PROTECTING HABITAT IN RIPARIAN CORRIDORS FROM THE IMPACTS OF TIMBER HARVESTING

Status of Santa Cruz County Streams

Santa Cruz County streams were once among the best producers of salmon and steelhead in the State of California, however, this historically strong fishery has collapsed due to the impacts of timber harvesting, road building and other development. Into the 1960's, the DFG rated local streams among the highest in number of juvenile fish produced per mile (3,100 juveniles per mile in Zayante Creek, D, W. Kelly). The San Lorenzo River was the second most fished river in the State in the 1960's. The Department of Fish and Game estimated an annual run of 20,000 steelhead and 2500 to 10,000 coho salmon in the San Lorenzo River in 1964 (San Lorenzo River Management Plan). The most accurate data on adult runs during the period 1976-1980 came from a trap on the San Lorenzo River operated by the County, the Department of Fish and Game and the City of Santa Cruz.

Adult Trap on the San Lorenzo River

1976-77- 1614 steelhead and 174 coho salmon
1977-78- trap did not operate due to low flows
1978-79- 625 steelhead and 100 coho salmon
1979-80- 496 steelhead and 77 coho salmon

As the data clearly indicates, there was a continual decrease in the numbers of steelhead and coho salmon over this time period.

In the 1980's and 1990's, the downward trend has continued and is repeated throughout the County. Estimates that the runs of adult spawning steelhead had dropped to less than 5% of their historic numbers prompted the status review and listing of the steelhead as "Threatened" by the National Marine Fisheries Service. The status of coho salmon is even more dire: salmon runs on four streams have completely disappeared and the numbers have fallen to less than 1% of the historic runs in the remaining streams. This precipitous drop in coho salmon populations has led to a status review by the DFG and a listing of the coho as "Endangered" under the California Endangered Species Act. A 1998 fish count documented that, although some aspects of fisheries habitat had improved due to the high stream flows of the 1997-98 winter, there was overall a decline in habitat quality due, for the most part, to sedimentation (Alley, 1999).

All major streams in Santa Cruz County are listed as "Impaired" (Section 404(d) of the Clean Water Act) due to sediment impacts, by the Environmental Protection Agency and the Regional Water Quality Control Board. This evaluation is confirmed by The San Lorenzo River Management Plan (1979 and its update in 1998), and the "Assessment of Streambed Conditions" (Hecht and Kettleson, 1998). All of these studies show that Santa Cruz County streams are seriously impaired with sediment, which has led to a serious loss in fisheries and degradation of water quality. These signs of declining environmental habitat have alarmed the residents of the County, who have requested that more be done to protect this important legacy of salmonid fisheries. Salmon and steelhead are not only a barometer to the health of the streams, but a symbol of the environmental attributes that make Santa Cruz a place that the residents chose to live in.

This has prompted the County to begin the development of a program to address the County's water quality issues, including the development of various ordinances relating to water quality and quantity, the hiring of additional staff to address continued impacts of accelerated erosion/sedimentation of County streams, and the participation in a State rule-making process for timber harvesting, This is seen as a multi-year, multi-task program that will include the Planning Department, the Department of Public Works, Environmental Health Services and other agencies working together to bring about the restoration of the listed steelhead or coho salmon species. One of the ordinances, the Locational Criteria for Timber Cutting., is intended to apply the County's riparian corridor protection policies to timber harvesting.

Proposed "'Locational Criteria for Timber Cutting" Provisions

The County's existing Riparian Corridor and Wetland Protection ordinance prohibits any disturbance within perennial and intermittent stream corridors and a corresponding buffer area except under limited circumstances. The proposed 'Locational Criteria for Timber Cutting" ordinance will extend these resource protection measures to proposed timber harvests, as follows:

Perennial Streams (defined as streams that have year round flow and/or are shown as blue line on the U.S.G.S. Map) - No timber cutting or removal pursuant to an approved Timber Harvest Plan (THP) or Non-industrial Timber Management Plan (NTMP) is permitted within a 50-foot buffer area on each side of the stream, measured horizontally from "mean high water".

Intermittent Streams (defined as streams that flow more than 30 days after a rain and/or are shown as a dotted blue line on the U.S.G.S. map) - No timber cutting or removal pursuant to an approved THP or NTMP is permitted within a 30-foot buffer area on each side of the stream, measured horizontally from "mean high water".

Value of Riparian Corridors

Riparian corridors are one of the most vibrant and critically important habitats in California. What is telling is the sheer number and variety of wildlife that depend on riparian corridors. In "Status of Riparian Habitat"(Kondolf, Kettleman, Embry, Erman), the authors state that "riparian habitats can consist of only 0.4% of the land area but are essential for at least one phase of life for 75% of local wildlife species. For example, at least 88 species of birds are completely dependent on western riparian systems. Other bird species use forested wetlands throughout the United States for food and rest during migration, or breeding and nesting habitat (4 Mitsch and Grosslink, 1993).

In the western United States, healthy fisheries are related to perennial streams with undisturbed riparian wetland zones (4 Mitsch and Grosslink, 1993). High quality streams in Santa Cruz are totally dependent on the ability of riparian corridors to moderate the temperature extremes of the inland areas. Transpiration by coniferous trees maintains low soil and water temperatures that are critical to the survival of cold water fish in streams fed by or within such forested lands (5 Sharitz and Gibbons, 1989). Studies have shown that intact stream corridors regulate "microclimate" (Raedeeke et al, 1988) and regulate aquatic habitat through shading and moderation of water temperature and algal growth production (Brown, 1969). The more intact and densely forested a riparian streamside zone is, the better it is protected from solar radiation and air mixing from the heated upslope areas. In Central California, the role of riparian corridors is even more important as the types of climate range

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from Coastal redwood forest to the semi-arid Mediterranean, Santa Cruz County is the farthest southern edge of coho salmon habitat, because cool shaded streams such as the San Lorenzo River are not found in the southern areas of the state where there are more open canopies and higher temperatures.

Riparian Values Related to Water Quality and Flood Storage

The County of Santa Cruz has a responsibility to protect public health, safety and welfare as well as to preserve sensitive resources. Local streams play a crucial role in supporting in-stream municipal water supply (approximately 50% of municipal use is derived from in-stream sources) and ensuring adequate local groundwater recharge. However, these streams have historically had serious problems with flooding (1955, 1964, 1977, 1982, 1983, 1986, 1996, 1997). It is well documented that riparian corridors play an important role in protecting the quality and quantity of this municipal water source. "Riparian forested wetlands have a significant water storage and ground wafer recharge role, [and] thus are valuable in water supply and flood control" (1. Reilly et al., 199 1; Hook et al,. 1998; Ewel, 1990; Demissie and Khan, 1993; Brow-n and Sullivan, 1998; Grosslinket al., 1990). "The wider the floodplain, the greater the storage action and reduction of flood peaks that occur. Large floodplains with long retention times can be important ground water recharge areas, depending on substrate permeability" (2 Taylor et al., 1990; O'Brian, 1998). "A forested wetland overlaying permeable soil may produce 100,000 gallons of water per day" (3 Anderson and Rockerel, 1991). Therefore, a program that results in the protection of riparian corridors is not only a benefit to aquatic species, but it is also beneficial to the preservation of water quantity and as a flood control measure to protect the citizens of the County.

In addition to helping to reduce flooding and improve groundwater recharge, riparian corridor buffers also benefit water quality by filtering sediments out of runoff before they can reach the stream, thereby reducing pollution, Along with reducing the sediment load from onsite and offsite sources, riparian buffers provide further benefits by reducing the impacts of off site "point" and "nonpoint" sources that lead to a cumulative effect on a water body- Studies by *Peterjohn and Correl (1984), showed that riparian corridors are effective at filtering out 89% of nitrogen that entered the forest from runoff, groundwater and precipitation. Riparian forests have proven effective in reducing in "phosphate concentrations in runoff and flood water by 50%" (*Gilliam, '1994). Riparian wetlands that are adjacent to small streams are particularly valuable in trapping pollutants and preventing nonpoint source pollution from ever reaching larger water sources (*Gilliam, 1994; Walbridge, 1993).

Large Wood Recruitment to Streams

Among the most important effects of forest management on fish habitat in western North America are changes in the distribution and abundance of large woody debris (LWD) in streams ('Hicks et al., 1991). Timber harvesting has reduced the amount and size of LWD in harvested areas as compared to that in nonharvested areas (Ralph et al., 1994). LWD in streams is a fundamental building block for creating and maintaining salmon habitat. The lack of LWD in Santa Cruz is a critical factor in the loss of quality salmonid habitat. Since the clearcutting of the County at the turn of the century, the local streams have been unable to route sediment to adequately form pools, and to create channel stability, processes that are normally associated with large trees embedded in the stream channel.

Physical processes associated with LWD in streams include, but are not limited to, formation of pools (important to both juvenile and adult salmon), creation of overwintering and other

important rearing and feeding habitat, control of sediment and organic matter storage, and modification of water quality. Biological attributes of large woody debris structures can include providing refuge from predators and flood events, and maintaining organic matter that benthic invertebrates feed, breed and take refuge in (Bisson et al, 1987). In the "Status of Riparian Habitat", the authors find that "[h]arvest of timber in riparian areas, [and] removal of trees for logging road construction" can cause "[d]irect loss of large trees in riparian areas, reduction in structural complexity, [and] elimination of the supply of large woody debris to the channel" along with "habitat complexity reduction"(Sedell and Luchessa, 1981).

No Cut Buffers Afford Superior Benefits to Riparian Corridors

A no cut buffer offers the best protection for the features that make riparian corridors work As cited before, intact corridors are necessary for cool waters and a healthy salmonid fishery. The intact, undisturbed corridor provides the best protection from solar heating and any removal of trees can only increase solar radiation or increase air flow, bringing about air mixing and microclimate changes that raise water temperature.

No cut buffers along a watercourse will achieve the conditions necessary to recruit and deliver LWD to the stream much quicker than a managed zone. Any reduction of biomass in the near stream zone will result in a direct reduction of material available for recruitment to the stream. Any removal of large trees will set back the recruitment of LWD by many years because old dominant trees are the most likely and most desirable trees to enter the stream, and these trees take a minimum of 100 to 200 years to grow to the size and height necessary to have proper function. This is true because, for proper function, trees need to be large enough to last instream for 50 to 100 years before rotting, and must be at least as tall as 150% of the stream width (with the large diameter section in the watercourse) (California Department of Fish and Game Stream Restoration Manual).

Large trees by nature are dominant and do not benefit from management (thinning of co-dominant trees) because dominants already have all the sun and water they need in the riparian zone. Overcrowding is a beneficial factor in accelerating recruitment because it hastens the shading out and dead fall of less dominant tress. Because the need for LWD is extreme, any reduction in large trees within the riparian corridor will prove detrimental, and will set back the future desired state of increased recruitment of LWD. Because adequately large conifer trees are rare along the stream banks and the instream LWD is almost nonexistent, the desired future state for LWD is at least 100 years away if natural recruitment is employed. Considering these factors in combination with the fact that Santa Cruz County streams "are deficient in LWD" (DFG, 1998), any management that reduces the number or sets back the delivery of LWD will be detrimental to the health of the streams and to salmonid recovery (California Department of Fish and Game S trategic Plan, 1998).

There may be certain very limited instances in which selective thinning of small trees could benefit the riparian zone. Such thinning for environmental non-commercial purposes could be. permitted under the County's proposed riparian corridor ordinance, By restricting the cutting of mature trees within the riparian zone, however, the proposed riparian buffer will on balance ensure greater recruitment of LWD into the streams than would occur without such a buffer.

Timber Harvest Effects On Streams

The problems of sediment delivery associated with timber harvesting are well documented and are recognized as a cost of doing business! 'War-vesting timber on hill slopes, results in

increased peak runoff and erosion," with the consequence of "[b]ank erosion and conversion of vegetated bottomland into open gravel-bed channel" *(Lyons* and Beschta, 1983; Grant, 1988). Roads in forested landscapes also lead to surface erosion and mass wasting which contribute to the dramatic increase in the delivery of sediments to streams. The Critical Sites Erosion Study (Durgin et al, 1989) found that, "although forest roads accounted for only 4% of the area, they accounted for 76% of the erosion measured." Construction of roads reroutes waters, concentrating natural sheet flow off slopes and channelizing water, thereby greatly increasing the sediment delivery rate off hillsides. Roads may affect groundwater and surface water by intercepting and rerouting water that might otherwise drain to springs and streams. This increases the density of drainage channels within a watershed and results in water being routed more quickly into streams (NRC, 1996, Spence et al., 1996).

The rerouting of flows and resulting concentration of sheet flow attributable to timber harvesting and associated road operations is especially dangerous during flood events. During periods of intense rainfall, any increase in surface waters discharged on a given site can make a small 10 year storm the equivalent of a 100 year storm event of higher in terms of runoff. The two most common sites of discharge are existing channels or bench flats on hillslopes. Loading flats {which can be unstable benches in hummock topography) with runoff *can* lead to landslides and debris flows, as slopes become saturated. Not only are short duration storms exacerbated, but the continuous loading of a slope causes long term saturation of the area, which can lead to large scale block landslides.

Photo # 20 shows an example of how an individual tree in the riparian corridor caught and stopped a small slide that had a short run. Substantial benefits are gained by leaving an undisturbed corridor along the stream margins to buffer such landslide delivery into the creek. The most dangerous and damaging slides are much larger (10 to 100 cubic yards) and travel downslope a great distance (100 to 1000 feet). These larger landslides require a substantial amount ofundisturbed, large timber to create an effective battier or buffer to landslides. However, even when the landslides are larger than the riparian buffer can stop, is the material that will be delivered to the base of the slide will be mostly large woody debris that protects the toe of the slide from being eroded by flows and helps retain slide debris soils on the slope above the wood (U.S.G.S. Professional Paper 1551-c). Undisturbed buffers have an ability to absorb sediment in the leaf litter, duff layers and throughout the groundcover and undergrowth.

The redirecting of additional waters into existing drainage channels leads to channel enlargement, because of the resulting hydrologic adjustments needed to accommodate additional flow volumes. These hydrologic adjustments cause channel bed and bank soil loss and lead to formation of head cutting gullies as the channel adjusts uphill. This channel erosion results in direct inputs of sediment from Class III watercourses to higher order Class I and II fish bearing streams.

Riparian Buffers and Sediment Reduction

The County of Santa Cruz and the State Resources Agency partnered in the early 1970s jointly endeavored to conduct extensive surveys to determine what could be done to correct the serious decline in salmon and steelhead. The survey led to a complete watershed analysis of the San Lorenzo River basin. This 5 year study was followed up with a County-wide watershed analysis, which led to the creation of the San Lorenzo River Management Plan and County-Wide Watershed Management Plans.

These plans and the highly informative studies that accompanied them recognized the need for a specific analysis of a project's effects in relation to cumulative effects caused by human activity in the watershed, both past and present. To address this, the County adopted ordinances and a permitting system that required minimum Best Management Practices to be placed on all projects. But it was with the insistence of the Department of Fish and Game, and the State of California Resources Agency, that the County agreed to protect the riparian corridors from the development activities because it was undisputed that if recovery was going to be possible it was necessary, at a minimum, to protect the integrity of these stream-&de zones. The resulting Riparian Ordinance (1977) has proven to be highly effective because it creates buffers that protect streams from the impacts of development, erosion and sedimentation, and creates wildlife corridors to facilitate wildlife travel from fragmented habitat and bird breeding areas.

The County has not historically applied its Riparian Ordinance to timber harvesting operations. The continuing decline of county streams and riparian habitats, however, has demonstrated the need for zoning that restricts timber harvesting along County streams to protect fish and wildlife habitats and to ensure the protection of high-quality drinking water. The need to protect the *County's* endangered fisheries is particularly clear. For example, the State Resources Agency and the National Marine Fisheries Service "Scientific Review Panel' concluded by consensus that, "the existing Forest Practice Rules (FPRs) and the Timber Harvest Plan, do not ensure protection of anadromous salmonid populations."

Forest practices and timber harvest activity, including ground disturbance, road and landing construction, and the resulting compaction of soils, result in increased sedimentation of streams. Site disturbance and road construction typically increase sediment delivered to streams through mass wasting and surface erosion, which can elevate the level of fine sediment delivered to spawning gravels, filling the inner spaces that provide habitat for aquatic invertebrates and reducing salmonid egg survival. Until roads are eliminated, recontoured, surfaced properly, and/or drained properly to eliminate their adverse effect on Santa Cruz County streams, the impacts of these roads must be mitigated. A standard practice for reduction in sediment delivery is to disperse concentrated flows and insure that a large undisturbed strip of well vegetated land exists between the site of disturbance and the nearest watercourse. The Monitoring and Study Group (MSG) of the Board of Forestry noted "that Water and Lake Protection Zones (WLPZ) provided sediment filtration for mobilized fine sediment associated with surface disturbance immediately above the WLPZ". This filtering of sediment is one of the key functions of a riparian corridor buffer.

Widths of Riparian Buffers

There have been suggestions from the timber industry that the proposed buffers are too wide. Such statements do not take into account the function of an undisturbed filter strip. The County riparian corridor buffer is a reasonable compromise, providing for the minimum width necessary to ensure an adequate buffer, while not significantly limiting timber operations, The larger the undisturbed riparian buffer, the greater the filter capacity, as is recognized by the FPRs in their acceptance of maximum disturbed soil amounts in the Water and Lake Protection Zone.

When Dr. Peter Moyle, a Fisheries Professor at U. C. Davis, analyzed the Pacific Lumber Company ("PALCO") Sustained Yield Plan/Habitat Conservation Plan, he stated that the weakness of the plan was that the Riparian Management Zone (RMZ) was too narrow, at 170 feet, with a 30 foot no-logging buffer. Dr. Moyle stated that the RMZs are "too narrow and

allow too much intrusion for logging. It is important to keep in mind when considering the RMZ that the watersheds involved are some of the most fragile/erodible on the Pacific Coast and that even small losses of stream habitat should not be tolerated if we are sincere in recovering coho populations" (Moyle, letter Re:SYP 96-002). Dr. Moyle suggested that a 340 foot RMZ and a 60 foot no-logging buffer would be more appropriate. (The Santa Cruz Mountains are considered to be at least as fragile/erodible as lands owned by Pacific Lumber and the rainfall intensity rating is higher: than that region of California.)

On federally owned lands, the Forest Ecosystem Management Team report recommended a standard, undisturbed buffer of approximately 300-feet along (fish bearing) watercourses. Tree removal and equipment activity is precluded within these 300-foot wide zones, until an "intensive assessment of resource implication" is performed. This need for a an undisturbed buffer is additionally supported by Dr. Moyle who stated in "Potential Aquatic Diversity Management Areas," that "until watershed-specific; management strategies are developed, it is highly desirable to use broad-scale prescriptions for land and water that err on the side of protection of habitats and biota".

Riparian buffers under the Oregon Forest Practice Rules for private lands include a 20 foot no-harvest zone, plus a zone of 30-80 additional feet where only Limited management is allowed (Man tech Report 1996). Buffer zones recommended by the National Marine Fisheries Service include a 30 foot no-harvest zone, with limited management out to the height of one site-potential tree, which could be 200 feet or more ,

Proposed buffer zones are almost invariably designed to take into account the economic impact of the regulation on timber harvesting and do not include the maximum protection for fish and wildlife values. The Federal and State Endangered Species Acts, however, dearly state that economic impact shall not be considered when establishing protections and restrictions to recover a species.

Considering all of these factors, the County's proposed buffers on perennial and intermittent streams are clearly justified in light of the current state of the fisheries, the listings of the coho and steelhead by the State of California and the federal government (Brown L.R. Moyle P.B. 1991), and Endangered Species Act, which forbids the "take" of an endangered species.

Recent Timber Harvest and Documented Damage to the Riparian Corridor and Stream

The County of Santa Cruz was aware of the effects of both urbanization and timber harvest activity *when* it considered the positive effect of requiting an undisturbed buffer along streams. The County also can point to examples of how the present Forest Practice Rules and their implementation have not protected the integrity and function of riparian corridors within the County. The Timber Harvest Plan(THP) l-96-376 SCR Gamecock Canyon (pictures included) removed canopy over an important "cold" water source feeding the best restorable coho salmon stream in the Pajaro River watershed. By the foresters own data, the stream temperatures were 4 degrees higher after operations were completed under this THP. This is critically important because the temperature downstream in the main stem of Corralitos Creek approaches the limit for both steelhead and coho salmon. This THP removed canopy by over-cutting, cutting unmarked trees, and knocking down the majority of the remaining non-commercial riparian hardwoods along the stream. This plan resulted in numerous violations of Forestry regulations but continued to operate, and to damage and remove riparian canopy over the stream.

Operations under this THP would not have continued if the County staff could have issued a "Stop Work Order" and prevented the damage. County staff warned CDF that damage was occurring, but no actions were taken until the County set up a meeting and threatened to sue the State. Even after hearing the County's concerns, the State Forest Practice Officers let the operation continue unabated for months. It was not until late in the operation that the Forest Practice Officer Supervisor stepped in and conducted the first canopy survey ever conducted by the Department of Forestry in the coastal region. This survey verified the over-harvest and timber harvesting was stopped within 50 feet of both sides of the stream.

Attachment A contains a collection of letters, analysis and photographs that further supports the County's position that the Forest Practice Rules do not protect the riparian corridors of the County from the adverse impacts of timber harvesting, and that additional protection in the form of a no-cut buffer is needed,

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In 1998 and 1999 the County of Santa Cruz proposed a set of special County Rules for consideration by the State Board of Forestry. Part of that packet included establishing no-cut buffer zones around water courses. Three THP's are especially important for understanding the inability of CDF to protect critical watersheds, and the lack of concern for County appeal issues to the Board of Forestry. The three plans are: THP l-94-353 SCR, lands of Golitzen/Diesel, RPF Gary Paul; THP l-96-275 SCR (formerly l-95-33 1 SCR), lands of Burch/Coleman, RPF M. W. Zeke Sechrest; and THP l-96-247, lands of Koppala/Eel River Sawmills, RPF Roy Webster. All three of these THP's took place in upper headwaters reaches of their watersheds, reaches which are particularly important for providing cold water to streams, and which are immediately above anadromous fish spawning areas.

THP l-94-353 SCR involved the helicopter harvesting of Rattlesnake Gulch Creek. Violations were issued by CDF for deposition of slash and trees into the watercourse. However, no violations were issued for stream canopy removal in excess to what was stipulated in the THP, even though large areas were essentially denuded because of falling practices which not only paralleled the watercourse, but also fell from two directions to a central point for easier pick-up by the helicopters (see photo's). County staff were told that the fallers were from Oregon and didn't know the local rules.

THP l-96-275 SCR (formerly l-95-33 1 SCR) involved timber harvesting in Gamecock Canyon. The harvest resulted in excessive removal of tree canopy above the stream. Extensive pre-harvest review was conducted in an attempt to protect the watercourse. The photo's clearly show that protection was not achieved. Numerous violation within the WLPZ are documented, and even continue to occur after the first violations are noted. The sensitivity of the watercourse, with regard to anadromous fish, is well documented in the appeal. Finally, after nearly all of the class I and II streams had been cut excessively, CDF required a 50 foot no-cut zone for the remaining portion of Gamecock Creek. The photo's show excessive canopy removal, slash material entering the stream, inner gorge instability within the WLPZ, and what a 50 foot no-cut zone looks like. County staff were told that the LTO was from Northern California and didn't know the local rules.

THP l-96-247 SCR was a timber harvest along Fritch Creek. Again, this THP was cited in the County appeal as having water quality and fisheries concerns. The RPF even did cross-sections of cable corridors, to show that the proposed harvest would not damage the canopy cover over the creek (attached). Also attached are the numerous violations along the WLPZ which were noted by CDF, and an amendment to the plan which attempts to correct the excessive removal of canopy by the planting of 6" tall seedlings! Again the photo's show excessive removal of stream canopy, and slash and soil entering the watercourse. Once again County staff were told that a very difficult LTO from Northern California did the job, and he didn't know the local rules.

Redwood Empire, and their RPF Peter Twight, have proposed a new THP immediately adjacent to their last harvest in Gamecock Canyon. The initial review of this THP (l-99-095 SCR) has been interesting in a number of ways. Redwood Empire has documented that their Gamecock harvest (l-96-275 SCR) has indeed had an impact on water temperatures, raising them up to 4 degrees Fahrenheit. The Department of Fish and Game has requested no harvesting within the

entire WLPZ (let alone 50 feet) due to the impacts of l-96-275. CDF biologist Brad Valentine has also made a recommendation for a 25 foot no-cut zone based on stream gradient which would accommodate flows which would wash out all but very large trees, elimination of most LWD present or recruitable at the turn of the century, and because the "young" 100 year old trees are "unlikely to contribute substantial volume of LWD to the watercourse for decades." These same factors similarly limit nearly all of the streams. In fact, this is the best case scenario, all stream corridors which have had harvests since the turn of the century would be less able to provide LWD.

ATTACHMENT 7
ATTACHMENT A

County of Santa Cruz

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
ALVIN D. JAMES, DIRECTOR

September 9, 1999

Mr. Christopher Rowney, Executive Director
Board of Forestry
14 16 Ninth Street
Sacramento, CA 958 14

SUBJECT: PROPOSED RULEMAKING - 1999 SANTA CRUZ COUNTY RULES

Dear Mr. Rowney:

The public hearing on the 1999 Santa Cruz County Forest Practice Rules package is scheduled for September 14, 1999, before the Board of Forestry. The County of Santa Cruz is submitting the enclosed material for consideration as a part of the deliberations on the County's Rules package. It is hoped that these comments provide the Board with further information and clarity on the proposed Rules and their related economic costs and benefits.

The County of Santa Cruz believes that the proposed revisions to the Forest Practice Rules are essential for the achievement of sustainable timber harvesting in a manner which does not adversely affect existing residential development and other beneficial uses in the watersheds.

If additional information is required, please contact Mark Deming at (83 1) 454-3 183.

Sincerely,

Alvin D. James
Planning Director

enclosures

cc: Board of Supervisors
County Counsel
County Administrative Officer

direction of local foresters, In fact, local forester's first met over three years ago to discuss the need for changes to 14 CCR 926.25. This meeting was prompted by the observation that the successive harvest on a second 10 year reentry was only yielding one-half the volume as was harvested on the first entry.

The proposed rule suggests harvest rates that can be used by landowners who do not wish to pay for growth and harvest inventories. These rates are maximum harvest percentages that if followed will reduce the present overcutting, but will still allow enough reduction of canopy to stimulate stump sprouts.

Proposed cutting standards for non-TPZ parcels was a compromise with environmentalist's who wanted even more restrictive measures, Regardless of zoning, 926.25(d) allows landowner's an alternative cutting percentage and cutting cycle based on sound forest management science.

Reference:

Attachment 15: City of Santa Cruz Water Department, Forest Management Report, 1994. (Tunheim/Butler). Proposed the continuation of the existing 12 - 14 year cutting cycle.

> Page 63 - "Experience has shown that 12-14 years as a cutting cycle has many benefits:
> 1. It adds flexibility to the actual harvest schedule because it exceeds the State regulated 10 year minimum re-entry, and
> 2. It provides time for the leave stand to fully respond to the release factor of the harvest, and
> 3. It provides time for the redwood stump sprouts and planted trees to achieve enough size to survive the next entry (they get big enough to miss), and
> 4. It adds the flexibility of over-lapping and adjusting unit boundaries because it exceed the State regulated 10 year minimum re-entry."

Attachment 16: Soquel Creek Water District Watershed, Management Plan, 1993. (Tunheim/Butler). Recommends a cutting cycle of 12 years for the above cited reasons.

Cost: There is no cost to this rule for lands zoned TPZ as this is sound forest management and will result in the maximum sustained production of high quality timber products. The only true cost, even to the more restrictive rule on non-TPZ land, is the cost of setting up the timber harvest operation. Harvesting is still allowed, just at a slower rate. There is no loss of actual inventory.

7. 926.26 Watercourse and Lake Protection

Purpose/Intent: To maintain and protect the functioning of riparian ecosystems for the conservation of aquatic habitat for all of it's beneficial uses.

