: The Aquatic HCP and Draft EIS do not use best science in interpreting conditions or forging a plan for the conservation of species such as coho salmon. The documents ignore the significance of documents characterizing species status (Higgins et al., 1992; NMFS, 2001; CDFG, 2002), riparian function (Chen, 1991; FEMAT, 1993), what drives stream temperatures (Bartholow, 1989; Poole and Berman, 2000) and how elevated water temperatures affect coho salmon (Welsh et al., 2001; Hines and Ambrose, In Review). Use of "best science" is required under both CEQA and NEPA; therefore, this documents lacks sufficiency with regard to these laws.

The Aquatic HCP failed to provide adequate data to characterize fish populations, especially ESA protected species and to provide standard data about aquatic habitat quality. NMFS should patently reject the document because it does not provide the basis for management needed by an ESA related document. Simpson has collected data pursuant to its HCP since 1994 yet they have provided very little of that data in useful form. This is unacceptable for public trust protection and unworkable as an ESA document. NMFS should require sharing of all fish, aquatic and watershed data collected by Simpson to be shared with all interested parties, including in raw form. Shared data should include spatial information for protection and understanding of public trust resources.

The Aquatic HCP cumulative effects discussions do not broach large rivers downstream of Simpson land and potential effects of management on them. It fails also to assess what impacts may be from other owners in the basin and their past and future land management. Monitoring plans in the HCP lack focus to discern cumulative effects related problems. NMFS needs to require Simpson to monitor fish and aquatic habitats in standards way and share results. There must be clear targets for fish and habitat recovery. Similar targets and objectives are needed for road densities and thresholds of disturbance for timber harvest.

This HCP fails to call for watershed rest, in order to recover restore natural hydrologic regimes and channel conditions that support that support diverse salmonid communities, when there is no substitute for that prescription (Kauffmann et al., 1999). The lack of strategy in reducing road related erosion will make it likely that investments will maintain access to areas for timber harvest but allow further degradation of key habitats. The fact that Simpson has more than double the recommended road densities to protect salmonids (Cedarholm et al, 1982; NMFS, 1996) and roughly twice what it can maintain, roads should be reduced by half.

The practices Simpson proposes will be locked in for 50 years, with little authority of NMFS to re-negotiate prescriptions. NMFS has also initiated recovery planning for listed anadromous salmonids, locking in to this management plan oriented towards timber harvest as a primary objective, may put it in conflict with the recovery planning process. California is also currently drafting a Coho Recovery Plan due out in August, 2003. It is widely recognized that California FPRs are deficient in providing for recovery of anadromous salmonids as currently written (Ligon et al., 1999; Dunne et al., 2001), and the HCP mimics or provides less protection than FPR's, which are currently under consideration for revision. It would seem unwise and imprudent to accept the current HCP and Draft EIS.

Sincerely,

Patrick Higgins

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