Justification/Documentation of Need: The County's Riparian Corridor and Wetlands Protection Ordinance requires a 50 foot buffer distance from perennial streams, wetlands and other bodies of water **(Attachment 17).** The proposed rule for TPZ parcels reflects this County standard. For non-TPZ parcels, a higher standard has been proposed in deference to environmentalist's concerns. The National Marine Fisheries Service recommends a riparian management zone (RMZ) based on the height of one site-potential trees, measured horizontally from the outer edge of any floodplain or channel migration zone **(Attachment 18).** The RMZ contains a 30 foot no harvest area with the remaining RMZ managed. to grow

mature forest conditions typical of an 80 - 200 year stand. In addition, salvage logging of dead, dying or downed trees is not allowed in the RMZ.

The California Department of Fish and Game, in ranking the value of different plant communities to wildlife, states that riparian habitat "provides living conditions for a greater variety of wildlife than any other type", Riparian buffer zones are essential for the recovery of endangered fisheries. Riparian buffer zones provide the processes that create and maintain fish habitat, such as shade, stream bank integrity, recruitment of large woody debris and nutrient input **(Attachment 19, 20, 21, 22 and 23).** Riparian buffer zones also provide protection from debris flows and logging slash from entering the stream. Agencies responsible for the recovery of coho and steelhead salmon are pressing for the requirement of riparian buffer zones of appropriate width on all permanent and ephemeral streams on on forested land adjacent to waterways that include or influence essential fish habitat. The cumulative affects of past and current forestry management activities on endangered fishery habitat needs to be addressed.

The County has appealed several plans for specific stream corridor impacts and the importance of pre-harvest stand composition **(Attachments 24, 25 and** 26). These concerns were also raised by other numerous commentor's to these Plans. During the harvest operations these concerns were ignored and many serious violations to existing Rules were committed **(Attachment 27).**

Reference - Violations to FPR and/or DFG 2090 Agreement:
THP# l-94-353 SCR Golitzen/Diesel, RPF - Paul
THP# l-96-275 SCR Redwood Empire, RPF - Sechrest/Twight (Gamecock Canyon)
THP# l-96-247 SCR Koppala, RPF - Webster (Fritch Creek)
Photographs (Attachment 12)

Cost: It is important to note that a change to proposed rule 926.25(c), approved by the Santa Cruz County Board of Supervisors on September 22, 1998, allows the credit of trees restricted from harvest in the non-cut zone under this rule for harvest in other portions of their property, for both TPZ and non-TPZ parcels. The discussion of the economic impact of this proposed rule has been adequately addressed in the 45-day Notice of Proposed Rulemaking.

Under the DFG 2090 Agreement an extensive amount of agency staff time is required to review and regulate stream canopy retention. In addition to the subjective and varied application of the 2090 Agreement (i.e. there is no scientific method to determine percent canopy retention), it is not possible to predict the amount of canopy knock down that will inadvertently occur during harvest operations. Using THP# l-96-275 SCR as a recent example, the immense amount of THP review efforts on the part of CDF, RWQCB, DFG (approximately $10,000 in staff time) and the County, totally failed to protect the Class I watercourse.

The CDF economic analysis also notes that there are some incalculable environmental benefits, such as the health of the stream habitat, wildlife and drinking water supply.

8. 926.27 Non-native Plants

Purpose/Intent: To attempt to manage disturbed areas resulting from timber harvesting by eliminating non-native plants.

ATTACHMENT 7
ATTACHMENT A

PLANNING DEPARTMENT

GOVERNMENTAL CENTER

COUNTY OF SANTA CRUZ

701 OCEAN STREET SANTA CRUZ, CALIFORNIA 95060
FAX (408) 454-2131 TDD (408) 454-2123

August 23, 1994

Mr. Steve Hollett
California Department of Forestry
San Mateo-Santa Cruz Ranger Unit

RE: Concerns with THP 1-54-353, Lands of Golitzin Diesel

The following is intended to reiterate the concerns raised by County Staff at the Review Team Meeting this morning.

The Timber Harvest Plan proposes the construction of an approximately 1.7 mile permanent road to access 3 landings, which will require extensive excavation and fills cn slopes in excess of 65%. The County is particularly concerned about tho use of the proposed road system for future development. The road is problematic with regard to its permanent designation since the construction of the proposed road kculd not meet County standards for lay-cut (crossing slopes >30%) or design (unengineered).

Additionally, the proposed road raises serious concerns with potential sediment transport from proposed cut banks, and permanent fills placed within Cl ass 3 watercourses, into the relatively undisturbed headwaters of Rattlesnake Gulch a Class 1 watercourse. The proposed winter operations along this road are of further concern.

It appears that the third landing proposed (furthest south) will access an insigniiicant volume of timber over that which can be reached by the center landing, and does not warrant the potential for significant environmental impacts associated with road construction between the two landings.

The cumulative impacts of the proposed plan with regard to water quality and canopy cover on the Ciass 1 watercourse of Rattlesnake Gulch, especially in'conjunction with THP 1-94-298 which was nct addressed in the THP, appear significant.

Sincerely,

Matt Baldzikowski
Resource Planner III

9/2 Close of Comment

ATTACHMENT 7 ATTACHMENT A

PLANNING DEPARTMENT

GOVERNMENTAL CENTER

COUNTY OF SANTA CRUZ

701 OCEAN STREET SANTA CRUZ, CALIFORNIA 95060
FAX (408) 454-2131 TDD (408) 454-2123

September 19, 1994

Nancy Drinkard
California Department of Forestry and Fire Protection
P.O. Drawer F-2
Felton CA, 95018

Subject: Nonconcurrance on THP plan # 1-94-353 SCR

The County of Santa Cruz has expressed concern over this proposed THP in past communications. After further review of the Plan and the Review Team Recommendations, the County of Santa Cruz does not concur with approval of THP 1-94-353 SCR, as recommended by the Review Team Chairperson.

The Cumulative Effects section of this plan did not include a large THP I-94-298 SCR on the adjacent parcel. At the request of CDF the neighboring plan was included, but no mention about it's combining effects was considered in the revised CEA. This is important because issues relating to coho salmon must be addressed in this plan, and there are clearly combining effects. Corralitos Creek is listed as a stream that must receive protection under the "Candidate" listing of coho salmon by the California Fish and Game Commission on April 7, 1994.

The Cumulative Effects assessment does not mention coho salmon or steelhead impacts and how they will be addressed. The class I watercourse, Rattlesnake Gulch is one of the most important tributaries to Corralitos Creek. This section of the creek is one of the least disturbed headwater areas that delivers cool waters and minimal sediment to the system.

Removal of any shade canopy must be evaluated and addressed by the-plan submitter. The plan admits to removal of 25% of the canopy over the creek, but does not mention what present levels are and what effect this will have on water temperatures. No review was made of the sample marking on the Class I watercourse (due to In Lieu Practices) so the effects are not yet clearly understood. The exemption for flagging of the WLPZ boundary may be justified but the exemption for sample marking in the zone clearly is not justified. The protection of canopy is critical for this plan and all trees marked within the Class I WPLZ should be reviewed to determine if 50% canopy retention is being met and if residual trees will be damaged by falling which could further reduce the canopy. Cable Skyline corridors must also be looked at to determine their effect on shade canopy.

The plan mentions in addenda #40 that, us2 of 913.8 (a) will adequately protect the watercourse, this is not true as 50% canopy retention is not

assured under this rule. The plan also checks item 46 and 47 stating "NO" that neither aver or understory canopy will be retained at 50%. The plan states under addenda #40 that no equipment will be operated within the WLPZ, but question #46 is checked "NO" far exclusion of heavy equipment from the Zone. These are material misstatements or at least contradictions that should be cleared up.

Another issue that should be addressed is the feasibility of the new 1.5 miles of Truck Road. This proposed road is intended to cross steep slopes to access timber that might be reached by other routes and methods. Feasibility for this route must be weighed against other routes and other methods of extraction. Our records also show that an Open Space Agreement exists on the parcel that will be used to access this proposed THP Truck Road. Road construction across the Open Space parcel is prohibited "except for the construction, alteration, relocation and maintenance of public roads." This indicates that the proposed road is not feasible due to lack of access to the County Road.

This proposed truck road is also within the San Andreas Rift Zone and is located cn over 65% slopes in an unstable High Erosion Hazard rating area. This road has the potential to deliver large amounts of sediment to Rattlesnake Gulch via steep Class III drainages prone to debris flows and rock slides. The existing condition of Corralitos Creek is clearly a case of too much sediment input with little recovery time between large storm events and huge sediment input.Winter operations are not acceptable for this plan as the entire road must remain open during operations.

This proposed road construction will create a large bedload problem that will threaten fisheries. This undisturbed headwater drainage (Rattlesnake Gulch) is extremely valuable and requires protection. The recovery value to the system provided by this type of drainage is critical because it can speed recovery by giving refuge in clear cool waters, and with its' low sediment budgets, can flush and clear out sediment in the headwater areas of the creek just below. This allows for recovery at least in the headwaters. Conversely if this drainage has accelerated erosion, the sediments effects are felt throughout the full length of the stream greatly increasing the length of effect.

In conclusion the County cannot concur with the approval of this plan due to the lack of adequate review of Cumulative Effects and feasible alternatives. The plan must consider all feasible alternatives before suggesting a road that has such a serious potential for environmental degradation. The plan must also give evidence that it has considered its' effect on coho and steelhead as these are clearly 916.2 (2),and 916.4(a) requirements.

Sincerely,

Dave Hope,
Review Team Member, Senior Resource Planner

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ATTACHMENT 7 ATTACHMENT A

PLANNING DEPARTMENT

GOVERNMENTAL CENTER

COUNTY OF SANTA CRUZ

701 OCEAN STREET SANTA CRUZ, CALIFORNIA 95060
FAX (408) 454-2131 TDD (408) 454-2123

January 12, 1995

Robert Kerstiens, Chairman
California State Board of Forestry
1416 Ninth Street
Sacramento, CA 95814

SUBJECT: APPEAL OF TIMBER HARVEST PLAN #1-94-353SCR

Dear Mr. Kerstiens:

The purpose of this letter is to appeal the decision by the Department of Forestry to approve the above referenced timber harvest plan. The Santa Cruz County Board of Supervisors authorized the Planning Director to file timber harvest plan appeals with the Board of Forestry on behalf of the County on May 20, 1986. This authorization has been filed with the Clerk of the Board of Supervisors and will be forwarded to you following its retrieval from warehouse storage.

Timber operations are proposed through this plan for property located in the headwatersof Rattlesnake Gulch, a tributary to Corralitos Creek (Sec. 19 T10S R2E). Ken Hart will act as the County contact for the purposes of thisappeal. Mr. Hart may be reached at (408) 454-3127. The County submitted a letter of non-concurrence for this plan and that letter is attached for your review. Concerns raised by the County during the review of the plan, and contained in the non-concurrence letter, have not been adequately addressed, including issues relating to public health and safety and the environment and construction activities which are mor2 appropriately dealt with through local land use regulatory processes.

The timber harvest plan contained in the Notice of Determination includes significant discrepancies when compared to other information contained in the official record. The plan map depicts a road to be constructed to the south and west of landing 92, including installation of crossing F's 6, 7 and 8 and construction of a third landing. This entisection of road, along with the crossings and landing, was deleted from the plan (please refer to a letter from the RPF dated November 17, 1994 and paragraph six of the COF response to the letter of non-concurrence).

In addition, paragraph five of the COF response indicates that culverts have been eliminated at crossing #'s 4 and 5 and that roiling dips will be installed in these locations. The approved plan map and the culvert list contained on page 29 of the plan still indicate that culverts will be used here Clearly, the approved timber harvest plan, which will be used by the RPF and LTO during operations, must accurately reflect the changes to the proposal which have occurred through the review process. Conversely, ii

these mitigations will not be incorporated into the plan as originally anticipated, the County and affected public must be apprised of this fact.

Many of the County's concerns regarding this timber harvest plan are centered on access-related issues, both from the standpoint of the potential for environmental impacts and circumvention of local development policies. Access to the property from Mt. Madonna Road is proposed across an adjacent parcel which is subject to an Open Space Easement. This Open Space Easement, executed in 1978, does not permit the construction of new roads on the property, such as that proposed in timber harvest plan #1-94-353SCR.

In response to our concern, the RPF has stated that Mr. Diesel, owner of the property on which the plan is proposed, has a deeded right-of-way through the Open Space Easement parcel and that the deeded access predates the Open Space Easement. If this is indeed the case, the County will defer on this issue. The Department of Forestry, however, has based their decision to allow this road construction on an unsubstantiated statement. The County believes that, because this matter involves a contractual obligation, the Department of Forestry must support its decision with substantial evidence-in the form of the deed in question.

A similar situation exists regarding the possibility for an alternative access route to the central landing. An alternate route exists through the parcels located to the east of the Diesel property which would preclude the need for a significant amount of road construction, as well as crossings 3, 4 and 5. Again, the RPF has stated that Mr. Diesel does not have access through these properties and has been unable to obtain easements to use the road. Our position is that the applicant should be required to submit some sort of evidence to support this claim. Such evidence should include copies of deeds and letters from these property owners responding to a request for an easement.

An additional alternative to road construction on the property, estimated to require in excess of 5,000 cubic yards of grading, was raised by the County during plan review. The County Review Team representative requested the RPF to evaluate the use of a helicopter as part of the operations and was given, in our estimation, an inadequate response. The RPF starts in his letter of October 25, 1994 that "Helicopter logging is not feasible, since costs associated with flying timber uphill are prohibitive. Helicopter logging would still require road construction to the property and would require a much larger landing than which could be feasibly constructed." While these statements are valid, they do not reflect the alternative proposed by the County: the evaluation of helicopter logging utilizing the nearby, down slope City of Watsonville property as a landing site. The County views this proposal as a feasible alternative that should receive serious consideration. We believe that, in order to satisfy the requirements of CEQA, a quantitative analysis is required here.

61 The County's concerns about road construction related to this timber harvest are based not only on the potential for environmental effects, but on the very real possibility that these activities could serve to circumvent local land use regulations. Previous actions taken by Mr. Diesel, coupled

with certain actions proposed in the timber harvest plan, provide a clear indication of an intent to develop the property. The parcel, in its current configuration, contains a building site for one single family dwelling. A division of this parcel and the creation of an additional building site is currently precluded by steep slopes. County regulations prohibit the creation of new parcels where accessroads would he required to cross slopes in excess of 30 percent. For the purposes of a land division, a new road is one which requires more than 100 cubic yards of grading in order to meet County standards.

Throughout the plan review process the RPF has refused to have the stream crossings removed following completion of operations. As a general rule, the County prefers that stream crossings installed to facilitate timber operations be temporary. Because maintenance is quite often sporadic or lacking altogether following timber operations, removal of culverts prevents fill failure during storm events. In the case of this operation, we requested that crossings be designated as temporary for this reason, as well as to preclude the r-sad from being considered es "existing" for the purpose of dividing the property in the future. This request was denied by CDF. Approval of plan #1-94-353SCR in its present form will therefore restict the County's ability to exercise its discretionary authority in the area of land use regulation.

In closing, it should be noted that the County of Santa Cruz is not opposed to the occurrence of timber operations on the subject property. We believe that if the deficiencies discussed above are corrected, timber operations could take place. We therefore urge the Board of Forestry to hold a public hearing on the issues covered in this letter and return plan #1-94-353SCR to the submitter for correction.

Sincerely,

Daniel K. Shaw, AICP
Planning Director

attachment

DKS/KH/kh

8. Rattlesnake Gulch/Golitzen/Diesel
1-94-353-SCR RPF - Paul

Logs and slash in Class 1. note brightness
due to WLPZ canopy removal

9. Rattlesnake Gulch/Golitzen/Diesel
1-94-353-SCR RPF - Paul

Logs and slash in Class I. note brightness
lue to WLPZ canopy removal

ATTACHMENT A ATTACHMENT

23. Rattlesnake Gulch/Golitzen/Diesel
1-94-353-SCR RPF - Paul

Slash and logs in Class I

22. Rattlesnake Gulch/Golitzen/Diesel
1-94-353-SCR RPF -Paul

Inner gorge slide into Class I stream. log in Class I

ATTACHMENT 7 ATTACHMENT A

PLANNING DEPARTMENT

GOVERNMENTAL CENTER

COUNTY OF SANTA CRUZ

701 OCEAN STREET ROOM 400 SANTA CRUZ, CALIFORNIA 95060
(408) 454-2580 FAX (408) 454-2131 TDD (408) 454-2123

Nancy Drinkard
Review Team Chair
CDF
Felton, CA 95018-0316

January 5, 1996

RE: Burch/Coleman THP #1-95-331 / 1-96-275

The County does not concur with the plan as written. Several portions of the plan are inconsistent with what County staff observed in the field. The most glaring error is the characterization in ths "general description" and "cumulative impacts assessment" portions of the plan with regard to the forest stand, and in particular the lack of discussion on the late seral component evident.

The THP describes the forest as "typical of timbered forests of the Santa Cruz Mountains" and that "the oldest components of the stand are approximately 80 years old." These characterizations do not appear consistent. with what was observed. This parcel is a large parcel which has not been harvested most likely since the original clear cut due to access problems (see Emergency Notice 1-95EM-032). This alone makes this parcel atypical for the Santa Cruz Mountains. Additionally there is an unusually high incidence of late seral stage trees on the parcel, again atypical for the Santa Cruz Mountains. The statement that the oldest components of the stand are approximately 80 years old seems grossly inaccurate given the original clear-cut occurred 70-90 years ago per the THP and the late seral stage stands are remnants of the original harvest. We wish to ascertain how the oldest stand component of 80 years was determined since this is important in determining site class and silvicultural prescription for the THP.

Given the unusually high incidence of late seral stage trees on the property, the assessment that "marbled murrelets are unlikely due to the lack of trees suitable for nesting" again seems suspect.

The THP is also flawed in the assessment that "Steelhead are present far downstream" and seems to indicate that far downstream means Corraiitos Creek. Steelhead are known to occur in Browns Creek, a tributary of Corralitos Creek, and many of the tributaries of Browns Creek, including Gamecock Creek. Steelhead werenoted within Gamecock Creek on the THP parcel during the PHI.

Given these inaccuracies in the plan the County does not concur with the review team recommendation for the approval of this THP.

Sincerely,

Matt Baldzikowski
Senior Resource Planner

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ATTACHMENT 7 ATTACHMENT A

PLANNING DEPARTMENT

GOVERNMENTAL CENTER

COUNTY OF SANTA CRUZ

701 OCEAN STREET ROOM 400 SANTA CRUZ, CALIFORNIA 95060
(408) 454-2580 FAX (408) 454-2131 TDD (408) 454-2123

January 31, 1996

Mr. Robert Kerstiens, Chair
State Board of Forestry
P.O.BOX 944246
Sacramento, CA 94244-2460

RE: APPEAL OF TIMBER HARVEST PLAN #1-95-331 SCR

Dear Mr. Kerstiens:

The County of Santa Cruz is hereby appealing the approval of the proposed Timber Harvest Plan, 1-95-331 SCR. The County Board of Supervisors has authorized the Planning Director to appeal Timber Harvest Plans that the Director feels are a threat to public health or safety or pose a threat to the environment. A copy of this directive is on file with the Department of Forestry and Fire Protection.

The proposed Timber Harvest Plan was submitted by Redwood Empire and was prepared by M. W. Zeke Sechrest, RPF #1790. The Timber Harvest Plan area is 325 acres and is located approximately 7 miles north of the city of Watsonville within Santa Cruz County. The proposed THP area is bisected by Gamecock Creek, a headwater tributary to Browns Creek, which is a tributary to Corralitos Creek. Slopes within the harvest area'range from nearly level to above 70%, the majority of the THP area has an erosion hazard rating of high to extreme, and rainfall intensity is extreme.

Planning Department Staff participated in the multi-disciplinary review of this plan, which is represented in the Preharvest and Review Team Reports.

This THP is significantly flawed in the characterization and assessment of the given THP parcel and area as required per the Forest Practice Rules (CCR 912.9), the required section of a plan which specifies the projects impacts and mitigations, and provides the context within which a THP must be evaluated.

In the Cumulative Effects section of the THP there is no mention of the most likely future impact within the assessment area, that being the harvest of the remaining 540 acres, purchased by the timberland owners together with the THP submittal acreage (Section IV, l(F), pg. 28). Page 21 of the THP shows the entire parcel, including "proposed roads" on the remainder portion. Page 29 of the THP indicates that the THP acreage will be logged in one year. CCR 912.9(1) and Technical Rule addendum #2 state that

the Cumulative Impacts Assessment must include all reasonable foreseeable projects.

As a whole, this property makes up nearly one-third of the wooded portion of the assessment area (900+ acres of a total 3182 acres) , and the 900+ acres is nearly equal to the 1166 acres harvested within the past ten years within the assessment area. The identification of this reasonably foreseeable probable future project and evaluation together with the THP area is required per CCR 912.9(1) and by Technical Rule Addendum No. 2, Cumulative Impacts Assessment.

Our concern is based on the fact that the 540 acre future harvest includes the majority of the Ramsey Gulch Creek area, which together with the Gamecock Creek portion of this THP impacts the two most significant headwater areas for Browns Creek, a municipal water supply watershed, steelhead stream, and part of the Corralitos Creek system which had recent historic runs of coho salmon.

County staff raised concerns with regard to the steelhead fishery during the PHI, which led to the classification upgrade of the Class I in the THP, submitted at the Review Team. Page 31 of the THP was changed from "steelhead are present in Corralitos Creek", to "steelhead are present in Browns Creek." It still does not indicate their presence in Gamecock Creek as required per Technical Rule Addendum No. 2, C,2.

Last year County staff completed a project on Gamecock Creek, on the property directly downstream of the THP parcel, funded by the Wildlife Conservation Board, and reviewed by the California Department of Fish and Game, specifically for steelhead. This project involved barrier modification to allow steelhead consistent access to the high quality spawning habitat of Gamecock Creek, including the lower portions of the THP area. Prior to the PHI, County staff was not contacted with regards to fishery issues associated with this THP which would have easily avoided this mischaracterization of streams in the THP.

Mitigated protection of water quality does not appear to be accomplished by the in lieu practice requested per CCR 916.3(e). The specifications in the THP would allow for the felling of up to 40 trees across the class I and IT watercourses. Page 27 of the THP acknowledges existing detrimental effects to water quality within the watershed. We disagree that these in lieu practices have a low potential to cause channel or bank erosion, streamside or inner gorge mass wasting, or increased amounts of small organic debris as noted in the THP (Section IV (l)(E), pg. 28). Given the extreme erosion hazard rating adjacent to the drainages, the steep unstable stream characteristics noted in the THP, fisheries concerns, and municipal supply, these in lieu practices would not protect the beneficial uses of water per CCR 916.3.

The THP describes the forest as "typical of timbered forests of the Santa Cruz Mountains" and that "the oldest components of the stand are approximately 80 years old" (Section III (1), pg. 16). These characterizations do not appear consistent with what County staff observed. This parcel is a

large parcel which has not been harvested most likely since the original clear cut due to access problems (see Emergency Notice 1-95EM-032). This alone makes the forest atypical for the Santa Cruz Mountains. Additionally there is an unusually high incidence of remnant late seral stage trees in the forest, again not typical for the Santa Cruz Mountains. Approximately 15 were noted by the review team in a limited review of the THP area. The statement that the oldest components of the stand are approximately 80 years old is grossly inaccurate given the original clearcut occurred 70-90 years ago per the THP and the late seral stage trees are remnants of the original harvesting. The RPF and his assistant stated that trees had not been bored to determine age, and by inference site class. 897(b)(l), 897(b)(l)(B), 897(b)(l)(C), 897(b)(2), and 897(b)(3) have not been addressed due to the lack of proper characterization of this forest.

County staff reviewed aerial photo's of the parcel beginning with the 1935 series through 1989. The known locations of late seral stage patches from the PHI were identified, and compared with similar canopy structure elsewhere on the property. It appears that a number of other locations which were not reviewed during the PHI exhibit a similar canopy structure, as did locations on the remaining 540 acre piece of the property.

Technical Rule Addendum # 2 (f) regarding late seral stage forest'stands may not be applicable, however, we believe that other sections of Technical Rule Addendum #2 do apply to the remnant late seral stage patches, in particular sections on snags/den/nest trees (a), multistory canopy (c), and special habitat elements (h). These are required factors to consider in the evaluation of cumulative biological impacts as stated in addendum 2 subsection (C). Since late seral stage remnants were not identified within the THP, a proper evaluation and analysis did not occur.

Staff submitted comments on a number of our concerns prior to the close of comment period, though responses were not included in the Departments "Official Response to Significant Environmental Points Raised During Public Review of THP 1-9 5-331 SCR."

The review of this THP and presite inspection indicates there is evidence that the information contained in the plan is incorrect, incomplete and misleading in a material way, and is insufficient to evaluate significant environmental effects (CCR 898.2).

The THP is significantly flawed with regard to Cumulative Effects and Environmental concerns which should be addressed prior to the approval of this THP. It is necessary first to properly characterize and identify all pertinent issues within the THP, so that they can then be appropriately reviewed and analyzed. We ask that you consider an appeal of the proposed harvest plan, and deny THP I-95-331 SCR. For the purpose of this appeal, Matt Baldzikowski, Senior Resource Planner for the Planning Department's Resource Section, will be the primary contact person for the County of Santa Cruz. Mr. Baldzikowski may be contacted at (408) 454-3096.

Thank you for your consideration of this matter. The County urges your Board to address the concerns outlined above.

Sincerely,

DANIEL K. SHAW, AICP
Planning Director

cc: Roger Burch
Brian Coleman
Zeke Sechrest, Redwood Empire
Nancy Drinkard, CDF-Felton
Thomas P. Osipowich, CDF-Santa Rosa
Richard Wilson, CDF Director
Board of Supervisors

attachments included in mailings: County Letter dated January 5, 1996
CDF-Felton letter dated January 17, 1996

ATTACHMENT

5. Gamecock Cyn/Redwood Empire
1-96-275-SCR RPF - Sechrest

Logs and slash throughout Class II stream corridor

*Note upcut density upper portion of Photo

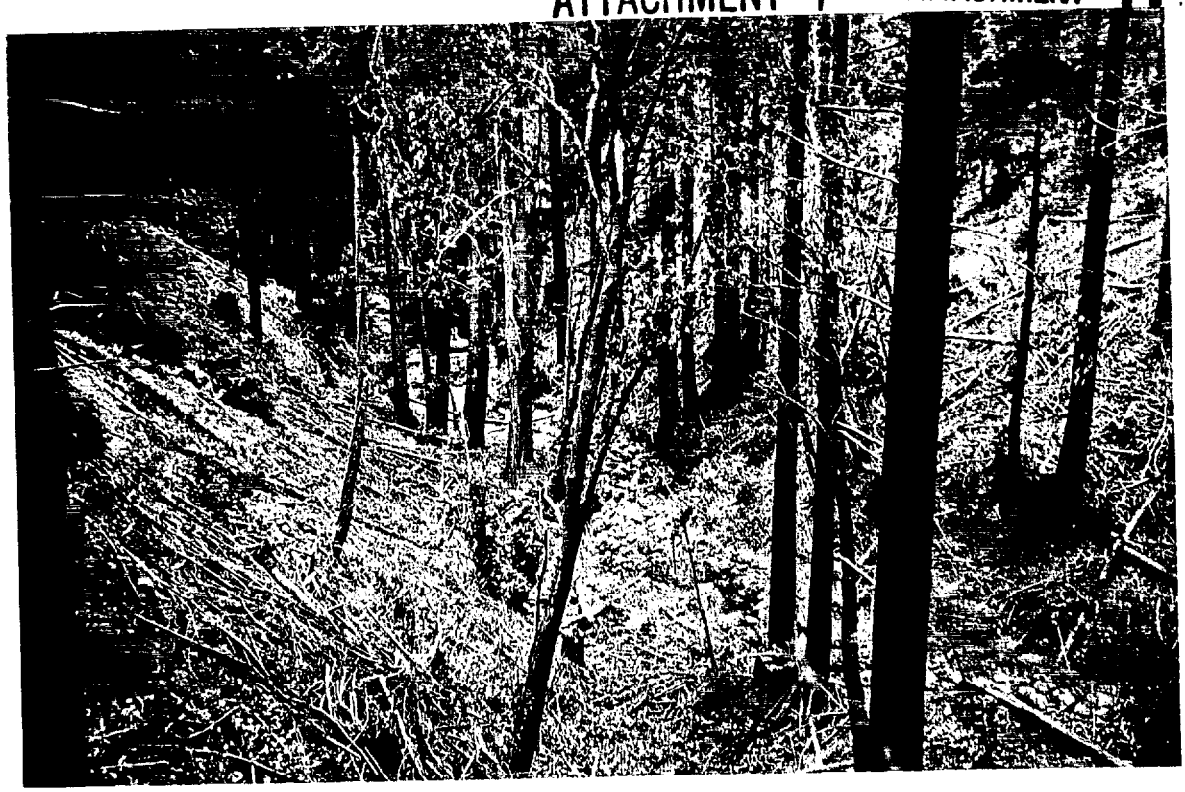
6. Gamecock Cyn/Redwood Empire
1-96-275-SCR RPF - Sechrest

Logs and slash throughout Class II stream corridor

* Note cut stand density

Gamecock Cyn/Redwood Empire
1-96-275-SCR RPF - Sechrest

Logs and slash throughout Class II stream corridor

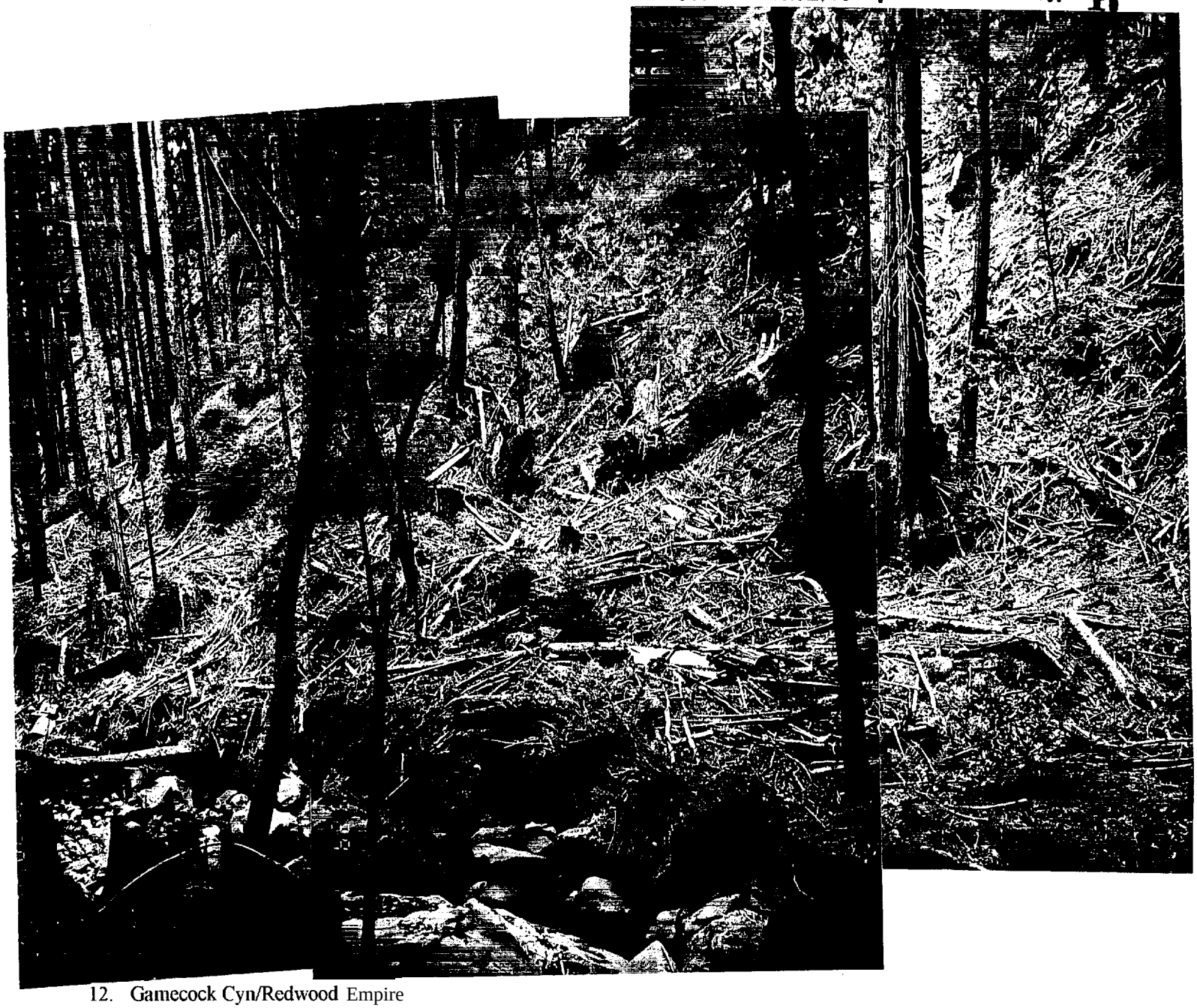


0. Gamecock Cyn/Redwood Empire
I-96-175-SCR RPF - Sechrest

WLPZ strip "leave Trees", note slash entering stream

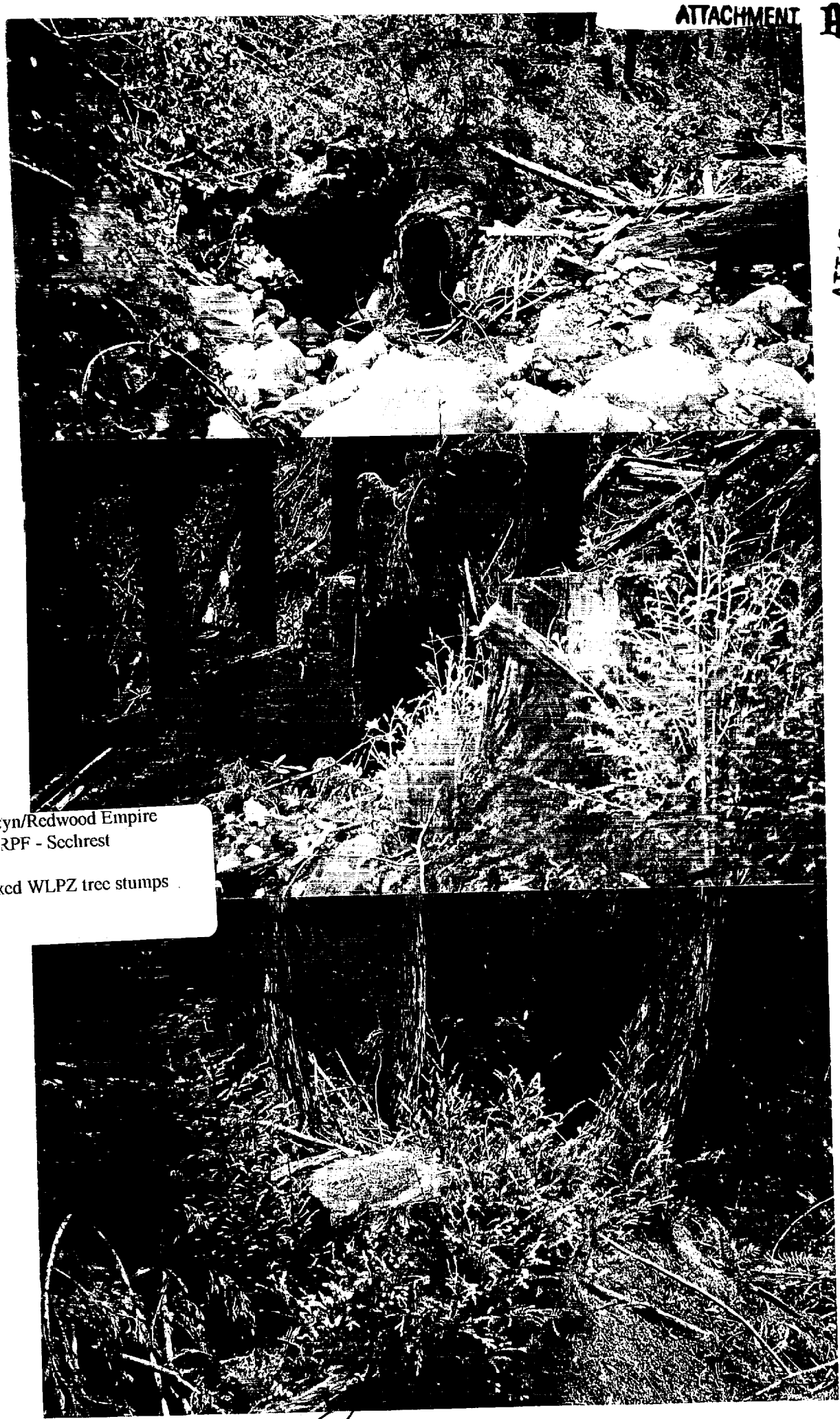
11. Gamecock Cyn/Redwood Empire
1-96-175-SCR RPF - Sechrest

Class II choked with logs



12. Gamecock Cyn/Redwood Empire
1-96-175-SCR RPF - Sechrest

Class I over-cut, note slash entering **stream**
and homogeneity of stand class size



13. Gamecock Cyn/Redwood Empire
1-96-175-SCR RPF - Sechrest

3 photos - unmarked WLPZ tree stumps

25

25. Gamecock Cyn/Redwood Empire
1-96-275-SCR RPF - Sechrest

Class II - CDF imposed 50-foot no cut zone
(180 degrees From photo no 24)

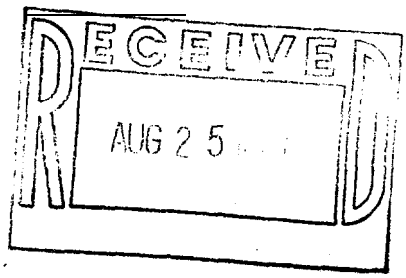
57

24. Gamecock Cyn/Redwood Empire
1-96-275-SCR RPF - Sechrest
Class II WZPZ cut, note slash entering watercourse, canopy cover and stand composition (next picture, no 25, is taken 180 degrees from this one)

61 person

ATTACHMENT 7

ATTACHMENT 1



State of California The Resources Agency

M E M O R A N D U M

T o : Tom Osipowich Date : August 22, 1997
Deputy Chief, Forest Practice Ref. : **IMD** 8-22

From: Department of **Forestry** and Fire Protection
Coastal-North ***Area***

Subject: ***Active*** Inspection Report; l-96-275 SCR; Gamecock

On August 21, 1997, I participated in an inspection of the referenced active THP with Peter Twight (Redwood Empire RPF), Dave **VanHennep** (Redwood Empire Technician); and Steve Hollett, Nancy Drinkard, **and** Geoff Holmes (CDF foresters). I was asked to attend after shade/canopy retention issues arose during the active **harvest along** Gamecock Creek. I had attended a Preharvest Inspection on July 24, 1996, when I recorded shade levels prior to harvest. Shade and canopy matters were the focus of our active inspection.

DFG is the state agency with jurisdiction under state law on fish and wildlife resource issues. My role **as a** CDF biologist is to provide biological recommendations and guidance to CDF. The biological judgment of **CDF's** biologist does not supersede that of **DFG's.** DFG did not attend this inspection.

FIELD REVIEW
The field review consisted of the group walking almost 1000 ft. upstream ***on*** the main fork of Gamecock Creek from the **THP's** downstream boundary. This stream reach corresponds to both that area where our prior shade measurements had been systematically recorded and where Inspector Hollet indicated the harvest had been heaviest.

Shade.--The Solar Pathfinder is an instrument designed to measure the amount of solar heat, by percent, that is available or shaded during any user defined month. It may be used any time of day and is corrected for latitude. The Solar Pathfinder does not measure **"canopy"** per se'.

We attempted to match the prior sampling design, beginning at the downstream limits of the THP and moved upstream **150'** . At each point, all members of the group individually took readings. The

[1] At **the** pre-harvest assessment, we took 3 readings with this sample spacing, then abandoned the systematic approach because of the apparent, consistent lightness of the **mark.** We then took three other readings at subjectively selected locations, one of which would be within the same reach sampled during ***this inspection.***

range and average of those readings are provided below. To be consistent with our pre-harvest data, we evaluated shade using the September sun arc. It was selected at the previous effort because Dave Hope (Santa Cruz Co.) asserted then that September was the critical temperature period for Santa Cruz county streams. For additional information, at a subset of points I also recorded pathfinder readings for June, July, and/or August.

Our post-harvest results were:

Point Number	Range: Sept. % Solar Heat obstructed	Average: Sept. % Solar Heat Obstructed	Comments or Other Month Heat Obstruction Values
1	91-95	93	T_w=15.5 °C[2] @ ll:OO; July = 90 August = 91%;
2	77-85	81	June = 70%; August = 79%.
3	81-89	85	T_w=17 °C @ 11:40
4	68-74	72	June = 86%; July = 83%; August = 78%
5	68-78	71	T_w = 15.5 °C; ± 12:30 T_a = 24.0 °C; August = 74%
6	80-87	83	

In my preharvest assessment, I predicted a post-harvest shade decline of about 5% from about 91% to about 87%. The grand mean from the active (post-harvest) inspection was 81% of the September heat being shaded at the stream's surface. The greater reduction than I predicted is probably due to (in order of probability) 1) greater than expected damage to residual shade in the WLPZ, 2) the greater than expected effects of harvesting secondary or background trees, and/or 3) heavier harvest in the WLPZ.

Canopy closure.-- Stream-side trees perform more functions than simply shading the water's surface. Among these are debris drop (nutrients), climate moderation, and control of heat fluctuations. Canopy closure is a good index of these functions. Canopy closure can be assessed by measuring the amount of vegetation (foliage, limbs, and boles) in the stream-side area.

[2] Two pocket thermometers were used, one metric and one English (converted to metric in this report). This type of thermometer may be inaccurate as much as 2 °C, although not often greater than 1 °C. I do not know the accuracy of these thermometers.

A good definition of canopy is that material which obstructs a vertical projection. I believe this definition matches the intent of "canopy" in the Forest Practice Rules.

The Forest Practice Rules do not prescribe a measurement protocol for canopy, so we devised one for this site. We used "Vertical Sighting Tubes," instruments which assure a vertical alignment of a skyward view. If vegetation obstructs the single cross-hair in the field of view, there is a "hit" or canopy is present. If vegetation is absent (sky at the cross-hair), then there is a "miss" and canopy is absent. We sampled 7 points along transects centered on the stream. We placed the transects at the same points we used with the pathfinder. One point was at the stream center and three samples were recorded in both directions at ± 33', 66', and 99'. We selected these distances to cover the WLPZ width. Thus we sampled 7 points along 6 transects. Transects ranged from 3 hits (43% canopy, n = 2) to 5 hits (71% canopy, n =2), and the grand mean canopy closure was 57% (24 hits for 42 sample points).

Other related observations--. My review of the harvest along the Class I watercourse leads me to believe that we should have judged the mark more closely relative to LWD recruitment potential. The harvest appeared to have removed larger diameter trees than generally available, thus either 1) substantially postponing the recruitment of large trees, and/or 2) should windfall occur, the trees' effectiveness in carrying out LWD's function in this type of stream will be constrained because of their small size.

CRAIG ANTHONY
Deputy Director for
Resource Management

By: Bradley E. Valentine
Senior Biologist

cc: Peter Twight (RPF - Redwood Empire)
Steve Hollett (CDF - Felton)

ATTACHMENT 7 ATTACHMENT A

FOREST PRACTICE INSPECTTON REPO

LE-3 (2/96)

CALIFORNIA DEPARTMENT OF FORESTRY

Timber Harvesting Plan No.	Inspection Hours
I-96-275 SCR	7
Person Contacted	Inspection Date/Report Date
SEE NARRATIVE	08/21/97
Title	Inspection No.
	6

Forest District: COAST	Subdistrict: SOUTHERN
Timber / Timberland Owner: ROGERBURCH	Timber / Timberland Owner: BRIAN COLEMAN
Mailing Address: 2 W. SANTA CLARA ST., 9th FLOOR	Mailing Address: 241 32nd AVE.
City: SAN JOSE Stale: CA Zip: 95113	City: SANTA CRUZ State: CA Zip: 95062
Site Contact: REDWOOD EMPIRE	Registered Professional Forester: M. W. ZEKE SECHREST License No.
Mailing Address: 1395 41st AVE.	Mailing Address: P.O. BOX 156
City: CAPITOLA Stale: CA Zip: 95010	City: CLOVERDALE State: CA Zip: 95425
Licensed Timber Operator: JACK HAYWARD License No.	Licensed Timber Operator License No.
Mailing Address: P.O. BOX 644	Mailing Address
City: BOONVILLE State: CA Zip: 95415	City State Zip
Status of Operation: ACTIVE / VIOLATION	THP Expiration: 01/01/00

NOTICE

TIMBER OPERATORS, TIME OWNERS, AND TIMUERLAND OWNERS ARE JOINTLY AND SEVERALLY RESPONSIBLE FOR CORRECTING VIOLATIONS OF FOREST LAWS AND REGULATIONS REQUIRED FOR TIMBER OPERATIONS.

IF VIOLATIONS WERE OBSERVED ON THIS TIMBER OPERATION, THEY ARE SHOWN BELOW BY CODE SECTION AND SPECIFIC DESCRIPTION AND CORRECTIONS ACTION IS REQUIRED.

CDF Headquarters address for further information:

California Department of Forestry and Fire Protection
San Mateo-Santa Cruz Ranger Unit
P.O. Drawer F-2
Felton, Ca. 95018-03 16

CODE AND SECTION NO.	SPECIFIC DESCRIPTION OR COMMENTS
1035.3 (d)	See attached narrative.

Steven Hollett
Forest Practice Inspector - RPF #2425

Steven Hollett
Signature

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62

LANDS OF BURCH

The purpose of this inspection was to assess canopy retention within a 1000-foot portion of the Class I WLPZ. This stretch starts at the harvest area's southern boundary and ends upstream approximately 1000 feet. Specific details of this inspection have been discussed in CDF biologist Brad Valentine's report of 08/22/97.

In attendance were:

B. Valentine
P. Twight (RPF)
D. VanLennep (Redwood Empire)
N. Drinkard (CDF)
S. Hollett (CDF)
G. Holmes (CDF)

VIOLATION
CCR 1035.3 (d), Licensed Timber Operator Responsibilities

The LTO failed to retain the required level of canopy within the Class I WLPZ, as stipulated in the THP. An approximately 1000-foot stretch of Class I WLPZ canopy was cut below the allowed 75% canopy, as discussed on Page 11 of the THP. Sample measurements indicated that approximately 57% canopy within the WLPZ was retained. These measurements were obtained using Vertical Sighting Tubes.

CORRECTIVE ACTION

Inspection Report #5 discusses corrective action that must occur in areas yet to be felled or yarded.

This particular stretch was believed to be the most open of all plan WLPZ areas observed during previous inspections. The probable reason for this open WLPZ was the excessively wide skyline corridors and the falling of timber into hardwood trees. During this inspection, the RPF indicated that he has worked with the LTO to create narrower corridors and he indicated that this was now occurring in other plan area WLPZs. The RPF also indicated that he has unmarked some of the WLPZ trees to further increase post-canopy levels. These areas were not reviewed during this inspection, but will be inspected by CDF in the near future.

Direct shade on the stream surface for the above stretch was measured by a solar path finder during this inspection. Measurements indicated that trees left along the stream edge for the above stretch was adequate, but WLPZ canopy further away from the stream was below acceptable limits (refer to Valentine's report)

ATTACHMENT 7 ATTACHMENT A

AUDIT-------TRAIL
AUDIT-------TRAIL
AUDIT-------TRAIL
AUDIT-------TRAIL
AUDIT-------TRAIL

AUDIT-------TRAIL
AUDIT-------TRAIL
AUDIT-------TRAIL
AUDIT-------TRAIL
AUDIT-------TRAIL

NOT TO BE MAILED
NOT TO BE MAILED

Place this in the THP file as the audit trail of computer generated form letters

Timber Harvest Plan 1-96-275/SCR
Violation Letter dated July 29, 1997
Person contacted concerning Timber Operation : See Narrative
Inspection Date: July 24, 1997 --- Inspection Number: 5

Steven Hollett - RP

signature

Steven Hollett, R P F 82425
Forest Practice Inspector
San Mateo - Santa Cruz Ranger Unit
6059 Highway 9, Felton, Ca 95018
408/335-5355 Or l-800-233-9710

VIOLATIONS AND COMMENTS

LANDS OF BURCH

VIOLATION - CCR 916.3(e)
GENERAL LIMITATIONS NEAR WATERCOURSE

Several trees within the Class I WLPZ were felled parallel or towards the watercourse.
CORRECTIVE WORK:
The LTO shall ensure that all trees within the Class I watercourse are felled away from the watercourse. Per the THP (Recommendation #9), some falling towards and across the Class II watercourse is allowed, but this should be conducted under the direction of the RPF.

VIOLATION - CCR 1035.3(d)
LICENSED TIMBER OPERATOR RESPONSIBILITIES

The LTO failed to comply with the approved THP; four trees were harvested along the Class I watercourse that were not painted by the RPF for removal. These trees were not located within or even at the edge of the cable corridors where they would need to be removed. No marked, standing trees were observed near the unmarked harvested trees which would occur if switching had occurred. Page 4 of the approved THP indicated that timber will be marked with a blue stripe or removed under the supervision of the RPF. The RPF indicated that at least one of these trees was removed without his approval. This tree stump has been flagged with pink flagging.
CORRECTIVE WORK:

The LTO shall ensure that only marked trees are removed unless they are located within a skyline corridor.

Attending this inspection was: T. Osipowich, J. Ahlstrom, D. Lucke, N. Drinkard, S. Hollett (CDF); P. Twight (RPF), and T. Peet (Redwood Empire).

A few skyline corridors across the Class I watercourse were wider than was necessary. The RPF has agreed to work with the LTO to keep the corridors as narrow as possible. Trees that are damaged by the skyline yarding should be left to act as a buffer for other trees further away from the yarder path. If these trees are able to survive, they should be left to provide shade and large woody debris (LWD) to the watercourses.. If these trees are damaged beyond recovery, they should be cut and yarded out at the very end of the corridor use. This is one technique to help keep the skyline corridors as narrow as possible. The RPF and LTO will develop other techniques to further improve corridor width. The RPF has agreed to re-evaluate his mark along the WLPZs that have *not* yet been felled to ensure that future corridors are kept narrow. It should be noted that corridors across the Class II watercourse near Road Points #1 and #8 were observed to be narrow.

Portions of the Class I WLPZ away from the actual stream channel appeared to be open due to wide corridors. Although an average of 75% canopy retention for Class I and II watercourses may be met, the RPF and CDF will conduct WLPZ measurements to confirm this stated THP standard. Results of this study will be provided in subsequent inspection reports.

NOTE:

The violation regarding litter at Map Point #6 has been corrected, but during this inspection, other garbage was observed below Points #10 and #6. Plastic water bottles and other items were observed along the hillsides, which must be cleaned up.

Slash was removed in watercourses, but some slash located below the high water mark must be removed prior to the winter rains. All Class I's and II's should be inspected to ensure that slash is removed from below the high water mark.

Roads have been constructed per the THP. Further work is needed at crossings prior to the start of the winter period (October 15, 1997).

ATTACHMENT 7 ATTACHMENT A

CALIFORNIA DEPARTMENT OF FORESTRY

FOREST PRACTICE INSPECTION REPORT

LE-3 (2/96)

Timber Harvesting Plan No.	Inspection Hours
1-96-275 SCR	**8**
Person Contacted	Inspection Date/Report Date
SEE NARRATIVE	**12/16/97 and 01/14/98**
Title	Inspection No.
	9

Forest District: **COAST**	Subdistrict: **SOUTHERN**
Timber / Timberland Owner: **ROGER BURCH**	Timber / Timberland Owner: **BRIAN COLEMAN**
Mailing Address: **2 W. SANTA CLARA ST., 9th FLOOR**	Mailing Address: **1085 HAZEL DELL RD.**
City: **SAN JOSE** State: **CA** Zip: **95113**	City: **WATSONVILLE** State: **CA** Zip: **95076**
Site Contact: **REDWOOD EMPIRE**	Registered Professional Forester: **M. W. ZEKE SECHREST** License No.
Mailing Address: **1395 41st AVE.**	Mailing Address: **P.O. BOX 156**
City: **CAPITOLA** State: **CA** Zip: **95010**	City: **CLOVERDALE** State: **CA** Zip: **95425**
Licensed Timber Operator: **JACK HAYWARD** License No.	Licensed Timber Operator / License No.
Mailing Address: **P.O. BOX 644**	Mailing Address
City: **BOONVILLE** State: **CA** zip: **95415**	City / State / Zip
Status of Operation: **INACTIVE / VIOLATION**	THP Expiration: **01/01/00**

NOTICE

TIMBER OPERATORS, TIME OWNERS, AND TIMBERLAND OWNERS ARE JOINTLY AND SEVERALLY RESPONSIBLE FOR CORRECTING VIOLATIONS OF FOREST LAWS AND REGULATIONS REQUIRED FOR TIMBER OPERATIONS.

IF VIOLATIONS WERE OBSERVED ON THIS TIMBER OPERATION, THEY ARE SHOWN BELOW BY CODE SECTION AND SPECIFIC DESCRIPTION AND CORRECTIONS ACTION IS REQUIRED.

CDF Headquarters address for further information:

California Department of Forestry and Fii Protection
San Mateo-Santa Cruz Ranger unit
P.O. Drawer F-2
Felton, Ca. 95018-0316

CODE AND SECTION NO.	SPECIFIC DESCRIPTION OR COMMENTS
916.3(b) **916.3(e)** **916.9** **923.3** **923.4** **926.1** 926.2 1035.3 **(d)** **1050**	**See attached narrative.**

Steven **Hollett**
Forest Practice Inspector - RPF #2425

Steven Hollett
Signature

67

61

LANDS OF BURCH

Two field inspections were conducted regarding this report. The first, on December **16, 1997,** was a general inspection of the main Class I and II watercourses. This field visit was attended by:

Steven Hollett (CDF)
Howard Kolb (California Regional Water Quality Control Board)

The second inspection, on January 14, 1998, was to measure canopy retention in the newly harvested areas within the same Class **II** watercourse. The following attended the January field visit:

Steven Hollett and Rodger Thompson (CDF)
Peter Twight and David VanLennep (Redwood Empire RPFs)

NOTE: The following violations occurred in areas felled and yarded after earlier violations contained in Inspection Reports #5 and #6 ***were*** issued. CDF attempted to reach the Licensed Timber Operator (LTO), Jack Hayward, by telephone on January 20, 1998, but was unsuccessful. The telephone number listed on the amendment (dated April 14, 1997), adding Jack Hayward as the LTO, has been disconnected.

CDF was successful in reaching Jack Hayward's brother, Chris. Chris Hayward indicated that it would be difficult to reach Jack by telephone for the time being and that he would forward any information on to Jack. CDF discussed information contained in this report with Chris and he indicated that he would convey this information to Jack.

1. VIOLATION
CCR §1035.3(d) LICENSED TIMBER OPERATOR RESPONSIBILITIES

The LTO failed to retain the required level of canopy within the Class II WLPZ as stipulated in the THP. An approximately 950-foot stretch of Class II WLPZ canopy was cut below the allowed 75% minimum, as discussed on Page 1 I of the THP (see attached map). Sample measurements indicated that 63% canopy was retained within the WLPZ. Sample measurements ***were*** obtained using Vertical Sighting Tubes.

This is the second violation issued for this offense (see Inspection Report #6).

2. VIOLATION
CCR §1035.3(d) LICENSED TIMBER OPERATOR RESPONSIBILITIES

The LTO failed to comply with the approved THP; twelve unmarked Coast Redwood trees were harvested within the Class II WLPZ in the **mea** shown on the attached THP map. These trees were not located within or at the edge of cable corridors where they would have needed to be removed. No marked standing trees were observed near the unmarked harvested trees which would occur if "switching" had occurred. Page 4 of the approved THP indicated that timber will be marked with a blue strip or under the supervision of the RPF. The RPF attended this inspection and told CDF that he did not authorize the removal of the trees. This action caused a reduction of WLPZ canopy, as discussed in the above violation.

Several additional unmarked redwood trees out of the WLPZ were also harvested without RPF approval. **One** tree along a spur ridge below Crossing #4 was marked then unmarked by the RPF (see Map Point "C"). The RPF "X'ed" out the blue strip and painted a large "*NO*" **on** the tree. This tree was harvested obviously without the permission of the RPF with the remaining stump still showing the "*NO*" on it.

This is the second violation issued for this offense (see Inspection Report #5).

3). **VIOLATION**
CCR §916.3(e) GENERAL LIMITATIONS NEAR WATERCOURSES

Several trees within the Class II waterdourse, delineated on the attached THP map, were felled parallel or towards the Class II watercourse. The RPF indicated to CDF that he did not approve of this destructive action. The felling of trees parallel or towards the Class II watercourse caused riparian trees along one stretch of stream to be knocked down and deposited in the watercourse. This also caused a reduction of canopy, as discussed above.

This is the second violation for this offense (see Inspection Report #5).

4. **VIOLATION**
CCR §916.3(b) GENERAL LIMITATIONS NEAR WATERCOURSES

The Licensed Timber Operator failed to remove accidental depositions of logging slash in a Class II watercourse immediately after deposition (see above violation). An approximately 30-foot section of stream was full of Maple, Tan Oak and Coast Redwood tops. This occurred at Map Point "B," shown on the attached map.

NOTE: The slash was observed in the stream during the December, 1997 inspection and removed by the LTO by the time the January, 1998 inspection occurred.

5. VIOLATION
CCR §1035.3(d) LICENSED TIMBER OPERATOR RESPONSIBILITIES

The Licensed Timber Operator failed to follow the approved THP when he removed a large Coast Redwood tree that was laying the main Class II watercourse (see attached THP Map Point "A"). The THP stated that any tree that has fallen in any Class I or II watercourse shall not be harvested and those trees previously marked shall be unmarked by the RPF (see THP Pages 94 and 97). Both Redwood Empire RPFs (Twight and VanLennep) indicated that they unmarked all trees previously marked and that the LTO removed this particular tree in violation of the plan. Fresh saw dust was seen on and around the remaining stem.

The removed tree appeared to have fallen in the watercourse several years ago; as evidenced by its attachment to a rootball, moss spread out over the rootball and six-foot tall sucker sprouts on top of the remaining rootball. The tree was actually two redwood stems, the largest approximately 34 inches in diameter as measured at the cut face. The length of the twin tree was estimated to be 30 to 40 feet, as evidenced by bark seen embedded in boulders away from the rootball. Sediment, previously trapped by the structure, and now free to travel downstream, was also seen a distance from the freshly cut root mass.

The **VIOLATION [CCR §1035.3(d)]** regarding placement of trash racks at Crossing #4 has not been corrected by December 31, 1997, as required in Inspection Report #8.

A field visit was conducted in the above area on December 15, 1997. In attendance were:
Jennifer Nelson (California Department of Fish and Game)
Howard Kolb (CRWQCB)
Peter Twight (Redwood Empire RPF)
CDF did not attend this field meeting.

As a result of this inspection, both regulatory agencies have or indicated that they will be requiring mitigation measures to offset the disturbance created as a result of the above violations. Kolb's supervisor, Roger Briggs, has submitted a letter regarding his concerns (dated January 12, 1998) and Nelson indicated that she will also be submitting her written concerns.

Below are mitigation measures that shall be followed as a way **to offset** problems created by the timber operation:

1. The RPF shall provide a planting plan to CDF in an attempt to replace unauthorized harvested trees within the Class I and Class II WLPZs. This plan shall include planting stream riparian areas with hardwoods such as Maple. A draft of this plan shall be submitted to the CDF Felton Office for review and approval. Once approved, the RPF shall submit this plan to CDF Region Office to be considered as minor amendment and part of the THP.

2. a. A 50-foot "No Cut Zone" shall be established on both sides of the uncut portion of Gamecock Canyon. This zone, approximately 1000 feet in length, shall apply to the Class II watercourse delineated on the attached map. The RPF shall "X-Out" all trees within this zone prior to the start of operations and shall discuss this "No Cut Zone" with the LTO. Trees that are damaged due to skyline yarding shall be left standing to offer large woody debris (LWD) recruitment and some amount of shade to the stream. ***No trees shall be cut in the zone.***

   b. The Operations RPF (Peter Twight) shall be responsible for ensuring that 75% canopy is retained in the remaining **portion** of the WLPZ outside the "No Cut Zone." The RPF shall provide CDF with **a** monitoring plan to ensure that this will **occur.** The plan shall be submitted as **a** minor amendment to made part of the plan.

   The RPF shall take measurements as skyline operations occur **and** corridors are established to ensure that the canopy remains at or above 75%. Staged marking and falling may be required to reach this goal. Operations shall be stopped by the RPF; **and** CDF shall be contacted **ii** his measurements indicate that the canopy falls below the 75% level.

3. A log with approximately the same dimensions as the tree removed from the watercourse shall be placed in the stream to provide LWD. The RPF shall provide a plan to Jennifer Nelson for her review and approval **to** accomplish this task. Once approved by Fish and Game, this plan shall be submitted to CDF as a minor amendment to made part of the plan.

4. The LTO and his fallers shall not switch any harvest trees unless the RPF is contacted. The RPF shall remark any trees that he authorizes for switching.

5. Prior to the start of any future timber operations, the RPF shall schedule a preoperational meeting, as discussed in CCR §926.2.

6. Future skyline corridors in the uncut area shall be no wider than 25 feet. The RPF shall inspect new corridor widths as they are established to ensure that this mitigation measure is followed. The RPF shall periodically contact CDF to update them on these corridor widths.

7. All mitigation measures discussed above shall be submitted to CDF as minor amendments to be made part of the THP and enforceable by CDF.

COMMENT:

The RPF, Peter Twight, agreed to work with the LTO to correct violations noted in past inspections (see Inspection Reports #5 and #6). He has been successful in his attempt, as discussed in Inspection Report #7, but he has failed to accomplish this goal after that point. He indicated to CDF that his directions were not followed by the LTO, but certainly the RPF should have more closely monitored the LTO's actions and either provided tighter controls or stopped the harvest operation. Unquestionably, the LTO is responsible for the above violations, but these repeat violations may have been prevented with closer RPF involvement.

The RPF is reminded of CCR §926.1, which requires the RPF to provide professional advice to the timber operator on a continuing basis throughout timber operations. The RPF is required to work closely with the LTO to help assure compliance with the approved THP. Furthermore, the RPF must inform the LTO of potential environmental impacts and mitigation measures to be taken to minimize such impacts.

NOTE: The LTO installed or repaired waterbars on the road to Crossing #4 and on the road to Map Point # 10, as required in Inspection Report #8. Waterbar installation and repair in other areas, discussed in Inspection Report #8, were not inspected during the December / January field visits. Except for the above, other work required in Inspection Report #8 was not inspected during this visit.

A citation has been issued to the Licensed Timber Operator, *Jack* Hayward, for the above violations (Case #98CZU00445).

c: Burch
Coleman
Redwood Empire (Sechrest , tight, Van Lennep)
Hayward
Nelson
Kolb
Thompson
M.Baldzikowski (County Planning)
M. Taylor (District Attorney's Office)

ATTACHMENT 7

ATTACHMENT A

THP 1-96-275 SCR
Minor Deviation - 4/14/97

350' Additional Road

Gamecock Canyon
Timber Harvesting Plan Map
Ptns. of Rancho Salsipuedes, T10S, R2E, MDB&M
Scale 800'
contour interval = 40'

LEGEND

- THP boundary
- Hardwood Mgt. - 913.8(b)
- Permanent road
- Existing seasonal road
- Proposed seasonal road
- Proposed skid trail
- Existing/Proposed landings
- Unstable/slide areas
- Class I watercourse
- Class Ii watercourse
- Class III watercourse
- Spring/wet area
- Dwelling
- Map Point References

All Site III

Rev. 4/15/97
Revised

Minor Deviation
Additional Road

NO CUT ZONE

SAMPLED AREA
UNMARKED TREE
HARVESTED
TREES FELLED
TOWARDS
WATERCOURSE

GAMECOCK

CLASS II

CLASS I

ROAD

COLEMAN

...t for these two
... areas labeled
...an, the
... ng area is the
...ance of Burch.

RECEIVED

APR 16 1997

COAST AREA OFFICE
RESOURCE MANAGEMENT

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Cal/EPA

Central Coast Regional Water Quality Control Board

81 Higuera Street
Suite 200
San Luis Obispo, CA
93401-5427
(805) 549-3 147
FAX (805) 543-0397

ATTACHMENT A

ATTACHMENT 7

Pete Wilson
Governor

January 12, 1998

Mr. Roger Burch
Redwood Empire
2 West Santa Clara Street, 9th Floor
San Jose, CA 950 10

Dear Mr. Burch:

POST HARVEST INSPECTION OF TIMBER HARVEST PLAN (THP) 1-96-275 SCR, **DECEMBER 15-16, 1997, REDWOOD EMPIRE, GAMECOCK CANYON**

On December 15-16, 1997, a member of my staff attended a post harvest inspection of Timber Harvest Plan (THP) f-96-275 SCR, Redwood Empire, Gamecock Canyon. The post harvest inspection was to review completed and "in progress", timber harvest operations. We have the following comments regarding the timber harvest operations.

The completed operations have reduced canopy in excess of those allowed by the existing THP and are in violation of Fish and Game Code 2090. Loss of canopy may result in increased water temperatures impacting water quality and beneficial uses. Completed and in progress operations have resulted in discharge of material (sediment, small woody debris, trash, etc.) deleterious to water quality and beneficial uses.

Impacts to water quality and beneficial uses are not acceptable to the Regional Board. Gamecock Creek supports resident trout and contributes flow to Corralitos Creek, a Coho Salmon stream. Regional Board is concerned about sediment discharges to the creek and changes in water temperature resulting from timber harvest. As land owner, you are responsible for the protection of resources during and after your timber harvest operation.

Pursuant to Sections 13267 of the California Water Code, Redwood Empire, its agents or assigns shall, by January 3 1, 1998, submit a complete report to the Regional Board Executive Officer, containing plans and measures to clean up and restore areas impacted by current timber harvest operations. The plans shall contain a time schedule for implementation and completion of detailed tasks. The plans shall contain a monitoring and reporting program to be implemented. The monitoring program shall include provisions to measure changes in water quality and riparian habitat at regular intervals.

By September 1, 1998, submit a complete report to the Regional Board Executive Officer documenting compliance with conditions of this letter.

ATTACHMENT 7
ATTACHMENT A

PLANNING DEPARTMENT

COUNTY OF SANTA CRUZ

GOVERNMENTAL CENTER

701 OCEAN STREET ROOM 400 SANTA CRUZ, CALIFORNIA 95060
(408) 454-2580 FAX (408) 454-2131 TDD (408) 454-2123

December 27, 1996

Bob Kerstiens Chairman
State Board of Forestry
1416 Ninth Street
Sacramento, CA 958114

SUBJECT: SANTA CRUZ COUNTY APPEAL OF PRCPOSED TIMEER HARVEST PLAN (THP) 1-96-247 SCR

Dear Mr. Kerstiens

The County of Santa Cruz is hereby appealing the approval of the proposed Timber Harvest Plan, 1-96-247 SCR by unanimous vote of the Board of Supervisors on August 20, 1996, a copy of the authorization by the Board of Supervisors is attached as per 1055(7). In accordance with 1055(8), I hereby certify that I attended the multi-disciplinary review of this plan, please reference the Pre-harvest and Review Team reports for this plan to verify attendance. The THP in question is located 10 miles north of the City of Santa Cruz near Ben Lomond in the northern section' of Santa Cruz County. The Plan was submitted by Gregory Koppala/ Eel River Saw Mills and prepared by Roy Webster, RPF 1765. The harvest is planned for the 116 acre group of properties in Fritch Creek, a tributary to Love Creek and the San Lorenzo River. The slopes on the property range from relatively flat to above 90%. The erosion hazard rating is high to 2 points under extreme, rainfall intensity rating is extreme. But it should be noted that the two hour rainfall intensity is the highest in the state.

The County of Santa Cruz appeals this plan due to its' proximity to and impacts on domestic water supplies, slope stability, wiidlife and biotic communities and general public health and safety associated with the haul route.

GEOLOGY

The County of Santa Cruz is very concerned about the limited nature of all the geologic investigations devoted to this proposed limber Harvest Plan. Joe Hanna the County Geologist stated in his review of the geologic reports including Tim Bests' report, that "two and a half pages of limited broad scale geologic information." was the extent of review afforded this project. "Landslides are defined in very general terms and no attempt is made to determine the age, limits, or significance of these existing landslides. Consequently, the author (Tim Best) may have data that supports his "opinion that the potential for large scale slope instability there is low," but this data is not present in the report leaving this reviewer with no way of relating opinion to fact."

ATTACHMENT 7 ATTACHMENT A

The County of Santa Cruz takes its' responsibility towards protecting public health and safety very seriously and requires that Geologic Reports meet standards of investigation and reporting. Geologic conclusions made without this minimum information can not be properly evaluated to determine if geologic features on the land support the conclusions made by a report. Mr. Hanna could only make the conclusion that "This report lacks persuasive logical conclusions based on site geologic information that the timber harvest will not induce instability."

Better Geologic mapping utilizing tools including aerial photographs and analysis of the sites' geomorghic features would allow a more conclusive analysis of impact of the timber harvest activity on stability. The County has concerns regarding geologic safety due to huge landslides that have occured nearby killing ten residents. The Fritch Creek drainage is very similar to the two sites of past landslide activity (Love Creek, Newell Creek), slope, aspect, geology and site conditions indicate extreme caution must be employed in this area. The flat areas along Fritch appear to be the result of massive catastrophic landslides that filled the entire canyon in the same manner as the Love Creek Slide of 1982.(It should be noted that the area were homes existed at the base of the Love Creek Slide, was on the flat area near the stream created by the past collapse of slope).

With the west side of the canyon commonly experiencing debris flows (1955,67,82,86), and the east side prone to large catastrophic landslides due to the dip slope relationship inclined toward Fritch Creek, and the location of several homes in the bottom of the canyon, this site does not lend itself to cursory geologic review normally afforded to timber harvests set many miles away from the nearest home with slopes showing no signs of past instability. Fritch Creek watershed has active debris flow chutes and recent large scales failures inside of ancient slope failures over 100 acres in size.

WATER QUALITY

Due to the unstable nature of the canyon and the need to protect beneficial uses of water, the County expressed great concern over impacts to fisheries and domestic water use onsite. The fisheries (steelhead, coho salmon) have recovered dramatically from the 1982 storm. The drainages need many more years of progressive recovery before they will even approach their potential. This cumulative damage caused by massive debris flows and 10 to 15 complete dams of trees and soil in channel of less than one mile indicate a serious need for continued recovery not retarded by chronic input of man-made sediment.

The County of Santa Cruz has expended 100s of thousands of dollars and many 10s of thousands of man hours on restoration of the Love and Fritch Creek watersheds. Two fish barrier projects of over $70,000, landslide repair totalling over $200,000, and erosion control projects and private road repair work exceeding $100,000. This is followed up by over 25,000 man hours of log jam, debris flow, and bank stabiiization work conducted by County watershed crews. All this points to the lony term commitment, backed by budget, plan-

ning and man hours dedicated to restore the Love Creek area. All the work is intended to protect the residents of the area and enhance the natural resources of this area, which shows recognition of this areas problems dating back to 1978.

Because of this concern we looked closely at the impacts of erosion on the streams flowing through the site. In reviewing the geologic information the County Geologist Joe Hanna states concerns that " This land has had aggressive timbering in the last one hundred years, and evidence of accelerated erosion is evident from the past activities. These past activities do not appear to be responsible for reactivation of the largest landslides, but do appear to have caused debris flows." These erosion problems occurred when timber harvesting did not build roads which are recognized today as contributing the most towards accelerated erosion off timber harvest activities conducted.

It is the acceleration of the debris flow treat coupled with generalized erosion problems that adds to concerns fcr timber harvesting in this area. The fact that roads will he built across drainages that have experienced recent debris flows and logs will be cabled from slopes that are prone to severe debris flows indicates a need for extreme caution (12 debris flow chutes are noted on the east slope). Sites were logs may impact steep debris flow chutes should be mapped and mitigations incorporated into the plan to avoid dragging logs and depositing soils in the existing chutes. This plan may have intended that the use of cable for this east slope is mitigation enough, but the dragging of any logs or the deposition of any soils in these steep unstable debris chutes will have serious impacts on Fritch Creek below.

These are immediate impacts to beneficial used of water, but may alsoposea threat to homes as they form landslide dams in the canyon that can fail and send walls of water down the stream directly at homes situated along the stream. Other direct impacts on domestic water use will come from the freshly cut banks along the newly opened haul road immediately along side Fritch Creek. The report by Tim Best admits that "newly graded road "weathers", spalling of debris from cutslopes should be anticipated." This anticipated erosion will occur on a road that discharges road drainage directly into the stream at the road edge, four instream water intakes are in Fritch Creek at this site.

WILDLIFE/BIOTIC

The area proposed for logging is at the headwaters of a conifer forested watershed -it contains many important features that make it. and important refuge for wildlife. In the upper portion of the property is a area where many residual old growth redwood trees stand. They form a brow that i s an important perching site for raptors and home for pileated woodpeckers. The loss of these important nest sites, cavity, granary, and perch trees is a serious impact in Santa Cruz County considering that areas like this are rare due to the predominance of vigorous second growth forest. It must be noted that if any old growth dependent species are expected to recover removal of 200 to 500 year old trees will set that recovery back at least that many

ATTACHMENT 7 ATTACHMENT A

years. The letter by Mark Allaback of July 22, 1996 indicates a serious lack of surveys and proper use of protocols for review for red-legged frog.

Because the County of Santa Cruz has not received a copy of the approved plan for review we can not make a decision whether the proper surveys were conducted. This is also a problem when a THP is approved on December 20th giving staff only 10 days to appeal with only 3 and 1/2 working days in that 10 day period and NO APPROVED PLAN TO REVIEW.

The haul route proposed uses an existing drive of marginally one lane to transport logs to Love Creek Road. There are no turnouts and even with the proposed improvements any car on the road at the same time as a logging truck will have to back up to their home or Love Creek Road to allow passage. Any breakdown that occurs on this 1/4 mile section of road will make passage by any vehicle impossible.

Cumulative effects, beneficial uses of water, slope stability, Public Health and Safety, and wildlife issues should have been mitigated prior to approval of this THP, along with giving ample time and a final document to review. We ask that you consider an appeal of the proposed harvest plan, and deny THP 1-96-247 SCR. For the purposes of this appeal, Dave Hope, Senior Resource Planner for the Planning Department's Resource Section, will be the primary contact person for the County of Santa Cruz. Mr. Hope may be contacted at (408) 454-3096.

Thank you for your consideration of this matter. The County urges your Board to address the concerns outlined above.

Sincerely,

DAVE HOPE
Senior Resource Planner

Attachments: Board of Supervisors Authorization

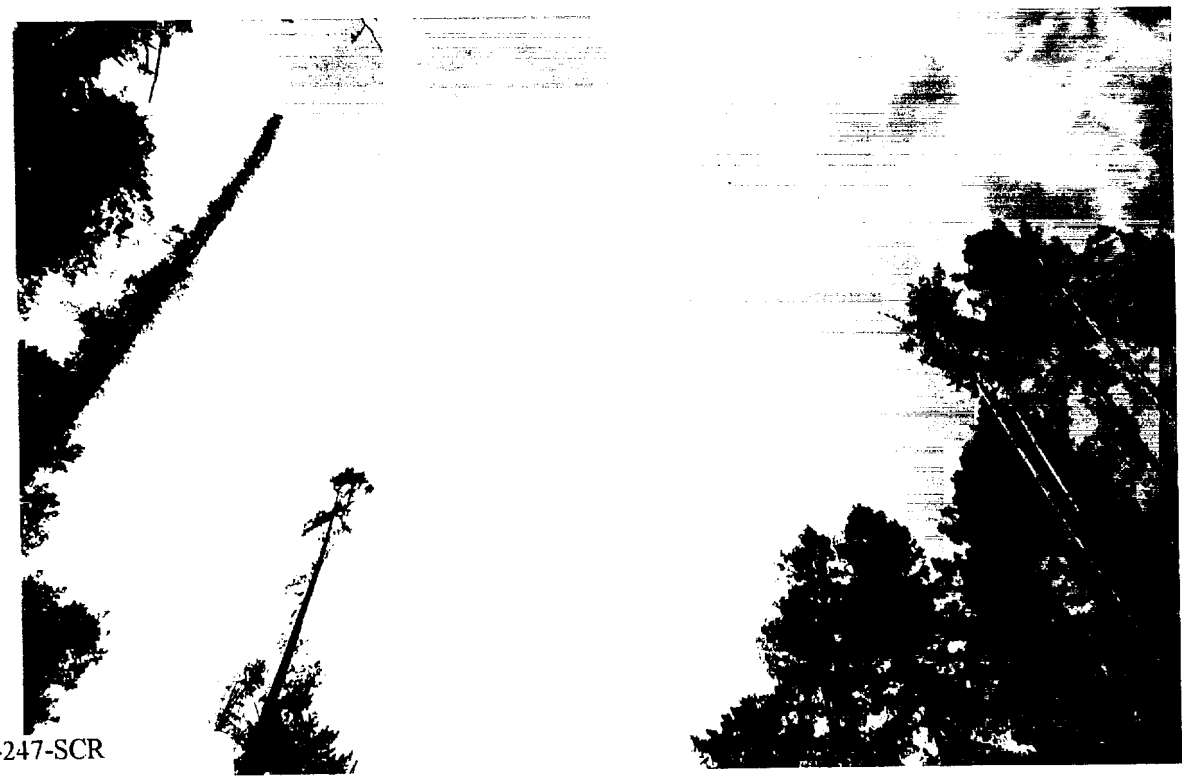
S/DH/emw

cc: Greg Koppala/Eel River Sawmills
Roy Webster
CDF Felton Region Office
Richard Wilson, CDF Director

Fritch Creek/Koppala 1-96-247-SCR
RPF - Webster
Class II stream - slash/logs in stream. note canopy cover and m-cut WLPZ in background

2. Fritch Creek/Koppala 1-96-247-SCR
RPF - Webster
Slash in watercourse - selective thinning. homogenous stand

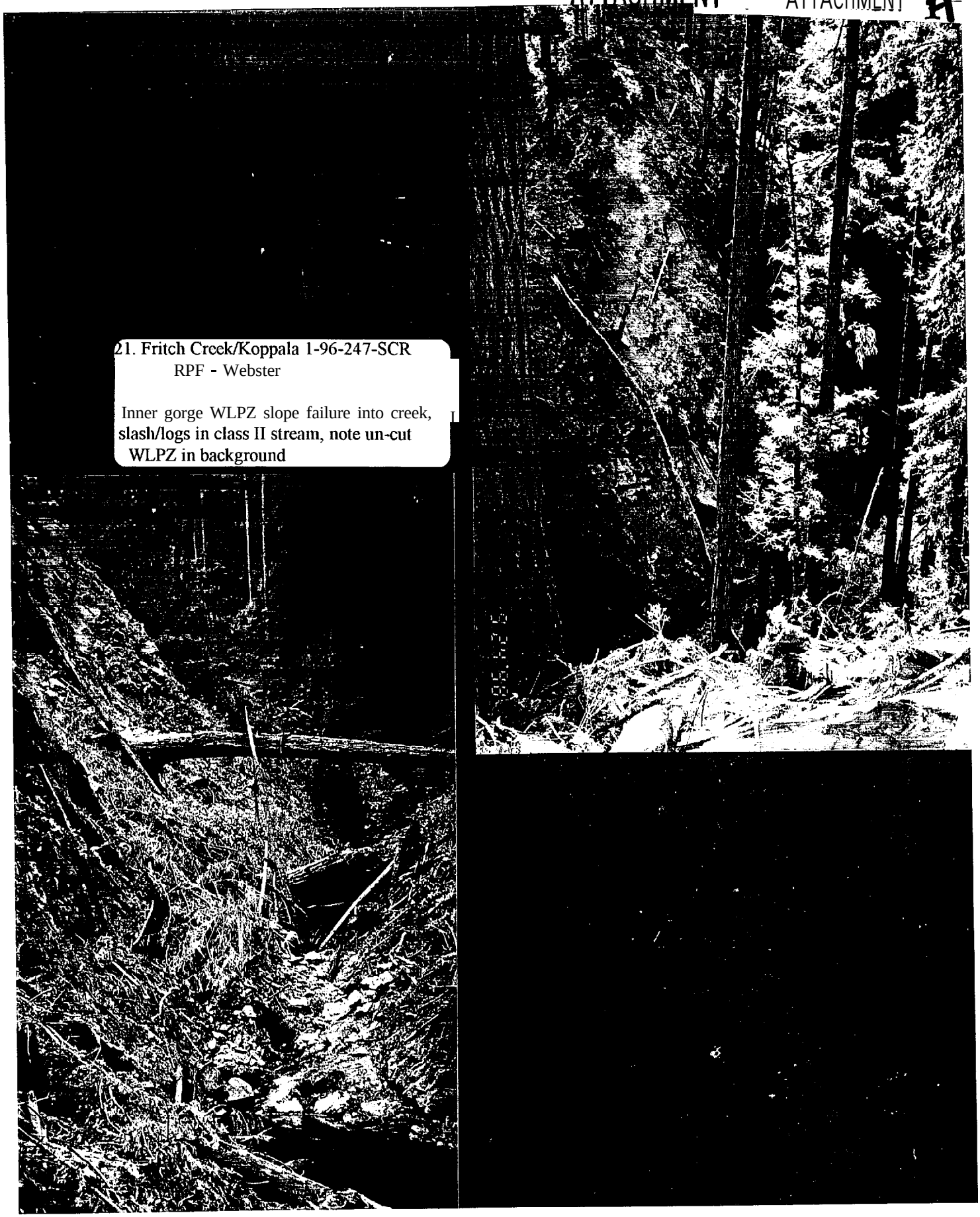
ATTACHMENT A



3. Fritch/Koppala 1-96-247-SCR
RPF - Webster

Class IT **canopy**

4. Fritch Creek/Koppala I -96-247-SCR
RPF - Webster
Class I canopy: right half = harvest boundary, left half = un-cut area



21. Fritch Creek/Koppala 1-96-247-SCR
RPF - Webster

Inner gorge WLPZ slope failure into creek, slash/logs in class II stream, note un-cut WLPZ in background

ATTACHMENT 7 A

STATE OF CALIFORNIA - THE I ..OURCES AGENCY PETE WILSON, Governor

DEPARTMENT OF FORESTRY AND FIRE PROTECTION

San Mat:o - Santa Cruz Ranger Unit
P.O. Drwer F2 6059 Highway 9
Felton CA 95018
(831)335-6740

Section 4604 of the Public Resources Code (PRC) requires the department to inspect timber operations for compliance with the forest Practice Act and rules of the Board of Forestry.

August 18, 1998

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NOTICE OF INSPECTION

Harvest Document: 1-96-247-SCR5
inspection Date: AUGUST 17, 1998
inspection Number: 21
Person Contacted: HIPKIN / SHIELDS

LANDS OF EEL RIVER SAWMILLS ET AL.

The violation of 14 CCR § 916.3(a), General Limitations Near watercourses, per Inspection Report #20, has been corrected and mitigation measures have proposed by the RPF as a minor amendment.

NOTE.
Page 17 of the THP states that the RPF will consult with CDF for the planting of Big leaf maple and/or other riparian hardwoods for additional shade canopy along Fritch Creek. For the corrective action toward the aforementioned violation per Inspection Report #20, Big Maple was referenced per the plan in order to provide additional stabilization for exposed soil in the WLPZ. The RPF proposes to plant redwood, which will be adequate.

CURRENT CONDITIONS:
Cable operations are complete and the LTO was removing the Yarder from the plan area on this inspection date.

Lopping operations are running concurrent with the remaining harvest operations on the plan.

Thomas Sandelin
SIGNATURE

Thomas Sandelin, RPF #2442
Forest Practice Inspector
San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2
Felton, CA 95018
(831) 335-6742

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ATTACHMENT 7 ATTACHMENT A

STATE OF CALIFORNIA - THE RESOURCES AGENCY PETE WILSON, Governor
DEPARTMENT OF FORESTRY AND FIRE PROTECTION
San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2 6059 Highway 9
Felton, CA 95018
(831) 335-6740

Section 4604 of the Public Resources Code (PRC) requires the department to inspect timber operations for compliance with the forest Practice Act and rules of the Board of Forestry.

August 5, 1998

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<<<<NOTICE OF VIOLATION OF FOREST PRACTICE LAWS»»»
For Harvest Document: 1-96-247-SCR5

Violations may be cause for prosecution as a misdemeanor (Public Resources Code § 4601), action against a Timber Operator License (PRC §§ 4573 and 4576), injunction action (PRC §§ 4605 and 4606), or a combination of the foregoing actions. The following letter details code sections violated, mitigations required and date by which all work must be completed. Mitigation(s) of violation(s) is required.

Violator:	**ED SHIELDS**
Inspection Number:	**20**
Inspection Date:	**July 30, 1998**
Person Contacted:	**SHIELDS / HOLMGREN**

LANDS OF EEL RIVER SAWMILLS, Et Al.

VIOLATION 14 CCR § 916.3(a) GENERAL LIMITATIONS NEAR WATERCOURSES:

The LTO failed to stop cable activities when there is a reasonable expectation that slash, debris, soil or other material resulting from timber operations, falling or associated activities will be deposited in Class I or Class II waters below the watercourse transition line. The LTO failed to defer those harvest activities until equipment is available for its removal, or another procedure, and schedule for completion of work is approved by the Director.

Side hill yarding across a Class II portion of Fritch Creek resulted in soil being displaced into the watercourse below the watercourse transition line. The stream bank was disturbed in a manner that will continue to contribute additional soil over an extended period of time.

CORRECTIVE ACTION:

1. The LTO shall comply with § 916.3(a) for subsequent yarder corridors.
2. The RPF shall provide advice, per 14 CCR § 926.1, to assure that the plan requirements to stabilize exposed soil exceeding 100 square feet within the WLPZ, and to plant maple.

ATTACHMENT 7 A

NOTE:

On 23 July 1998 (Inspection #19), N. Drinkard and T. Sandelin determined that Region Office needed to be contacted concerning cable operations within the Fritch Creek WLPZ.

On 7 July 1998 (Inspection #13), CDF, CRWQCB, CDFG and the RPF proposed additional erosion control measures for a corridor located upstream from the aforementioned violation corridor, as a result of exposed soil due to lack of deflection and large log piece size. CDF verbally warned the LTO not to bare soil on another corridor.

According to the previous RPF, John Andersen, the LTO was cautioned not to yard tree length logs. A successor RPF was named because Andersen felt that he could not effectively convey his concerns, observations and directions to the LTO. Excessive log size and/or length probably contributed to the current violation,

According to Larry Holmgren, the Plan Submitter's representative, there may have been an alternative location for corridor placement that may have caused less damage.

SIGNATURE

Thomas Sandelin, RPF #2442
Forest Practice Inspector
San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2
Felton, CA 95018
(831) 335-6742

cc: CAO, Unit file

NOTE:
Nancy Drinkard, CDF Felton, and Rodger Thompson, CDF Santa Rosa, attended this inspection.

ATTACHMENT 7 ATTACHMENT A

STATE OF CALIFORNIA - THE RESOURCES AGENCY PETE WILSON, Governor
DEPARTMENT OF FORESTRY AND FIRE PROTECTION
San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2 6059 Highway 9
Felton, CA 95018
(831) 335-6740

Section 460-l of the Public Resources Code (PRC) requires the department to inspect timber operations for compliance with the forest Practice Act and rules of the Board of Forest?.

August 5, 1998

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NOTICE OF INSPECTION

Harvest Document: 1-96-247-SCR5
Inspection Date: JULY 23, 1998
Inspection Number: 19
Person Contacted: SHIELDS / HOLMGREN

LANDS OF EEL RIVER SAWMILLS, ET AL.

No violations were observed within the areas inspected.

The purpose of this inspection was to investigate corridor placement and yarding activities associated with the WLPZ of the Class II portion of Fritch Creek. Nancy Drinkard, CDF, attended this inspection.

WARNING 14 CCR § 914.3(a) Cable Yarding

The LTO failed to exercise due diligence so that residual trees would not incur unreasonable damage. A number of residual trees are damaged just below Landing L3, and soil is exposed throughout an approximate half-acre area.

CORRECTIVEACTION

1. No damaged redwood trees shall be harvested.
2. In addition, the Plan Submitter's representative, Larry Holmgren, said that tree planting will occur below the landing. The RPF shall provide a minor amendment with a reforestation plan to be completed the first available planting season after the completion of timber harvesting.

CURRENT CONDITIONS

NOTE: CDF Inspectors Nancy Drinkard and Tom Sandelin met with the LTO to discuss corridor placement from Landing L3. The LTO, Ed Shields, and Larry Holmgren explained that with the removal of the Uhrdahl portion of the harvest area, there were three yarder locations removed from the plan, In addition, tailhold trees were already pre-selected and yarder operations could no longer occur perpendicular to Fritch Creek.

CONCERN: Corridor spacing appears too close and inadequate deflection has resulted in exposed soil within the WLPZ. Exposed soil will be mitigated per a minor amendment to be provided by the RPF. CRWQCB and DFG concurred with the installation of erosion control fabric (refer to Inspection Reports #13 and #14), however, an additional corridor has a significant amount of soil exposed within the WLPZ and immediately adjacent to the watercourse. Region Office will be contacted for direction on appropriate action.

Thomas Sandelin
SIGNATURE

Thomas Sandelin, RPF #2442
Forest Practice Inspector
San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2 Felton, CA 95018
(831) 335-6742

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MENDOCINO

ATTACHMENT 7

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STATE OF CALIFORNIA - THE RESOURCES AGENCY PETE WILSON, Governor

DEPARTMENT OF FORESTRY AND FIRE PROTECTION

San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2 6059 Highway 9
Felton, CA 95018
(831)335-6740

Section 4604 of the Public Resources Code (PRC) requires the department to inspect timber operations for compliance with the forest Practice Act and rules of the Board of Forestry.

May 22, 1998

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NOTICE OF INSPECTION

Harvest Document: 1-96-247-SCR5
Inspection Date: JULY 15, 1998
Inspection Number: 17
Person Contacted: **REFER TO NARRATIVE**

LANDS OF EEL RIVER SAWMILLS, ET AL.

No violations were observed within the areas inspected.

The purpose of this inspection was to have a new pre-operational meeting to convery the contents of the THP and subsequent amenments to the successor RPF, per 14 CCR § 926.1 and § 1035.2. Larry Holmgren of Eel River Sawmills, LTO Ed Shields, former RPF John Andersen, successor RPF Chris Hipkin, and Tom Sandelin of CDF were in attendance.

NOTE:
Telephone complaints have been made to CDF concerning log hauling in the predawn hours. The LTO indicated that this allows the log trucks to avoid the rush hour traffic through Santa Cruz County and the Bay Area, and provides the opportunity to do two round trips per log truck. This will shorten the amount of time it takes to complete the THP. CDF has informed concerned parties that there is no provision within the plan or rules restricting the hauling **hours** during Monday through Friday (non-holidays].

The LTO has cut the approximate half dozen stumps flagged by the RPF [and CDF) that did not meet the maximum height requirments of the THP.

The LTO was given verbal permission by COF to cross fall two approximate 14-inch DBH Douglas fir trees located within a corridor across the Class II portion of Fritch Creek, in the vicinity of Landing L10. This practice will enable the trees to be yarded without the risk of debris entering the watercourse and provides better watercourse and WLPZ protection than the standard rule.

Thomas Sandelin
SIGNATURE

Thomas Sandelin, RPF #2442
Forest Practice Inspector
San Mateo -Santa Cruz Ranger Unit
P.O. Drawer F2
Felton, CA 95018
(831) 335-6742

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ATTACHMENT A

STATE OF CALIFORNIA - THE RESOURCES AGENCY ATTACHMENT 7 PETE WILSON, *Governor*

DEPARTMENT OF FORESTRY AND FIRE PROTECTION

San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2 6059 Highway 9
Felton, CA 95018
(831) 335-6740

Section 4604 of the Public Resources Code (PRC) requires the department to inspect timber operations for compliance with the forest Practice Act and rules of the Board of Forestry.

July 22, 1998

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NOTICE OF INSPECTION

Harvest Document: 1-96-247-SCR5
Inspection Date: JULY 16, 1998
Inspection Number: 18
Person Contacted: SHIELDS

LANDS OF EEL RIVER SAWMILLS, ET AL.

NO VIOLATIONS WERE OBSERVED WITHIN THE AREAS INSPECTED.

THE PURPOSE OF THIS INSPECTION WAS TO INVESTIGATE THE SWAIN DOMESTIC WATER UPTAKE. ACCORDING TO ARDEEN SWAIN, SHE DISCOVERED THAT HER INTAKE WAS DAMAGED BY THE LTO. SWAIN INDICATED THAT RPF JOHN ANDERSEN AND THE LTO ED SHIELDS KNEW OF THE EARLIER DAMAGE AND HAD REPAIRED THE PLASTIC PIPE AND ELECTRICAL WIRES BUT, ACCORDING TO HER ELECTRICIAN, HAD NEGLECTED TO PRIME THE PUMP. THE LTO INDICATED THAT THE ELECTRICAL WIRING IS BENT BECAUSE A NEW PART IS NECESSARY TO INSTALL CORRECTLY. THE LTO WILL PROVIDE THIS PART AND FINISH THE REPAIR. THE DEBRIS LOCATED IN THE WATERCOURSE IS NOT A RESULT OF TIMBER HARVESTING AND RELATED ACTIVITIES, HOWEVER, THE LTO INDICATED THAT THIS WILL BE REMOVED WITH AN EXCAVATOR. CDF OBSERVED THIS DEBRIS PRIOR TO THE START OF HARVESTING ACTIVITIES.

Thomas Sandelin
SIGNATURE

Thomas Sandelin, RPF if2442
Forest Practice Inspector
San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2
Felton, CA 95018
(831) 3356742

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ATTACHMENT 7

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CURRENT CONDITIONS:

The purpose of this inspection was to have California Regional Water Quality Control Board and California Department of Fish and Game representatives visit the plan area to evaluate operations within the WLPZ. J. Andersen (RPF), J. Nelson (DFG), H. Kolb and B. Arkfeld (CRWQCB) attended this inspection.

It was determined that the treatment for bared soil within the WLPZ proposed in the plan may not be suitable for the damaged cable corridor along the property line (refer to Inspection Report #13).

The RPF will submit a minor amendment addressing mitigation measures, discussed in the field, for erosion control of bared soil at this corridor. In brief, seeding will be done after the first fall rains and an appropriate erosion control fabric will be anchored over the seeded bare soil within the WLPZ.

Thomas Sandelin

SIGNATURE

Thomas Sandelin, RPF #2442
Forest Practice Inspector
San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2
Felton, CA 95018
(83 1) 335-6742

cc: CAO, Unit file

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ATTACHMENT 7 ATTACHMENT A

STATE OF CALIFORNIA - THE RESOURCES AGENCY PETE WILSON, Governor

DEPARTMENT OF FORESTRY AND FIRE PROTECTION,
San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2 6059 Highway 9
Felton, CA 95018
(831) 335-6740

Section 4604 of the Public Resources Code (PRC) requires the department to inspect timber operations for compliance with the forest Practice Act and rules of the Board of Forestry.

July 14, 1998

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««NOTICE OF VIOLATION OF FOREST PRACTICE LAWS»»

For Harvest Document: 1-96-247-SCR5

Violations may be cause for prosecution as a misdemeanor (Public Resources Code § 4601), action against a Timber Operator License (PRC §§ 4573 and 4576), injunction action (PRC §§ 4605 and 4606), or a combination of the foregoing actions. The following letter details code sections violated, mitigations required and date by which all work must be completed. Mitigation(s) of violation(s) is required.

Violator:	**ED SHIELDS**
Inspection Number:	**14**
Inspection Date:	**July 9, 1998**
Person Contacted:	**SHIELDS**

LANDS OF EEL EIVER SAWMILLS, Et Al.

VIOLATION: 14 CCR § 923.4(h) ROAD MAINTENANCE
The LTO failed to treat the road running surface during timber operations in the logging area, as necessary to prevent the excessive loss of road surface materials.

CORRECTIVE ACTION:
The LTO indicated that he will water the road.

NOTE:
The LTO and RPF were told that the road within the harvest area and adjacent to Fritch Creek, through Crossing C5, continuing uphill needs to be watered (see Inspection Report #13). Fine soil is at an average depth approaching four to six inches, and it is necessary to engage the four-wheel drive in order to climb the steep portions of the road, due to lack of traction. The RPF indicated that the LTO would water the road on 7 July 1998, however, the road has not been watered. The RPF indicated that the LTO failed to meet the water truck at the Love Creek slide, as prearranged. The LTO indicated that he felt it was the RPF's responsiblity to see that the water truck is available at the logging site.

FOREST PRACTICE INSPECTION REPOR
LE-3 (2/96)

ATTACHMENT 7 A

CALIFORNIA DEPARTMENT OF FORESTRY

Timber Harvesting Plan No.	Inspection Hours
1-96-247 SCR	3
Person Contacted	Inspection Date/Report Date
ANDERSEN, SHIELDS	06/22/98
Title	Inspection No.
RPF, LTO	12

Forest District	Subdistrict
COAST	SOUTHERN

Timber Owner / Timberland Owner / Plan Submitter	Timber Owner / Timberland Owner / Plan Submitter
EEL RIVER SAWMILLS	GARY URDAHL
Mailing Address [redacted]	Mailing Address P.O. BOX 354
City FORTUNA / State CA / Zip 95076	City CAPELLA / State CA / Zip 95418
Timber Owner / Timberland Owner / Plan Submitter LAWRENCE RATTO	Licensed Timber Operator ED SHIELDS / License No. A-9108
Mailing Address 4219 BLACKBERRY LANE	Mailing Address 291 DICK SMITH RD.
City SOMIS / State CA / Zip 93066	City FORTUNA / State CA / Zip 95540
Licensed Timber Operator / License No.	Registered Professional Forester ROY WEBSTER & ASSOCIATES / License No. 1765
Mailing Address	Mailing Address 512 CAPITOLA AVE., SUITE 201
City / State / Zip	City CAPITOLA / State CA / Zip 95010
Status of Operation ACTIVE	THP Expiration 12/19/99

NOTICE

TIMBER OPERATORS, TIME OWNERS, AND TIMBERLAND OWNERS ARE JOINTLY AND SEVERALLY RESPONSIBLE FOR CORRECTING VIOLATIONS OF FOREST LAWS AND REGULATIONS REQUIRED FOR TIMBER OPERATIONS.

IF VIOLATIONS WERE OBSERVED ON THIS TIMBER OPERATION, THEY ARE SHOWN BELOW BY CODE SECTION AND SPECIFIC DESCRIPTION AND CORRECTIONS ACTION IS REQUIRED.

CDF Headquarters address for further information:
California Department of Forestry and Fire Protection
San Mateo-Santa Cruz Ranger Unit
P.O. Drawer F-2
Felton, Ca. 95018-0316

SPECIFIC DESCRIPTION OR COMMENTS

LANDS OF EEL RIVER SAWMILLS, Et Al.

No violations were observed within the areas inspected.

The violation per Inspection # 11 (LTO Responsibilities, 14 CCR § 1035.3) was corrected.

Cable blocks were installed with proper fire clearance and tools, per 14 CCR § 9 18.10. The LTO has contracted a water truck for the dirt portion of the haul road, per § 923.4(h).

Log hauling is occurring with an average of five to seven loads per. day in accordance with § 926.10. CDF received a telephone call that log trucks were observed. According to the LTO, empty log trucks are on site and log hauling does not occur on weekends, however, log hauling started early Monday morning on 06/22/98 to avoid commuter traffic.

Thomas Sandelin
Forest Practice Inspector - RPF #2442

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Thomas Sandelin
Signature

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ATTACHMENT 7

ATTACHMENT A

STATE OF CALIFORNIA - THE RESOURCES AGENCY PETE WILSON, Governor

DEPARTMENT OF FORESTRY AND FIRE PROTECTION

San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2 6059 Highway 9
Felton, CA 950 18
(831) 335-6740

Section 4604 of the Public Resources Code (PRC) requires the department to inspect timber operations for compliance with the forest Practice Act and rules of the Board of Forestry.

July 14, 1998

CDF FILE COPY
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, CA

NOTICE OF INSPECTION

Harvest Document: 1-96-247-SCR5
Inspection Date: JULY 7, 1998
Inspection Number: 13
Person Contacted: SHIELDS

LANDS OF EEL RIVER SAWMILLS'

No violations were observed within the areas inspected.

The LTO and RPF were told that the road within the harvest area and adjacent to Fritch Creek, through Crossing C5, continuing uphill, needs to be watered. Fine soil is at an average depth approaching four to six inches, and it is necessary to engage the four-wheel drive in order to climb the steep portions of the road, due to lack of traction. The RPF indicated that the LTO will water the road on the evening of 7 July 1998.

A minor amount of WLPZ damage (displaced soil] was observed within a cable corridor adjacent to the property line. The RPF stated that this was primarily due to the large log piece size (primarily length). CDF observed tree length logs (70 to 90 feet) being yarded ***on*** an adjacent corridor with full suspension. The LTO indicated that the damage observed had more to do with large diameter short logs rather than the length of the log, and that the more desirable landing location was unavailable (a portion of the plan is not being operated upon). The LTO stated that there would be suitable lift on subsequent corridors. CDF cautioned the LTO not to damage another corridor,

NOTE:
Representatives from California Regional Water Quality Control Board and California Department of Fish and Game will be visiting the plan area on Thursday, 9 July 1998 to evaluate operations within the WLPZ.

A

Thomas Sandelin
SIGNATURE

Thomas Sandelin, RPF #2442
Forest Practice Inspector
San Mateo - Santa Cruz Ranger Unit
P.O. Drawer F2
Felton, CA 95018
(831) 335-6742

61

90

LANDS OF EEL RIVER SAWMILLS, Et Al.

The purpose of this inspection was to check review a proposed amendment to change tractor operations to cable operations. Cable operations, as proposed, are recommended for approval as a major/minor amendment for the tractor unit above Crossing C5.

VIOLATION 14 CCR 1035.3 Licensed Timber Operator Responsibilities

The LTO failed to instruct timber fallers to cut only marked harvest trees in accordance with Item #14c of the THP. During Field Inspections #7, #9 and #10, CDF observed that a number of unmarked trees were being traded because the fallers were having trouble directionally falling trees away from the WLPZ and were hanging up trees. The RPF indicated that he had instructed the LTO on numerous occasions that tree trading needed to be authorized. by the RPF. CDF cautioned the RPF to make sure that stocking was not adversely affected by the LTO removing extra high quality trees and leaving smaller diameter trees in trade. Stocking does not appear to be an issue, however, there appears to be larger diameter unmarked trees being harvested in lieu of marked trees of poorer form and underdeveloped crowns.

CORRECTIVE WORK

The LTO shall only harvest marked trees.

OTHER OBSERVATIONS

Cable and tractor operations were underway. The third completed corridor across Fritch Creek was inspected by CDF. Cable block clearance at the tailhold barely met the standards of 14 CCR § 918.10. The LTO was instructed that the clearance must meet at least fifteen (15) feet. WLPZ canopy, per § 9 16.5, and corridor width were adequate. Stocking and cutting, per § 9 13.8, was met upon completion of operations.

STATE OF CALIFORNIA - THE P ..OURCES AGENCY PETE WILSON, Governor
DEPARTMENT OF FORESTRY AND FIRE PROTECTION
San Mateo / Santa Cruz Ranger Unit'
P.O. Drawer F-2
6059 Highway Nine
Felton, CA 95018
(408) 335-6740

Section 4604 of the Public Resources Code (PRC) requires the department to inspect timber operations for compliance with the forest Practice Act and rules of the Board of Forestry.

June 5, 1998

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««NOTICE OF VIOLATION OF FOREST PRACTICE LAWS»»

For Harvest Document: 1-96-247-SCR5

Violations may be cause for prosecution as a misdemeanor (Public Resources Code §4601), action against a Timber Operator License (PRC § 4573 and 4576), Injunction action (PRC § 4605 and 4606). or a combination of the foregoing actions. The following letter details code sections violated, mitigations required and date by which all work must be completed. Mitigation(s) of violation(s) is required.

Violator:	**ED SHIELDS**
Inspection #:	9
Inspection Date:	***June 3, 1998***
Person Contacted:	**ANDERSEN** / HOLMGREN

LANDS OF EEL RIVER SAWMILLS, Et Al.

The corrective work to be completed by 13 June 1998, per inspection Reports # 6 and #8, for **WLPZ** limitations has been corrected.

VIOLATION 14 CCR 916.3(a)

The LTO failed to instruct timber fallers to wait to fall trees when there is a reasonable expectation that slash, debris, soil or other material resulting from timber operations, falling or associated activities, will be deposited in Class I and II waters below the watercourse and lake transition line, those harvest activities shall be deferred until equipment is available for removal.

According to the tree fallers on site, there are a number of trees that get ***hung*** up in unmarked trees when an attempt is made to directionally fell trees away from the watercourse. Tree trading is necessary and treejacking ***would*** be desirable, assisted **by** cable pulling. Larry Holmgren (Eel River Sawmills), John Andersen (RPF) and Tom Sandelin (CDF) observed the following in an approximate 225-foot section of Fritch Creek::

1. An unmarked 24-inch diameter redwood tree was cut and fell ***over*** backward, bridging the Class II watercourse. No soil was deposited into the water and water flow was unimpeded.

STATE OF CALIFORNIA - THE RESOURCES AGENCY ATTACHMENT 7 PETE WILSON, Governor

DEPARTMENT OF FORESTRY AND FIRE PROTECTION

San Mateo / Santa Cruz Ranger Unit
P.O. Drawer F-2
6059 Highway Nine
Felton, CA 95018
(408) 335-6740

Section 4604 of the Public Resources Code (PRC) requires the department to inspect timber operations for compliance with the forest Practice Act and rules of the Board of Forestry.

May 26, 1998

CDF FILE COPY
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, CA

««NOTICE OF VIOLATION OF FOREST PRACTICE LAWS»»
For Harvest Document: 1-96-247-SCR5

Violations may be cause for prosecution as a misdemeanor (Public Resources Code §4601), action against a Timber Operator License (PRC § 4573 and 4576), injunction action (PRC § 4605 and 4606), or a combination of the foregoing actions. The following letter details code sections violated, mitigations required and date by which all work must be completed. Mitigation(s) of violation(s) is required.

Violator:	**ED SHIELDS**
inspection #:	**6**
Inspection Date:	May 73, 1998
Person Contacted:	**ANDERSEN / HOLMGREN**

LANDS OF EEL RIVER SAWMILLS, Et Al.

Note:
Rodger** Thompson, CDF, **accompanied** t. Sandelin **on this inspection.

The purpose of this inspection was to check the recent letters sent to CDF by the RPF indicating the ***operations along*** Fritch Creek that are not the responsibility of the LJO (refer to Inspection Report #4, ref: Williams Tree Service and Jennifer ***Nelson,*** Department of Fish and Game]. The RPF indicated that a "Matt Bean" was the individual that was salvaging fogs within the Fritch Creek WLPZ outside the plan area. This was the individual confronted by ***Jennifer*** Nelson, DFG. A letter will be sent to Matt Bean from CDF Felton, indicating the need for Forest Practice Rules compliance..

VIOLATION
14 CCR 4 9 1 6.3(c) General Limitations Near Watercourses

The LTO decked approximately two loads of logs within the WLPZ of the Class II portion of Fritch Creek in the vicinity of the Orchard. Heavy equipment was used to skid and stack logs ***in*** the WLPZ. An area approximating 25 feet in width ***from*** the WLPZ flagging (i.e. operations occurred within 50 to 75 feet of the Class II watercourse) and 80 feet in length. Disturbance was minimal with logs stacked on existing vegetation and no environmental damage was observed. There is a berm between the disturbed area and the break in slope leading to the Class II watercourse. ***The*** RPF indicated that the LTO was instructed to ***cease*** operations in this area and to remove the decked logs as soon as the weather was dry. Operations occurred in a non-approved WLPZ landing.

ATTACHMENT 7

ATTACHMENT 1

STATE OF CALIFORNIA - THE RESOURCES AGENCY PETE WILSON, Governor

DEPARTMENT OF FORESTRY AND FIRE PROTECTION

San Mateo / Santa Cruz Ranger Unit
P.O. Drawer F-2
6059 Highway Nine
Felton, CA 95018
(408) 335-6740

Section 4604 of the Public Resources Code (PRC) requires the department to inspect timber operationsfor compliance with the forest Practice Act and rules of the Board of Forestry.

May 26, 1998

CDF FILE COPY
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, CA

««NOTICE OF VIOLATION OF FOREST PRACTICE LAWS»»

For Harvest Document: 1-96-247-SCR5

Violations may be cause'for prosecution as a misdemeanor (Public Resources Code §4601), action against a Timber Operator License (PRC § 4573 and 4576), injunction action (PRC § 4605 and 4606), or a combination of the foregoing actions. The following letter details code sections violated,mitigations required and date by which all work must be completed. Mitigation(s) of violation(s) is required.

Violator:	**ED SHIELDS**
Inspection #:	7
Inspection Date:	May 22, 1998
Person Contacted:	ANDERSEN / SHIELDS

LANDS OF EEL RIVER SAWMILLS. Et.Al.

Note:
Steven Hollett, CDF, accompnaied T. Sandelin on this inspection.

The purpose of this inspection was to determine the corrective work for the violation in Inspection Report #6. The LTO redecked the logs on the edge of the WLPZ to the Class II portion of Fritch Creek at the Orchard.

VIOLATION
14 CCR 914.1(a) Felling Practices

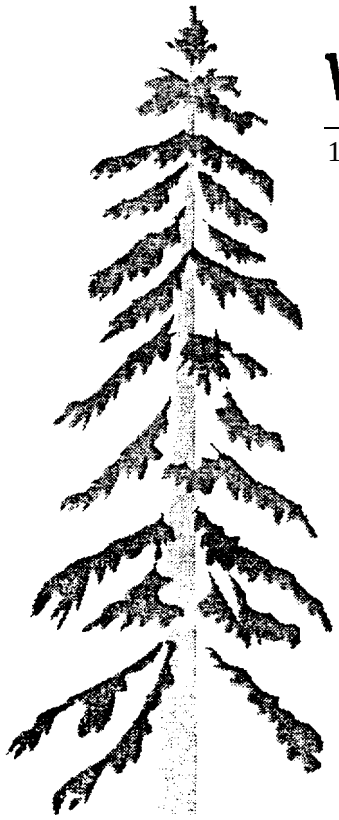
The LTO failed to instruct his fallers to fell trees in a direction away from the watercourse. Trees near the outside of the WLPZ were being felled into the WLPZ. The LTO's faller lost control of a large Douglas fir, located outside the WLPZ to the Class II portion of Fritch Creek, causing the top to fall within the water. The top was removed immediately.

CORRECTIVE ACTION

The LTO discuss with employees the need to fall away from the watercourse for trees within the WLPZ and to fell trees in a manner outside the WLPZ as to not affect the WLPZ.

The violations for this inspection and Inspection Report #6 were discussed with the LTO, Ed Shields, on site.

ATTACHMENT 7 ATTACHMENT A 1



Webster and Associates PROFESSIONAL FORESTERS

132 **Rancho** Del Mar . Aptos, California 95003 . Phone 408-688-8787 . Fax 408-688-3001

Roy Webster
RPF#1765

John Andersen
RPF #2503

Matt Bissell
Associate Forester

David P&e
Associate Forester

John Finhy
Associate Forester

Karen Palmer
Office Manager

August 8, 1996

California Department of Forestry and Fire Protection
Attn: Resource Manager
P.O. Box 670
Santa Rosa, CA 954020670

Re: THP I-96-247 SCR; Lands of Eel River Sawmills/Koppala, Urdahl, and Ratto

Dear Resource Manager:

For the above referenced Timber Harvest Plan, I am submitting this letter to clarify three issues which were raised at the review team meetings in Felton and were not addressed clearly enough in the original THP. The three issues are:

1) RPF signature on revised page three, revised 7-20-96.
2) Profiles of potential cable corridors and discussion of expected ground clearance within the riparian zone,
3) Water source for road watering.

#1) RPF signature on p.3

A revised page 3 is attached with the RPF signature.

#2) Cable Corridor Profiles

During the first Pre-harvest inspection on June 26, 1996, Tom Spittler of the Department of Mines and Geology recommended that some representative profiles of possible cable corridors be developed off of the topographic maps to evaluate the potential for areas of inadequate ground clearance over Fritch Creek, the main drainage bisecting the property.

Included here are sketches of eight probable corridors, from five different landings where cable operations are proposed. In consulting with an LTO who is interested in doing the harvest, I was able to ascertain that given site conditions, a mid-span deflection of approximately 10 percent of total horizontal span could feasibly be achieved. Given these constraints, I have visually estimated the probable ground clearance over Fritch Creek for the eight corridors on the profile sketches. For all but two of the corridors, it appears that at least 100 feet of clearance can be achieved over Fritch Creek.

For two of the corridors (#1 and #8), clearance over Fritch Creek is less; -50 feet and -60 feet respectively. For these two corridors, several options exist to insure that logs will be fully suspended over Fritch Creek. The LTO could

Full suspension of logs over class I + II portions of Fritch Creek (all) is required.

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climb a tree to elevate his tailhold, use intermediate supports, or simply lighten the weight carried on each turn of logs so the logs will achieve full suspension over Fritch Creek.

In the event that any of the corridors result in a significant disturbance to riparian vegetation or bare disturbed soils near Fritch Creek, mitigations are already included in the THP which should prevent significant adverse impacts from either of those situations.

On page 5 of the THP (revised 7-20-9 6),the following mitigation measure is proposed to protect bare soil areas.

> In order to comply with the California Department of Fish and Game's new Baseline Conservation Measures for the protection of Coho salmon south of the San Francisco Bay, if areas of bare soil greater than 100 square feet occur within any WLPZ, or if any other areas occur where the RPF and CDF agree that sediment could be transported to a watercourse in amounts which could be deleterious to the beneficial uses of water, then these areas will be mulched with straw or available slash at the close of operations, or prior to the winter period, whichever comes first. Straw mulch will be applied at the rate of one bale per 400 sq. ft., with at least 90% coverage of bare ground. This rate is equivalent to a 3 inch depth of straw over 400 sq. ft. Slash will be tractor packed, if tractor access is possible. Otherwise, slash will be hand spread. In either case, slash mulch will achieve a minimum of 90% coverage of bare ground.

On page 17 of the THP (revised 7-20-96), the following mitigation is proposed to prevent adverse impacts to water temperature in corridors where riparian vegetation is significantly reduced after operations:

> We anticipate full suspension of logs cable yarded across Fritch Creek. In the event that, due to low deflection. vegetation providing direct shade canopy to Fritch Creek is damaged or removed within any of the cable corridors. these areas will be treated to restore shade canopy. Upon the completion of the cable yarding operation, an inspection of residual streamside vegetation will be conducted with CDF and the RPF. If there are areas where CDF and the RPF agree that streamside vegetation directly shading Fritch Creek has been decreased to levels which would cause increases in stream temperature which might adversely affect coho salmon or other aquatic species, big leaf maples or other riparian hardwoods will be planted directly adjacent to the stream to increase shade canopy.

#3) Water Source **for Watering of Roads**

Because of concerns for domestic water supplies, and water temperature affects to coho salmon, questions have been raised regarding the effects of lowering water levels by drawing water daily from Fritch Creek to water roads during low summer flows. Consultation with Jennifer Nelson of the Department of Fish and Game resulted in the following two options, either of which Mrs. Nelson agreed would be acceptable given the concerns mentioned above.

1) The first and preferred option would involve setting up a storage system which could be filled using a low flow source. The low flow source would be designed to flow only enough to meet the daily watering demands by refilling roughly every twenty four hours. There are several storage tanks on the property not currently being used which would be adequate for such a system. The low flow source could come from the main body of Fritch Creek **or one of the** class III tributaries which appear to have sub-surface summer flows, based on the presence of springs well upslope of Fritch Creek. Jennifer Nelson did not feel that drawing water in this manner would adversely affect flows with respect to fisheries concerns. If this option is used and flow levels in Fritch Creek are decreased to the point where downstream water uptakes are unable to draw water, then option 2 will be implemented.

2) Option two would involve simply establishing an account with the San Lorento Valley **Water** District and filling water trucks at their filling station in Boulder Creek.

ATTACHMENT 7

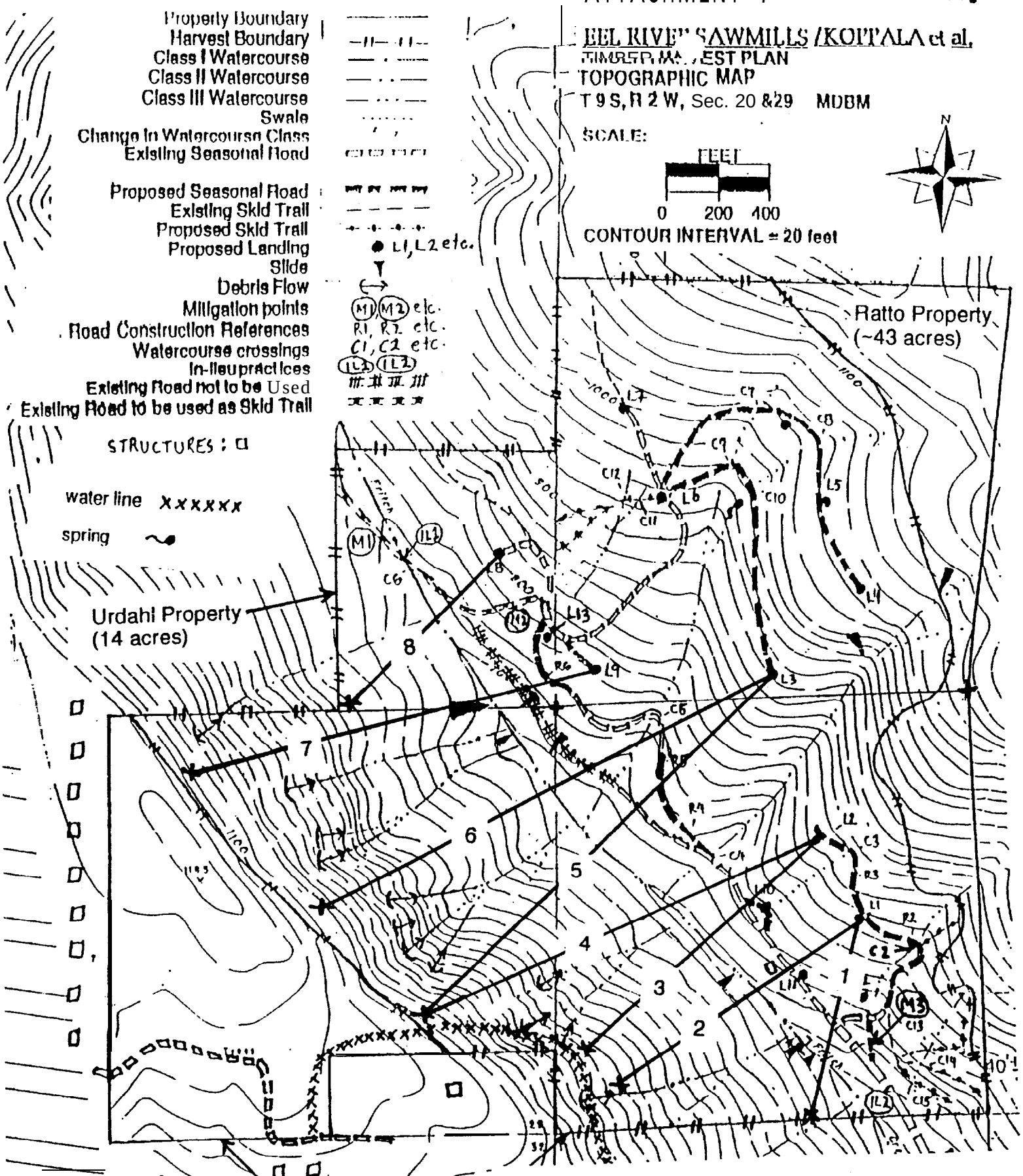
If you have any questions regarding any of this information, please contact me at this office.

Thank you for your time.

Sincerely,

Roy Webster

Roy Webster, RPF #1765



POSSIBLE CABLE CORRIDORS PROFILE MAP

profile #1-8 —— 1 ——
possible tailhold X

revised 8-12-96

1 / 1 / 98

ATTACHMENT A

ATTACHMENT 7

FRITCH CREEK THP: POSSIBLE YARDING CORRIDOR PROFILE # 1

1" = 200'

1" = 100'

TOTAL SPAN = ~ 660'

10% DEFLECTION MID-SPAN

ATTACHMENT 7

FRITCH CREEK THP: Possible YARDING CORRIDOR Profile # 2

TOTAL SPAN = ~ 890

10% DEFLECTION

m.10 - SPAN

1" = 200'

1" = 100'

001

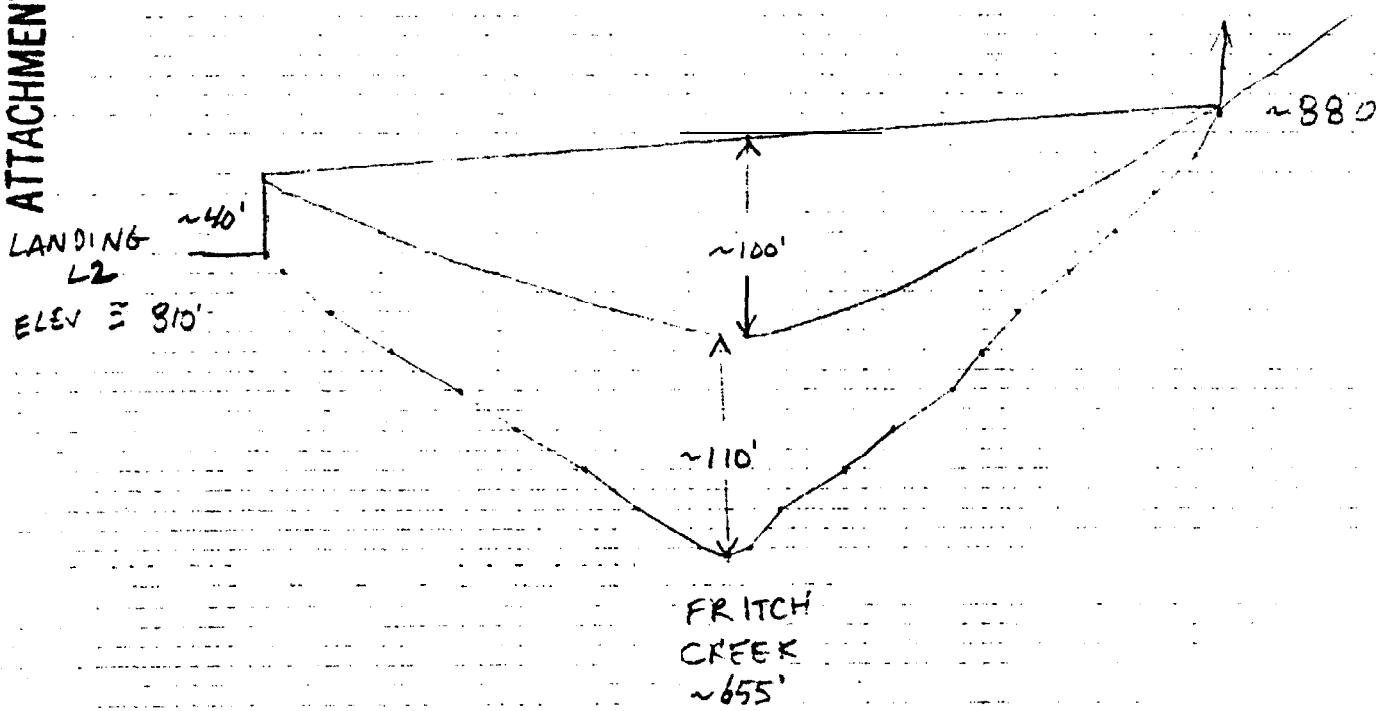
FRITCH CREEK THP: POSSIBLE YARDING CORRIDOR PROFILE #3

TOTAL SPAN = ~990

10% DEFLECTION MID-SPAN

1" = 200'

1" = 100'



FRITCH CREEK THP: Possible YARDING

CORRIDOR PROFILE # 4

TOTAL SPAN = ~ 1280'

10% DEFLECTION

MID-SPAN

~1030'

~130'

~150'

FRITCH CREEK ~555

LANDING 2 ELEV ≈ 810'

~40'

1" = 200'

1" = 100'

ATTACHMENT 4

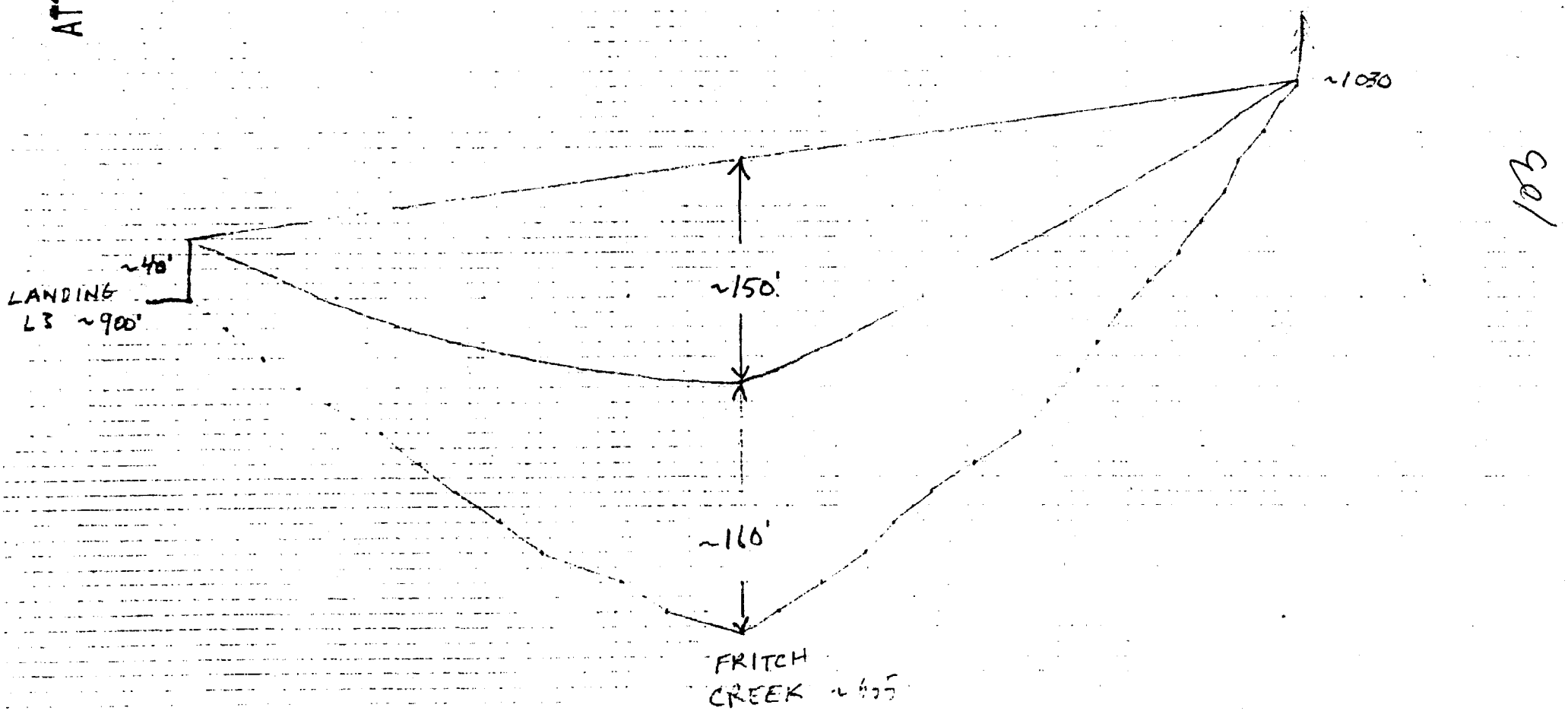
FRITCH CREEK THP: POSSIBLE YARDING CORRIDOR PROFILE #5

TOTAL SPAN = ~1510

1" = 200'

1" = 100'

10% DEFLECTION MID-SPAN



ATTACHMENT 7

ATTACHMENT 7 ATTACHMENT A

FRITCH CREEK THP: POSSIBLE YARDING

1" = 200'

CORRIDOR PROFILE # 6

1" = 100'

TOTAL SPAN = ~ 1570

10% DEFLECTION

MID-SPAN

ATTACHMENT 4

ATTACHMENT 7

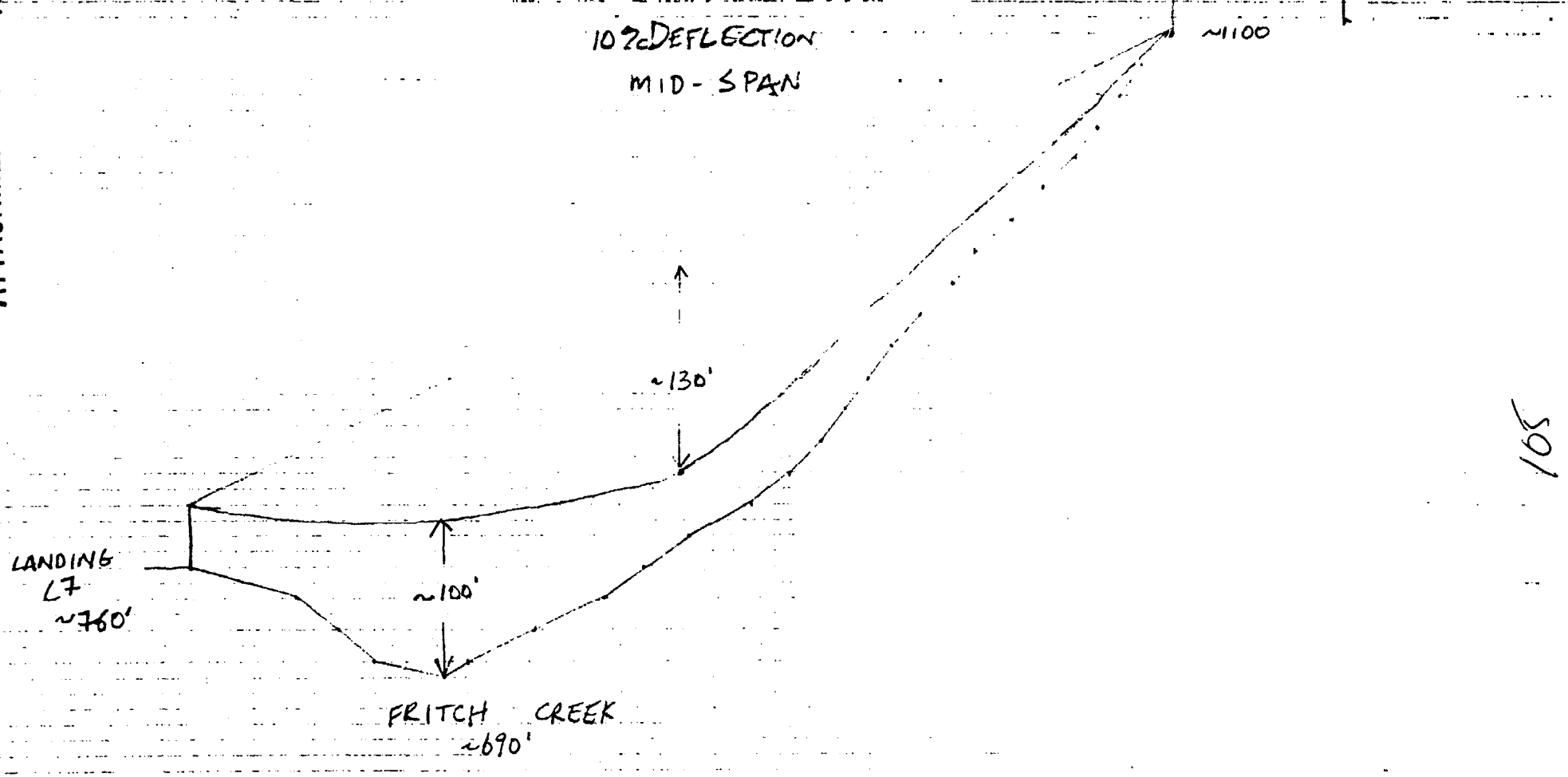
61

FRITCH CREEK THP: POSSIBLE YARDING CORRIDOR PROFILE #7

TOTAL SPAN = ~1280

1" = 200'

1" = 100'



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ATTACHMENT 7 ATTACHMENT C

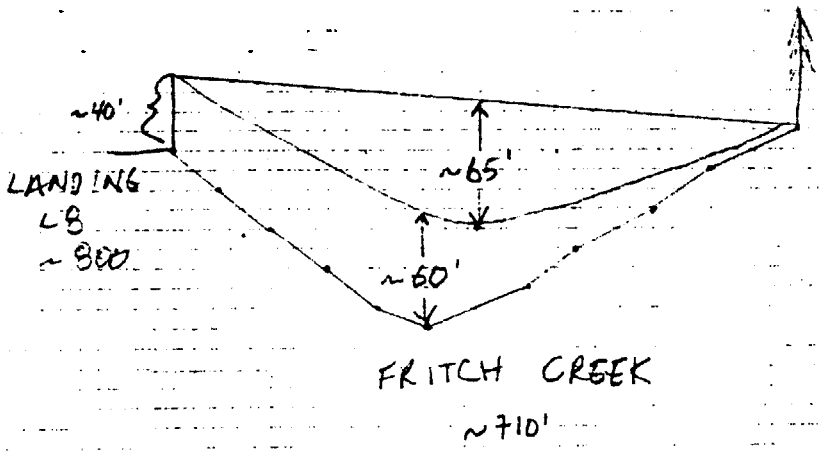
FRITCH CREEK THP: POSSIBLE YARDING CORRIDOR PROFILE # 8

TOTAL SPAN = ~ 650

1" = 200'

1" = 100'

10% DEFLECTION MID-SPAN



ATTACHMENT 7 ATTACHMENT A

AMENDMENT NO. 12 (major)

Statewide Forestry Services
607 Polrier Street
Oakland CA 94609-1226

(510) 654-6310

Date: 3 August 1998

From: Christopher Hipkin, Forester

To: Thomas P. Osipowich, Deputy Chief for Forest Practice
CDF Coast Area Office, Resource Management
P.O. Box 670
Santa Rosa CA 95402-0670

RECEIVED
AUG 17 1998
COAST AREA OFFICE
RESOURCE MANAGEMENT

Re: Amendment to THP 1-96-247 SCR.

Please amend this THP to reflect the following:

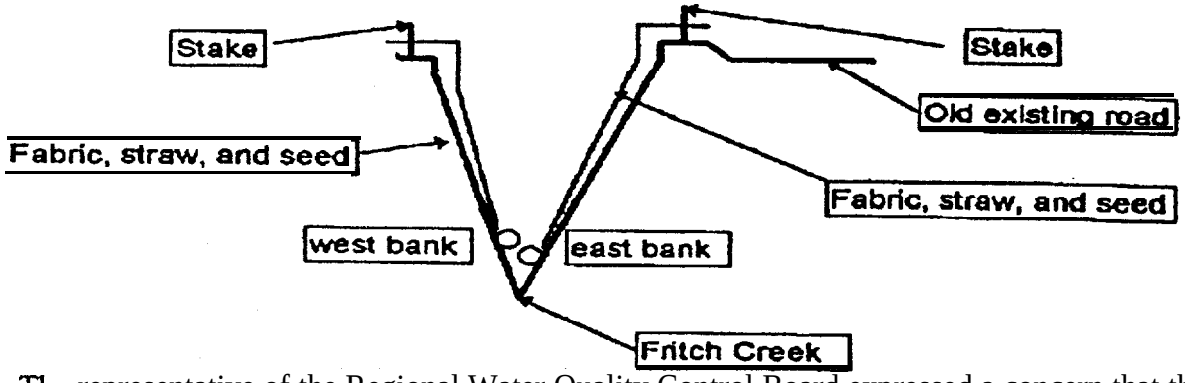
A. The proposed road above L12 was not built. The LTO and the landowner's representative Larry Holrngren proposed using two new skid trails (see attached Map) instead of the road and skidtrail proposed in the plan. Portions of these trails cross slopes greater than 50%. Construction and use of these proposed skidtrails will involve considerably less excavation and disturbance than constructing the road above L12 and the other skidtrail. Forest Practice Inspector Thomas Sandelin on his inspection of 14 July 1998 reviewed this proposal and he approved the construction and use of these proposed skidtrails.

B. The LTO proposed a new location for L9 involving a shorter spur road off of the main road above L13. The new location for L9 is approximately 100 feet uphill of the previous flagged location and will facilitate better deflection for the yarder roads coming into L9. This location should provide better protection to Fritch Creek, and also involves less road construction. Forest Practice Inspector Thomas Sandelin reviewed relocation of L9 during one of his inspections and he approved the relocation of L9 as shown on the attached Map.

C. Mr. Urdahl decided to remove his lands from this THP after layout and location of yarder landings and yarding corridors were already well towards completion (trees had already been cut for the yarder roads). Many adjustments had to be made to accommodate this change; one of these was to increase the number of yarder roads coming in to L3. In spite of the best efforts of the LTO and his logging crew, more trees were damaged between Fritch Creek and C5 than was anticipated as these yarder roads came together below L3. The effect of this is to cause a locally small opening (approximately 1 acre) affecting the canopy cover over the tributary class III watercourse leading to Fritch Creek below C5, and also the east side of the WLPZ of Fritch Creek (Class II watercourse) at that location. In accordance with THP section II, item 26 (page 17 last paragraph) to mitigate the loss of shade canopy, the plan submitter shall plant 100 1 - 1 Redwood seedlings during the first wet season after completion of harvesting activities in this small opening below C5 as shown on the attached Map.

D. The northern-most yarder road coming into L3 was one of those added to L3 in order to facilitate harvesting the NW comer of the THP after the Urdahl parcel was removed from the

THP. This corridor runs from East to West from L3 just south and roughly parallel to the south boundary of the Urdahl parcel (see attached Map). Where this yarder road crosses Fritch Creek inadequate deflection has caused some logs to strike the steep sides of the inner gorge above Fritch Creek. This has caused removal of protective vegetation and surface litter from the sides of the inner gorge within the width of the yarder road (approximately 25 feet). The THP requires that such exposed soil within the WLPZ be covered with straw or slash mulch (see THP Section II, item 18 [page 5]). However, these mulches cannot be expected to stay in place on the steeper parts of the inner gorge where soil has been exposed. Therefore in this location the plan submitter shall install a jute or similar type erosion netting to the slope (designed to decay and deteriorate after two to three years) over the areas where straw and seed have been applied to hold them in place long enough for vegetation to become re-established. On the east side of Fritch Creek the netting shall be attached along its upper edge with redwood stakes on the outside of the old existing road. On the west side of Fritch Creek the netting shall be attached to an old skid trail or flatter-benchy area above the creek in a similar fashion. The netting shall be rolled and stapled at the bottom of the slope to trap sediment that may come off the slope. In addition, where safe and feasible, staples shall be pressed or hammered into the banks of the inner gorge to hold the netting close the soil surface (see diagram below).



E. The representative of the Regional Water Quality Control Board expressed a concern that the old orchard area next to the creek may be a source of sediment to the creek if vehicles are allowed access to this area from the main road. To address this concern, the plan submitter shall block vehicle access from the main road to the flat area (old orchard) adjacent to Fritch Creek below L 12, using cull logs, root wads, or any similar suitable material after completion of harvest activities and prior to the winter period (see attached Map).

Because the CDF Forest Practice Inspector, Thomas Sandelin, has been shown all these proposed changes during his inspections of this THP, and has approved these proposed changes, we request that you **-- Please accept this amendment as a minor amendment.**

It continues to be a pleasure working with you and your staff.
Sincerely,

Christopher Hipkin, RPF 2300

RECEIVED
AUG 17 1998
COAST AREA OFFICE
RESOURCE MANAGEMENT

ATTACHMENT 7 ATTACHMENT A

3 AUG 1998 AMENDMENT

EEL RIVER SAWMILLS /KOPPALA et al.

TIMBER HARVEST PLAN THP 1-96-247 SCR

TOPOGRAPHIC MAP

T 9 S, R 2 W, Sec. 28 & 29 MDBM

SCALE:

FEET

0 200 400

CONTOUR INTERVAL = 20 feet

N

Property Boundary
Harvest Boundary
Class 1 **watercourse**
Class 2 **watercourse**
Class 3 watercourse
Swale
Change In **watercourse class**
Existing seasonal road
Proposed **seasonal road**
Existing skid trail
Proposed rkid **trail**
Proposed landing
Slide
Debris flow
Mitigation points
Road Const. References
Watercourse crossings
In-lieu Practices
Existing road not to be used
Existing road to be used as a skid trail
Structures
Waterline
Spring

L1, L2, etc.

M1, M2, etc.
R1, R2, etc.
C1, C2, etc.
IL1, IL2, etc.

Ratto Property (~43 acres)

Urdahl Property (14 acres) (Removed from THP)

Koppala/Eel River Property (~80 acres)

A

B

C

D

E

DIET

RECEIVED

AUG 17 1998

COAST AREA OFFICE-A
RESOURCE MANAGEMENT

State of California The Resources Agency

MEMORANDUM

To: Rodger Thompson
Deputy Chief, Forest Practice

Date : August 13, 1999
Ref. : IMD 8-13

From: Department of Forestry and Fire Protection
Coastal-North Area

Subject: Pre-Harvest Inspection; l-99-095; Ramsey Gulch THP

On Tuesday, August 3, 1999, I attended a pre-harvest inspection (PHI) of the referenced plan. Also attending were Peter Twight (Registered Professional Forester [RPF] for Redwood Empire), David van Lenep (forester for Redwood Empire), Matt Baldzikowski and Joe Hanna (Santa Cruz County representatives), Jennifer Nelson (Department of Fish & Game [DFG] fisheries biologist), and Nancy Drinkard (CDF inspector). I was asked to attend in response to concerns raised by DFG regarding the potential for cumulative watershed effects, specifically water temperature, that might lead to significant impacts on steelhead salmon. This was the focus of our field review.

In an earlier memorandum, I reviewed temperature information collected by RPF Twight and discussed its strengths and weakness. In it, I noted that: 1) the program to date provides little more than limited documentation of the temperature conditions during most of one summer; 2) the temperatures reported are warmer than preferred by steelhead, 3) there is no substantive evidence supporting RPF Twight's claim that temperatures have not already been affected by past projects, and 4) that other projects are proposed, all elevating concerns about temperature effects.

DFG is the department with jurisdiction under state law on fish and wildlife resource issues. My role as a CDF biologist is to provide biological recommendations and guidance to CDF. The input of CDF's biologist does not supersede that of DFG's relative to biological issues. DFG did attend this PHI.

FIELD REVIEW

A PHI does not substitute as a wildlife survey due to the limited amount of time (part of one day), improper season for detecting many wildlife species (late summer), and poor and limited time of day (mid-day). For biological resources, a PHI only enables the agencies to 1) detect significant impacts when they are obvious, 2) determine a species' presence only if observed, and 3) evaluate the accuracy and completeness of information provided in the THP upon which the RPF rationalized their determination of significance. Habitat conditions assessed during the PHI might enable the reviewing agencies to make

qualified predictions of presence. Therefore, the THP document itself is very important to provide the evidence and foundation upon which CDF can determine that significant impacts to biological resources have been appropriately identified and mitigated. I viewed the water temperature information provided.

The field tour started when we left the vehicles on the ridge along the eastern plan boundary near the 2120' contour. We dropped WNW directly to the major east-to-west flowing watercourse, arriving just upstream of where the classification changed from a II to a III. From there, we walked upstream about 50 yards. We then turned around and continued downstream to the confluence with the major north-to-south flowing class II watercourse in the western part of the plan. We walked up this watercourse for about 100 yards. We then turned around and continued downstream to < 50 yards from the plan's downstream boundary, from where we walked up an abandoned road to the road outside the plan area to the southwest.

Where we first arrived at the eastern class II, the channel exhibited LWD steps that developed from the corduroy-enhanced yarding conducted down the watercourses during the prior harvest. These log chunks displayed very well the sediment metering and habitat forming functions of in-channel logs. Plunge pools were well developed below these, and although most were now free of pooled water, we did find one still holding surface water and inhabited by aquatic insects. Hydrophilic vegetation was largely absent, a circumstance probably due to the forest canopy that was dense enough to inhibit the growth of much herbaceous vegetation. Based on the channel structure, moist soils in many of the channels scour-pools, and surface water and aquatic insects in one pool, we upgraded this reach to a Class II watercourse upstream to where the channel steepened and the indicators diminished. With the harvest-induced reduction in evapotranspiration, the flow will increase in, this channel post harvest; albeit only marginally due to the partial cut. ***The new limit was* flagged *in the field* and *the map* should *be corrected.***

Large woody debris was sparse in the channel nearly all the **way through** the plan area. This is due, I believe, to a combination of:

- the high gradient of much of the watercourse that bestows upon it adequate power to flush all but very large logs,
- elimination of most of the LWD present or recruitable for commercial or yarding purposes during the prior **entry, and**
- the relatively "young" stand that is growing along the drainage bottom has yet to generate adequately stable LWD.

Although the redwood trees in the drainage are 100 +- years old, they all appeared healthy, thrifty, and unlikely to contribute substantial volume of LWD to the watercourses for decades. Harvest of trees from the streamside zone during the proposed

entry needs to be considered carefully to assure that it does not significantly diminish future LWD recruitment. **A no-cut *zone of at least 25′ from the channel edge would* be *a step in* that *direction, and should be considered.*** In addition to addressing LWD recruitment potential over the long term, this would enhance both stream bank stability (of which there were few signs of instability), protection against surface erosion delivering soil to the watercourse, and retain desirable canopy closure.

We evaluated the mark of trees (the paint line was difficult to see in some areas) as we walked downstream with special attention on shade retention. The mark followed some rules such as marking trees in an alignment to the proposed yarding, thus attempting to minimize the "frontage" of stream that would be exposed to the harvest. While this appeared to have merit, it was still difficult to ascertain the likely effects on canopy opening since the actual cable corridor locations, widths, and frequencies were not fixed; as well as the possibility of damage to residual canopy during yarding. At one point, RPF Twight asserted that the deflection was adequate to assure full suspension above the WLPZ, thus avoiding residual tree damage from the yarded trees (there still might be some from the cables, but RPF Twight and Forester van Lennep asserted that would be very minimal).

I noted another concern relative to shade. Although the WLPZ mark appeared to be fairly light in most locations, because of the steep slope the trees along the watercourse provided shade only with their boles. A large amount of shade was derived from the canopy of the forests (largely tanoak in many locations) outside the WLPZ from the south. Thus, +- north-south aligned cable corridors that continue to the break-in-slope have a high probability of creating a direct "line-of-sight" between the sun and the watercourse. This appeared to be especially probable where the stream alignment was closer to east-to-west than to north-to-south. ***To* minimize *risks of solar heating due to reduction in non-WLPZ stands, helicopter logging should be considered for* all *areas on the south side of a Class II* watercourses *with an alignment between 45° and 135°. This consideration should include a description of possible helicopter impacts to the residual stand and limitations on its use needed to minimize them.*** Helicopter yarding might also enhance stream protection (both sediment delivery and canopy retention) throughout the WLPZs.

In the north-south flowing stream reach in the western part of the plan, the mark appeared to be very light. This reflects the affect of stream alignment on solar heating potential. RPF Twight indicated he had used the solar pathfinder in marking this area, and it showed. Still, I had concerns (emanating in part from the problems revealed in the Gamecock harvest) about how

close the mark will match the final harvest in light of cable corridor frequency, width, and residual damage. The RPF proposed temperature protection to include 85% shade as determined by the solar pathfinder (measures shading from the direct energy of the sun, and thus affects only vegetation to the south), and 60% canopy as determined by the vertical siting tube (which covers the entire WLPZ). The temperature report prepared by RPF Twight argued that this level was adequate, but the data used to make the case were insufficient. Due to the past impacts, the possibility for this proposal to lead to similar canopy conditions as those experienced in Gamecock Creek, and the reported future projects, ***the canopy restrictions should be 85%*** **as** ***measured with a solar pathfinder, and 75% as measured*** **with** ***a vertical sighting tube***[1]***. For both, the*** **minimum** ***stream length for enforcement purposes should be 200'. For the former, the measurements should be*** **taken at** ***systematically located mid-channel points (≥10, or*** **at** ***least one every 20 feet) within the 200' reach and should employ the August sun arc. For the later, the measurements should follow the protocol recently drafted by CDF and currently being field-tested.*** I believe that the WLPZ I observed on the north-to-south stream reach in the western half of the THP will achieve these standards, if harvested as marked without residual damage. The area along the east-to-west reach on the eastern side is more difficult to tell.

In the eastern Class II, surface flow was absent to infrequent though about the upstream 1/3 of its length that we observed. Flow here, and downstream in the remainder of the plan area and off the plan will likely increase due to the harvest-induced decrease in transpiration. Thus, surface flow will likely have a greater distance to achieve the local equilibrium temperature and daily peaks will likely to be carried further downstream before cooling back to the new location's equilibrium temperature. RPF Twight notes steelhead inhabit Ramsey Gulch within 800-900' of the THP's downstream boundary.

Prevention of impacts is far superior to citing/violating actions after-the-fact, especially relative to shading impacts that can only be remediated by the slow, natural process of forest growth. ***The RPF should assume a heavy accountability in monitoring the progress of the harvest and should be held ultimately responsible if operations lead to*** **violations.** The THP under item 32 offers some RPF-responsibility protection measures.

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[1] The RPF needs to be aware that these standards are total, not the percent of the shade/canopy that is currently present. That is, if the preharvest shade is <=85%, no trees should be harvested within that stream reach.

[2] If needed, the RPF can contact me to get a copy of the canopy sampling protocol.

However, ***the* RPF *should prepare an operations monitoring program that will detail the frequency of* his *inspections, progress reports to CDF, and the consequences of the failure to comply with the protection measures.*** Such measures could include daily monitoring during the 1st 10 operating days, with a daily report to CDF Felton. Then, assuming no problems are observed, a less frequent (every other day) inspection with a weekly call to CDF Felton. Measures could include the RPF immediately stopping work on the entire plan area if problems are noted and not permitting work to restart until after a CDF inspection.

OTHER

During the field review, I remained attentive to stand structure and murrelet habitat issues. In the areas of the THP that I walked, I did not see evidence of "late-successional forests" as defined by the Forest Practice Rules, or by a more pure biological definition. Neither, in the areas I walked, did I observe any stands or even individual trees with structure adequate to qualify as murrelet habitat.

RECOMMENDATIONS

Based on my review of specified portions of the THP document, my Pre-harvest inspection, as explained above, I recommend the following measures in order to avoid the potential for this plan to cause significant direct or cumulative impacts to fish and wildlife resources. To aid in finding the backqround discussion for each of the following recommendations in the-document above/there they are **in italics and bold print.**

1. The upgraded reach of eastern watercourse shall be correctly identified on the THP maps.

2. A no-cut zone of at least 25' from the channel edge shall be established within the WLPZs.

3. Helicopter yarding shall be employed for all areas that are not tractor-yarded on the south side of Class II watercourses that flow primarily along an east-west axis (aligned between 45° and 135°). The RPF shall provide an assessment of possible helicopter impacts to the residual stand and limitations on the helicopters needed to minimize the potential impacts. Additionally, helicopter logging all cable ground should be investigated.

4. Post-harvest, the shade on the creek shall be 85% as measured with a solar pathfinder, and the canopy shall be 75% as measured with a vertical sighting tube[1]. For both, the minimum stream length for enforcement purposes shall be 200'. For the former, the measurements shall be taken at systematically located mid-channel points ($\geq$10, or at least one every 20 feet) within the 200' reach and shall employ the August sun angle. For the later, the measurements shall follow the protocol recently drafted by CDF and currently being field-tested[2].

5. The RPF shall prepare a detailed operations monitoring program that will describe the frequency of his inspections, progress reports to CDF, and the consequences of the failure to comply with the protection measures.

By: Bradley E. Valentine
Senior Biologist

cc: P. Twight(RPF)
J. Nelson(DFG)
N. Drinkard(CDF Inspector)
Second Review Team (CDF Felton)
Water quality
X Santa Cruz Co.

ATTACHMENT 7 ATTACHMENT 1A

STATE OF CALIFORNIA—THE RESOURCES AGENCY
GRAY DAVIS, Governor

DEPARTMENT OF FISH AND GAME
MARINE REGION
20 LOWER RAGSDALE DRIVE, SUITE 100
MONTEREY, CA 93940
(831) 649-2870

California Department of Forestry and Fire Protection
San Mateo and Santa Cruz Ranger Unit
Resource Management
Attn: Ms. Nancy Drinkard
P.O. Drawer F-2
Felton, CA 95018

August 10, 1999

Subject: Focused August 3, 1999 preharvest inspection of WLPZ activities for Timber Harvesting Plan 1-99-095 SCR.

Because the subject preharvest inspection focused on activities proposed within the WLPZ, the following comments address only those **aspects** of the plan. As was noted in the **May** 18, 1999 letter by the Department of Fish and Game, the Corralitos sub-watershed contains one of the few remaining viable steelhead populations within the Pajaro watershed. Given its importance as steelhead habitat, maintaining and enhancing the Corralitos watershed for the continued existence of steelhead is an important objective. In our review of THP 1-99-095 SCR, we focused on those activities which independently or cumulatively could negatively impact steelhead or their habitat. In particular, we considered activities which could deleteriously affect stream temperatures, sediment input and woody debris recruitment.

Taking into account these considerations, **the following comments and recommendations are made.**

Stream Temperatures

According to current literature, optimum stream temperatures for rearing steelhead range between 50 and 59 degrees Fahrenheit. In many areas this goal may be unattainable, so instead it needs to be assured that stream temperatures remain as cool as possible and that activities da not lead to increases in stream temperatures.

During the preharvest inspection, the proposed mark of the trees within the **WLPZ** appeared to be reasonably light, however concern was expressed that some trees had such a faint line that many marked trees may have been missed by the review team Mr. Twight also stated that once the cable corridors are **laid** out that the mark may need to bc adjusted, therefore the review team was unable to make a clear determination of the extent of the proposed WLPZ cutting and related effects in temperature, sediment and woody debris recruitment.

THP **1-99-095** SCR states that **data** collected on Gamecock Creek after THP 1-97-275 SCR. was implemented indicated an increase in stream temperatures of 4 degrees Fahrenheit. Given that stream temperatures in the watershed are probably already sub-optimal any

increases in stream temperature should be unacceptable. The increased stream temperatures from Gamecock Creek needs to bc adequately addressed in the cumulative impacts assessment and the THP needs to have a very conservative approach to protecting stream temperatures within Ramsey Gulch.

The plan states that retention of 60% of the canopy will be adequate to protect. the stream For class II streams that provide significant quantities of water to class I streams supporting unadromous salmonids, it is questionable if even a 75% canopy retention is adequate to assure cool stream temperatures. We believe the canopy retention proposed in the plan is likely to result in increased summer stream temperatures. The data and analysis presented in the plan is insufficient to conclude otherwise.

Sediment

Only those potential sediment sources within the WLPZ were evaluated. Potential sediment issues from the proposed road infrastructure were evaluated by Department of Mines and Geology personnel and we defer to their expertise. Because of the steep terrain, the primary concern within the WLPZ is the potential for cut trees to backslide into the creek, dislodging sediment and either transporting it to the creek directly or baring the soil and making it susceptible to erosion during rain events.

The plan does not discuss the potential for trees or logs to backslide or roll into the watercourse much less discuss mitigation measures to minimize impacts from such an event.

Woody Debris Recruitment

Mr. Twight accurately states that there is lack of large woody debris within Ramsey Gulch. It has been agreed upon that all trees which have fallen and are currently spanning the watercourse channel or are within the channel shall remain in place, but there are no provisions for future recruitment of trees. In fact the few redwood which were leaning toward the channel were marked.

Recommendations

Because of the uncertainty of the impacts associated with THP I-97-275 SCR and the ambiguity of the proposed activities in the WLPZ in THP I-99-095 SCR, the Department adheres to its original recommendations as follows:

1. A no cut zone or no activity zone should he established within the WLPZ of Ramsey Gulch. This would include cable corridors in addition to the individual trees which are marked for harvest.

2. Winter operations should not be allowed on the remainder of the plan.

3. No woody material within or perched over class II or class III watercourses should be removed.

Additional Comments

The Department of Fish and Game is willing to help design a study protocol which would hopefully answer some ofquestions about the impacts associated with THP l-97-275 SCR. Ideally, Department biologists could work in conjunction with CDF biologists since they have developed studies in other parts of the State to ascertain the impacts associated with timber harvest activities.

If you have any questions or comments please call me at (83 1) 688-6768.

Sincerely,

Jennifer Nelson

Jennifer Nelson
Associate Fisheries Biologist

ATTACHMENT

ATTACHMENT 7

STATE OF CALIFORNIA—THE RESOURCES AGENCY GRAY DAVIS, Governor

DEPARTMENT OF FISH AND GAME
MARINE REGION
20 LOWER RAGSDALE DRIVE, SUITE 100
MONTEREY, CA 93940
(831) 649-2870

Post-it® Fax Note 7671			
To Nancy Drinkard	Date 8.15	# of pages ▸ 4	
Co./Dept. DFG	From Jennifer Nelson		
Phone #	Co. CDF		
Fax # 6866768	Phone #		
	Fax # 335 1712		

ATTACHMENT A

ATTACHMENT 7

State of California

The Resources Agency

MEMORANDUM

To: Rodger Thompson
Deputy Chief, Forest Practice

Date : July 30, 1999
Ref. : IMD 7-30

From: Department of Forestry and Fire Protection
Coastal-North Area

Subject: Information review: l-99-095 SCR; Ramsey Gulch

At the request of CDF Inspector Nancy Drinkard, I reviewed the temperature reports provided by RPF Peter Twight relative to this plan. The potential for significant stream temperature increases to result from this plan is a concern of the Department of Fish & Game (DFG) biologist Jennifer Nelson.

The Department of Fish and Game (DFG) is the department with jurisdiction under state law on. fish and wildlife resource issues. My role as a CDF biologist is to provide biological recommendations and guidance to CDF. The input of CDF's biologist does not supersede that of DFG's relative to biological issues. DFG has been on-site, and I believe will do so again.

The following is specific to the RPF's April 15, 1999 report (I won't address his interim letter-report dated August 28, 1998 because all its data is included in the April 99 report) .

- The report states that *"the study* was *designed to compare water temperatures form unlogged through area of known canopy* density *reduction in Gamecock Creek, and measure the downstseam effects in* several *locations"* and *"the hobos* [temperature monitors] *were to* measure *the effects on stream water temperatures and their variation as they might be affected by the various levels of canopy reductions from the Gamecock Creek* timber *harvesting* in *1997-98."* These goals are probably impossible without pre-harvest and post-harvest information as the data can't account for the temperature complications of gaining and losing reaches of stream. Such goals can not be well documented unless there are several years pre- and post-harvest to account for annual climatic variability, and to the extent it happens, THP-induced wind-throw further opening the canopy. In addition to being only one season's worth of information, the data is weak because a) it starts half way through the summer (mid July) and b) misses a critical t-l week period at the end of August/start of September. At best, I think the information can be considered a characterization of the temperature regimes along a longitudinal gradient of the watercourses, with weak inferences to canopy levels.
- The report goes on at some length regarding an analysis of daily fluctuations (amplitude). While daily amplitude in temperature is accepted to be an important parameter in fish health, I am not familiar with any research that has set

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standards or thresholds for this factor. Further, the analysis uses an average of many day's amplitude, thus possibly swamping out periods of high variation (presumed bad) with periods of low variation (presumed good [actually, what I know about temperature variation effects is that the best is an intermediate amount of variation]). This analysis would be more useful if it ploted the daily amplitude across the period of record, looking for extended periods of wide amplitude. Or perhaps better, looking at the amplitude during a set-length, warmest period only. Still, the information in the report suggests a substantial effect of reduced canopy on the daily amplitude. In any regards, the report should cite the information used to support the analysis and conclusions regarding the impacts of temperature variation on steelhead.

. The report notes a reduction in the amplitude from Station 3 to station 4, a decline that is dismissed as not being due to higher canopy levels in that reach. Canopy is reportedly low there as a result of a 1988 THP, and recent photos show open areas. The report attributes the changes not to side stream inflow, but to subsurface circulation. In addition to subsurface circulation (I assume by this, the report means in-channel exchange between the substrate and surface water), there is the possibility of submerged springs. Perhaps importantly, the stream course changes directions from a +- north to south to a +- east to west flowing stream. Directionality can have substantial affects on solar warming potential, especially in canyons.

- The report discusses that the Solar Pathfinder readings were recorded for the month of September, and then notes that the greatest temperatures were in July and August -- yet at one station a September peak equaled the earlier ones. The month of September was recommended based on Dave Hope's opinion that -- for the region -- September is the hottest month. From this data set, anyway, it appears that future uses of the Pathfinder in the area should use August.
- The report asserts that sighting-tube canopy should be 60% and shade (pathfinder) should be 85% to keep a stream in a functional range for salmonids in south flowing streams. The data set to support this conclusion is weak at best (as described under #1) and limited (samples few [n=3?]), and does not provide the temperature regime (threshold) against which such a statement could be made.
- Under watershed effects, the report implies that "*…temperature effects of THP 1-96-275 have [not] been transmitted into Brown's Creek,*" but further qualifies that with the clause "*…the data we have so far...*" The implication is unfounded (see 1st bullet), the data says little about temperature effects transmission.

. Under watershed effects, the statement that "*…fish must be staying in the forest part of the watershed...*" is probably true, and probably has always been more or less true. As far as temperature is concerned, a fully shaded forested stream might have feed suitably cool water for some distance downstream, but at **some** point it probably became too hot anyway. **The** point is to not reduce the geographic range of suitably cool temperatures, and to not make areas where temperatures are stressful any more stressful.
. Under watershed effects, the statement that "*…logging seems to have little downstream temperature effects...*" is unfounded by the data provided. Then the report leaps to a statement that "*…from this one* **must** *conclude that temperature increases from canopy removal, such as they are, have little or no effect on the value of the steam to anadromous fish"!* Again, there is no basis for this statement, as the extension of the stream temperature data to the steelhead habitat quality is not provided -- what temperature range do steelhead in the system under consideration need? The report doesn't report threshold criteria needed to support this statement.

Minor suggestions on the report: Figure l's y-axis is not identified -- are the values graphed thereon daily averages, maximums, or ??. Subsequent figures have differing scales that complicate analysis. This is a result of being printed from the manufacturer's software that sets the scales based on the range of the input data. The RPF can remedy this by inputting the data into a spreadsheet and plotting it from the spread-sheet's graphics module (however, the RPF should keep the original data in addition to the spreadsheet).

The best information I have readily available (Bjornn & Reiser 1991) suggests that steelhead prefer 10-13°C (+-SO-56°F) and +-24°C (75°F) is lethal. All of the temperatures reported by the RPF are above the "preferred" level. Someplace between preferred and lethal is stressful where fish growth is slowed, habitat use becomes constrained, and other natural risks elevate -- CDF should assure adequate shade and canopy to prevent projects from causing water temperatures to encroach into or increase in this zone, whether the projects o so individually or cumulatively. Where do we set this zone of concern [the tough question]? One approach is the MWAT concept[1] (Brungs & Jones

[1] The recent Science Review Panel ([SRP],Ligon et al. 1999) discounts the use of **MWAT.** However, their rationale for doing so seemed to me to be suspect, citing "*. . .recent studies suggest that the MWAT method is not a validated hypothesis;*" and "*temperatures used . . .* do *not appear to be based on all thermal studies reported in the scientific literature...*"; then citing a few examples that do not clearly support their statements because **MWATs** are not reported. The SRP underscored their concern by noting that site specific factors (e.g., food abundance) can modify the influence of temperature and that this is not taken into account with **MWAT.** Yet there is no reazon why **MWAT** could not be calculated from local fish studies. Indeed, the SRP suggests that "*. . .the best method is a site-specific thermal*

1977). MWAT is an acronym for Maximum Weekly Average Temperature, which is an attempt to calculate a physiologically-based temperature threshold of concern. Against the calculated MWAT threshold, the weekly average temperature values of any local area can be compared to determine if there is temperature stress. Using the information from Bjornn and Reiser (1991) as input variables, an MWAT calculates out to +- 16°C (+- 62°F). From the data provided by the RPF, temperatures exceed 62°F for extended periods. To the extent that this admittedly rough calculation has value (this deserves to be reviewed with local authorities on steelhead[2]), the meaning is that shade canopy should not be reduced and vertical canopy should remain high to minimize the downstream effects (shade protects from the dominant heating factor, direct solar heating; vertical canopy protects against microclimate shifts).

If the temperatures as reported in the report are in a stressful state, is that natural temperature regime for the region or the results of cumulative impacts? Probably both. This area is in the southern portions of the steelhead's range (and the southern extreme for coho salmon), and as a consequence is naturally warm. The reports describe recent past THPs that have opened the canopy (96-275 and a 1988 THP), and states another THP will be submitted in the near future. Other land uses that might be elevating water temperature are rural housing and county roads. The other land uses-that have opened the canopy substantially or modified discharge character are a good basis for tightly controlling proposed, near-future canopy modifications based on cumulative impacts. Regardless of cumulative effects, if temperatures are near stressful naturally, CDF still restrict activities that might increase the them.

As interim direction for temperature evaluations, 1) in addition to providing graphical output from the hobos, report some other standard variable (e.g., MWAT[1]), 2) before extending the results of temperature monitoring to fish habitat suitability or impacts, describe the thresholds against which he is comparing the information, 3) get multiple years of information with before and after values before asserting relationships between logging impacts on canopy and stream temperatures.

By itslef, the report provides only a small bit of information desirable to conclude anything about the potential significance of direct or cumulative impacts of the proposed project on the temperature aspects of salmonid habitat.

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physiology approach that integrates *information on water temperature, food use, and fish growth..."* and then references some gray literature regarding a Computerized Fish **Energetics** Model. Clearly, site specific information on fish physiology/water temperature relationships would be the best to use, and evaluation of these models' outputs after fed the local information could guide how the temperature monitors information should be evaluated in the future.

[2] Populations probably are adapted to local temperature regimes and thus may have different temperature thresholds than those I used to calculate **MWAT.**

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By: Bradley E. Valentine
Senior Biologist

cc: Peter Twight(RPF)
Jennifer Nelson (DFG)
X Nancy Drinkard (CDF Inspector)
Pete Cafferata (CDF-Sacramento)

Redwood Empire
A DIVISION OF PACIFIC STATES INDUSTRIES, INC.

ATTACHMENT 7 ATTACHMENT A

1395 41ST AVENUE, SUITE D • CAPITOLA, CA 95010
(831) 464-8788 • FAX (831) 464-8780

MAY 13 1999

Water Temperatures as related to Canopy densities in Gamecock Creek
Santa Cruz County California April 15 1999

Peter A Twight, RPF 2555

Water temperature monitoring was begun initially in response to concerns arising from the Iisting of Coho salmon and the ¶2090 Agreement between California Department of Forestry (CDF) and the Department of Fish and Game (DFG) which permitted "incidental take" if certain additional protection practices were followed. These included canopy protections to prevent water temperature increases if Department of Fish and Game could demonstrate water temperature problems in the Timber Harvest Plan (THP) area. Monitoring will bring objectivity to water temperature concerns, and provide us with information we need to plan future logging operations in anadromous fish streams. The study was designed to compare water temperatures from unlogged through area of known canopy density reduction in Gamecock Creek, and measure the downstream effects in several locations. The results should indicate whether logging is endangering the temperature regime in the rearing and summering areas of young steelhead. A few individual temperature measurements give an indication of the problem for juvenile steelhead movement to the ocean. Further monitoring in Ramsey Creek and Gamecock Creek will be carried out during the summer and fall of 1999.

Procedures

Hobo water temperature monitoring devices were standardized and set out at five points in Gamecock and Browns Creeks in the summer of 1998. The Hobos were to measure the effects on stream water temperatures and their variation as they might be affected by the various levels of canopy reductions from the Gamecock Creek timber harvesting in 1997-98. Hobo temperature monitoring devices were placed in the stream at the THP upper boundary (Hobo 1), in the middle of the THP at the bottom of a lightly cut area (Hobo 2), and at the bottom of the THP below an area with moderate canopy cutting (Hobo 3). Two more Hobos were placed to determine the temperature rise (or drop) at the bottom of Gamecock Creek (Hobo 4), and in Browns Creek downstream from Ramsey Creek (Hobo 5) which was unlogged but planned for logging during the following year. From the water temperature measurements and the canopy measurements we hope to compare changes in canopy density from the logging with the temperature regime down stream. In theory, "the principal source of energy for heating small streams during summer conditions is incoming solar energy striking the water surface, and most of this energy is stored in the stream."[1] It was anticipated that water temperatures would be lowest and have the least variation at the upstream THP boundary, and increase in temperature and range of variation in temperature as measurements were taken down stream. Because water flow through shady reaches was not expected to result in cooling of water temperatures,[2] we expected tie

[1] Beschta et al. 1987 pp 198-199

[2] Beschta et al, 1987 p205

highest temperatures and greatest variation from maximum to minimum at the lowest elevation. Two additional Hobos were provided by Department of Fish and Game and put out in early September to measure Ramsey Creek as a control, and Corralitos Creek at the Browns Valley Road bridge to assess down stream effects. The locations of the Hobos is shown on Figure 1.[3] Individual Hobo graphs are appended. Water temperatures were recorded at various spots at various times with a hand held thermometer to attempt to give information on the overall watershed temperature effects.

Results:

A graphic portrayal of daily maximum temperature spikes at the different Hobo sites is shown on Figure 2. Two of our Hobos were not properly programed and failed to yield data during the first measurement period. The two Department of Fish and Game Hobos also yielded no data for some reason. The highest daily water temperature spikes were recorded during 2 hot spells in early August and 1 in early September (see Figure 2). Since canopy effects will show in the rise in temperature from its overnight minimum, the difference between maximum and minimum temperature per day was 'measured from the graphs (Appended), and the average variation for each station was determined. By proportion, the average variation in temperature for Hobo stations 1 and 5 were calculated for the period when daily data was not recorded. During the Pre-Harvest Inspection. the period of highest water temperatures was anticipated to be in September and the THP canopy density agreed upon was keyed to this. This year the highest temperatures and greatest variation occurred between July 18 and August 26. It will undoubtedly be different during other years, however the data we obtained appears to be instructive on the local effects of canopy densities.

Sufficient measures of canopy have been made on the Gamecock THP (l-96-275 SCR) to make preliminary estimates as to the effect of canopy density on north to south trending streams in the Santa Cruz mountains. East - west trending streams have topographic as well as canopy protection. Our measurements show the lowest temperatures and the least variation from minimum to maximum occurred at the THP upper boundary where the average variation was 1.97" F during the period of greatest variation. Hobo location 2 had an average variation of 2.53" F, Hobo 3 had an average variation of 4.1" F, Hobo 4, about 1 mile down stream, had a variation of 2.43, and Hobo 5, 1000 feet down stream (below the entrance of Ramsey Creek) had a variation of 2.47.[4] Stream canopy below this THP area was not measured, however that area was cut heavier than this THP in 1988, open areas can be seen on aerial photographs and thus the stream reach below THP l-96-275 SCR continues to receive some solar energy inputs. Since there is very little inflow from side streams, most of the drop in temperature measured is probably the result of subsurface circulation through the gravel/boulder

[3] Figure 1 has been corrected after further data analysis since the August 28, 1998 Report on THP 1-96-275-SCR

[4] This is an insignificant difference from Hobo 4 considering the variation between Hobo devices.

stream bed as the water sinks in elevation.

Canopy in the area above Hobo 1 was about 90% measured with a vertical sighting tube, although we know the canopy is likely less dense upstream on the area of a 1990 THP. Hobo 2 has a 2200± foot reach above it with highly variable canopy samples showing some areas with about 57%, some 81% and most of the area at 60% canopy as measured with the vertical sighting tube, and an overall average density providing solar energy protection of 56% as measured with the Solar Pathfinder. Hobo 3 had 81% canopy protection from solar energy in September which the PHI team chose as the critical month. In August some data indicates the canopy provides about 74% protection against solar energy because the sun is higher. The 1200 feet above Hobo 3 also has several significant breaks in canopy at wide skyline corridor crossings which allowed the sun to strike the water surface especially early to mid summer. e.g., a 100 foot segment had September canopy protection of only 69%.

It appears that early August to early September was the hottest period. but this did not translate to higher temperature variations downstream. The stream seems to have an overall water temperature variation of about 2.5" F[5] when the solar energy protection from the canopy is about' 85%, but the temperature spikes up more during hot periods when the canopy provides only 81% protection. Ocular analysis of the graph of daily spikes indicates that during hot spells, the effect of canopy is more pronounced (to 67.4° F), but that the effects are short lived, and even the spikes are reduced by distance from the area of solar energy impact. It appears that for a north to south flowing stream, overhead canopy density as measured by the vertical sighting tube should be about 60%, but with no large gaps where sun can penetrate, and that provides about 85% protection against solar energy. This density will keep a stream in a functional range of anadromous fish habitat. These canopy densities appear to maintain stream temperature variation in the range of about 2.5" F over thousands of feet of forested stream side area.

THP Preparation and Practice to Achieve Minimal Temperature Effects:
We have found the Solar Pathfinder fairly rapid to use. directly measures the solar energy input, and can function during tree marking to avoid gaps where sun can penetrate. The Solar Pathfinder does not have the statistical variation of the Vertical Sighting Tube, so the number of samples required is less. The Vertical Sighting Tube is not useful during tree marking. Good felling practices to protect the planned canopy is necessary. We have achieved excellent results in Sleeper Gulch (THP l-97-254 SCR). in Bear Creek (THP l-97-256 SCR), and good quality yarding corridors have been achieved with a running skyline in SDSF, on our THP l-94-453 SMO. as well as on the heavily supervised parts of the Gamecock THP. We know that close monitoring of felling and yarding is necessary and can achieve good results.

[5] In 1996 Kings Creek had an average variation in early September of 2.1, for the same period the San Lorenzo River at Big Trees had an average variation of 3.4° F.

Water **Temperature and Canopy - Gamecock Creek** 4/15/99

Watershed Effeds

Watershed effects of timber harvesting in this watershed appear to be minimal. THP l-83-319 SCR directly downstream reduced the canopy substantially more than any 200 foot segment of THP 1-96-275 SCR, however the water temperature this year cooled through that area and the area remains productive of steelhead. The data we have thus far do not indicate that temperature effects of THP 1-96-275 SCR have been transmitted into Browns Creek. The temperature in Browns Creek just below Ramsey Creek (unlogged) appear to be very close to that of Gamecock Creek.[6] A temperature measurement at the Browns Valley Road bridge on 7/27/98 registered 71" F, at Gamecock Hobo station 4 the maximum temperature spike was 61.7. On 7/29 the water temperature at the Browns Valley Road bridge was 70" F, at Gamecock Hobo station 3 the maximum temperature spike was 60.1" F. On 9/2 (a cool day) at the Browns Valley Road bridge the water temperature was 66.5". at Gamecock Hobo station 4 the water temperature measured 61.5° F. On September 10 the maximum recorded at Gamecock Hobo station 4 was 59.5°, the temperature at the Freedom Blvd bridge in Watsonville was 67.5" **F, an** 18° F rise. Thus it appears that on a hot day the water temperature will spike up 3.7" from the top of the watershed through the logging area, and increase 10" F between the forested upper watershed and the Browns Valley road bridge 3 miles down stream, and is likely to be more than 18° F higher farther downstream. This means the lower Corralitos Creek watershed could be over 80° F for much of August and September. Fish must be staying in the forested part of the watershed throughout the summer and fall where temperatures remain satisfactory, and simply do not use the lower watershed until cool weather sets in after mid to late September or October.

Logging seems to have little downstream temperature effects as the comparison between Ramsey Creek and Gamecock Creek appear to indicate. Even if the temperatures remained at a headwaters temperature of 60° through the forest. the temperatures downstream from the forest (Freedom Blvd bridge) likely would still be lethal in late September. Only the upstream area could be used by fish just as now occurs. From this one must conclude that temperature increases from canopy removal, such as they are, have little or no effect on the value of the stream to anadromous fish. It will require a substantial extension of shading into downstream areas before areas outside the forest may become usable. Temperature regimes would have to be improved drastically. then perhaps, just perhaps, canopy reductions from logging could effect the amount of the lower watershed that could be used by fish. More information on sources of heat and their mitigation in the lower watershed clearly is needed.

[6] On 9/2/98 the water temperature at the bottom of the unlogged Ramsey Creek was 62º F, at the same time the bottom (Hobo station 4) of Gamecock Creek was 61.5º F. 1999 data may confirm this.

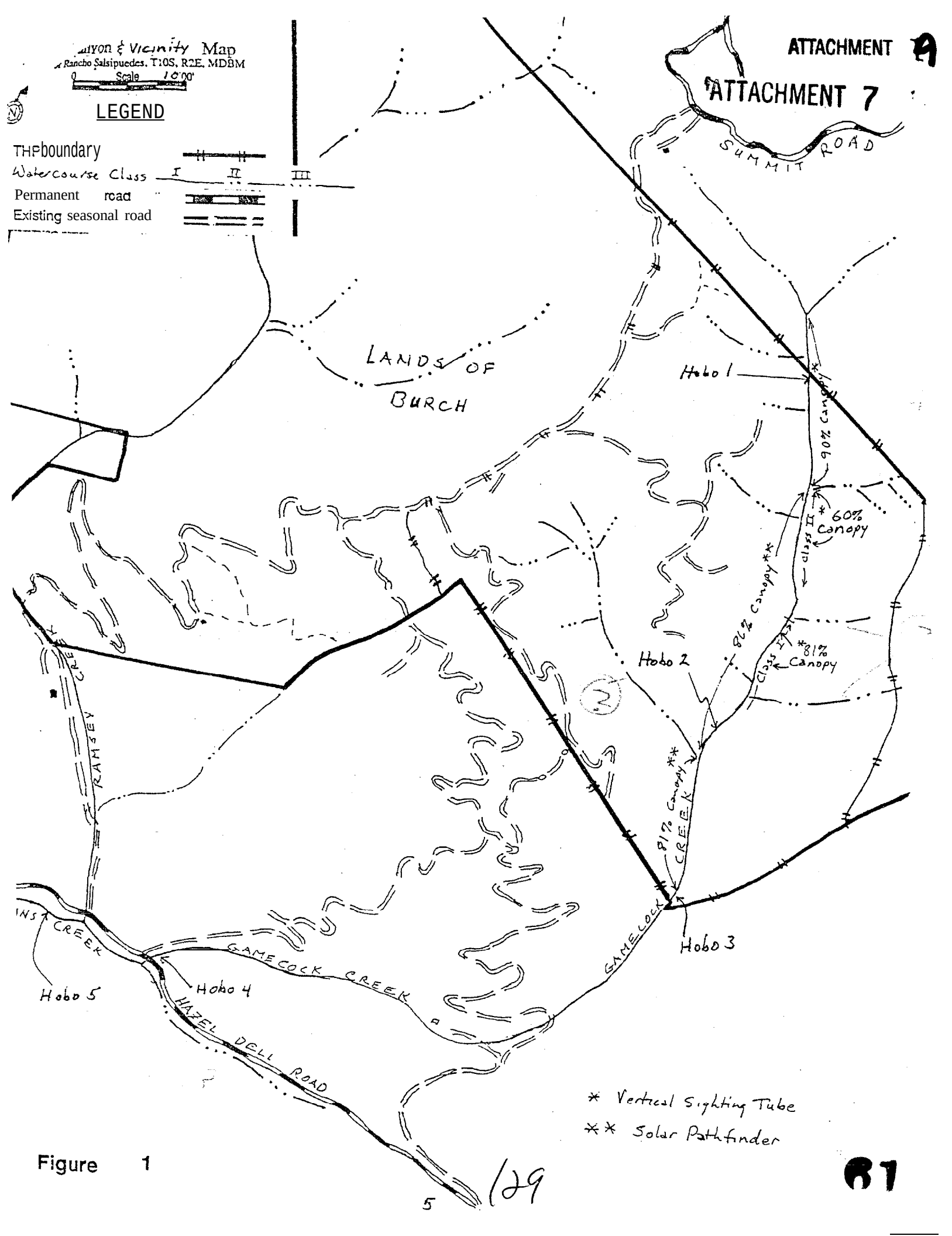

Figure 1

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Water Temperature and Canopy - Gamecock Creek 4/15/99

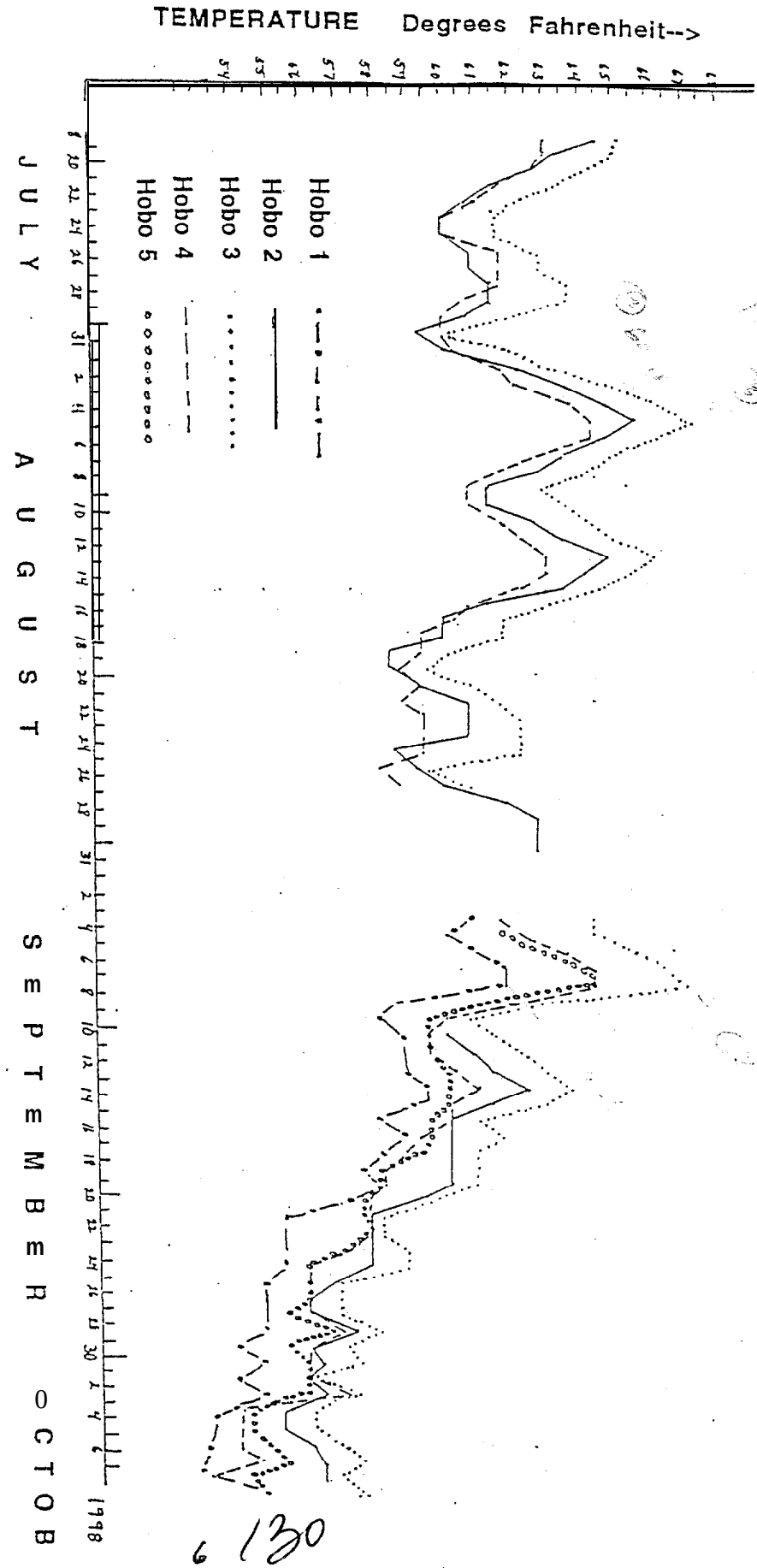

Figure 2

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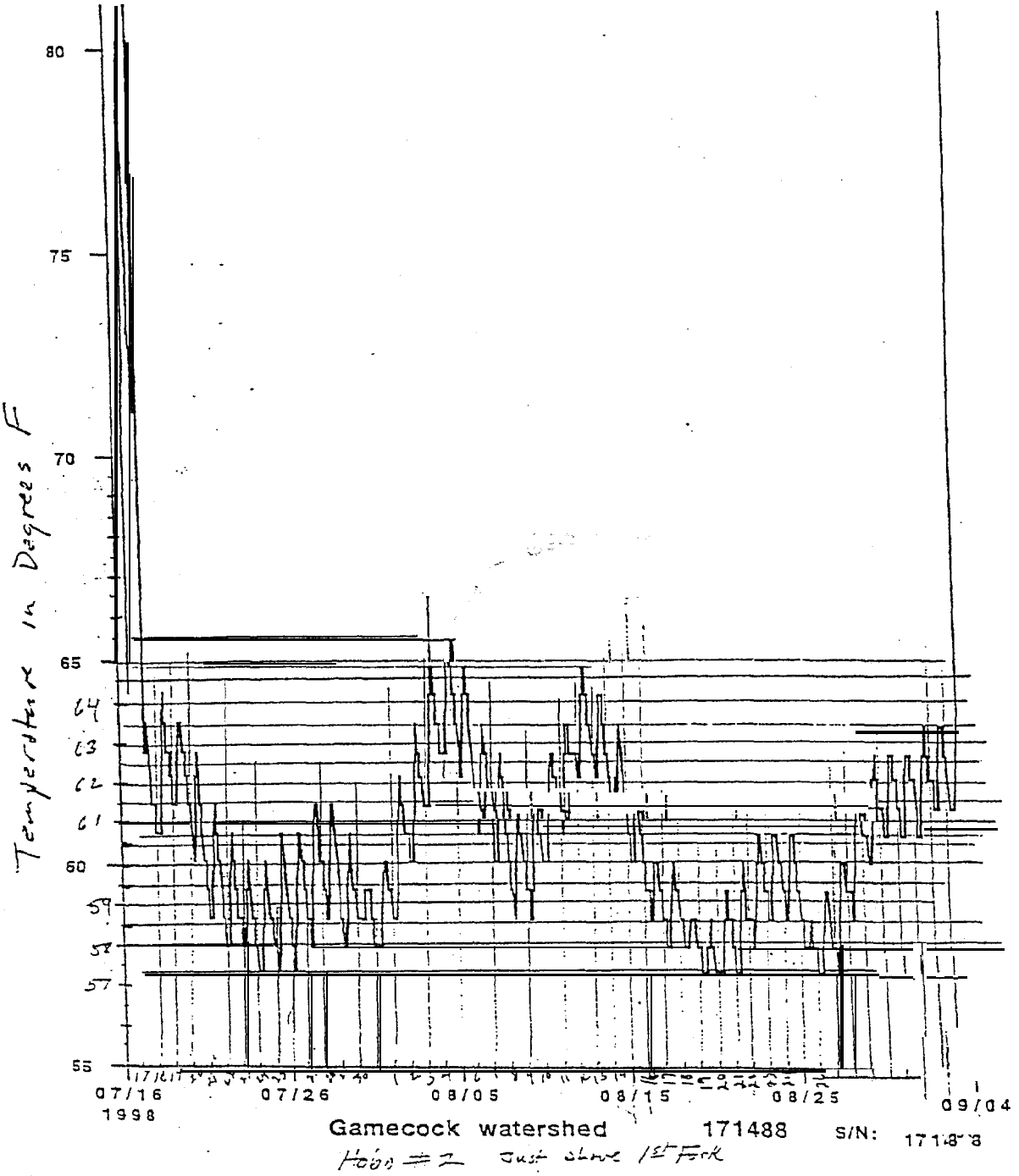

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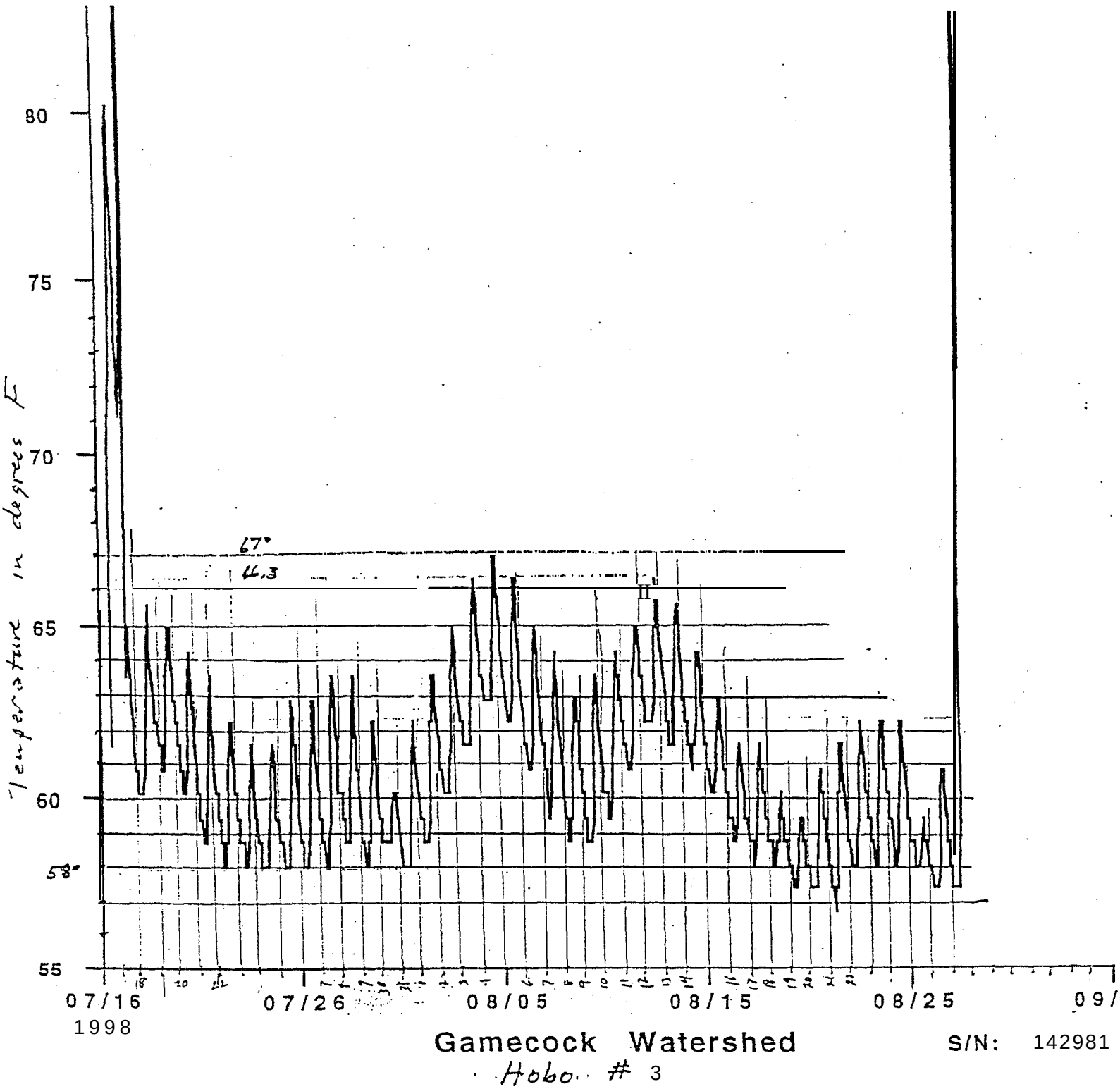
A 7

Water Temperature and Canopy - Gamecock Creek 4/15/99



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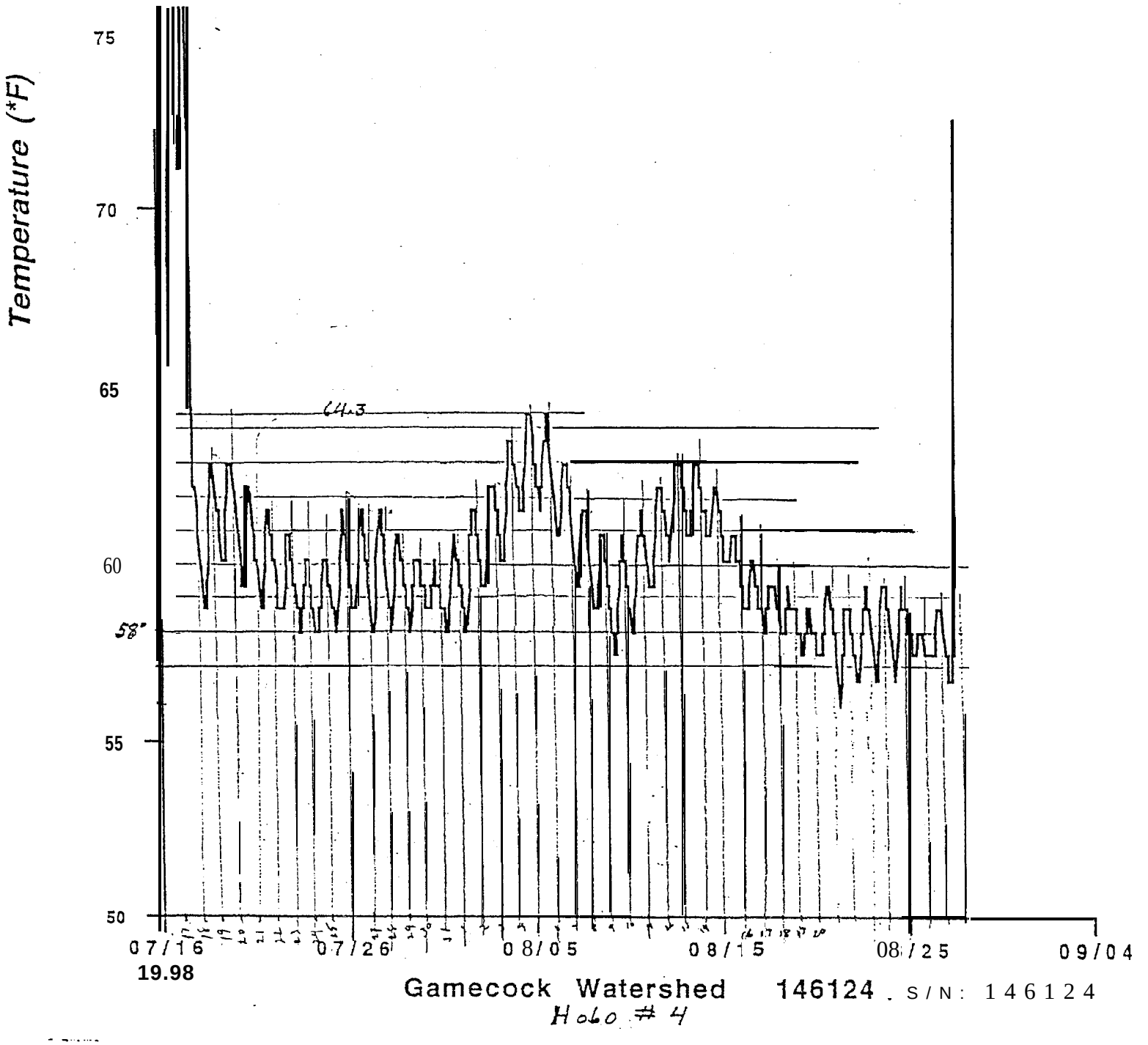
Water Temperature and Canopy - Gamecock Creek 4/15/99



ATTACHMENT 7

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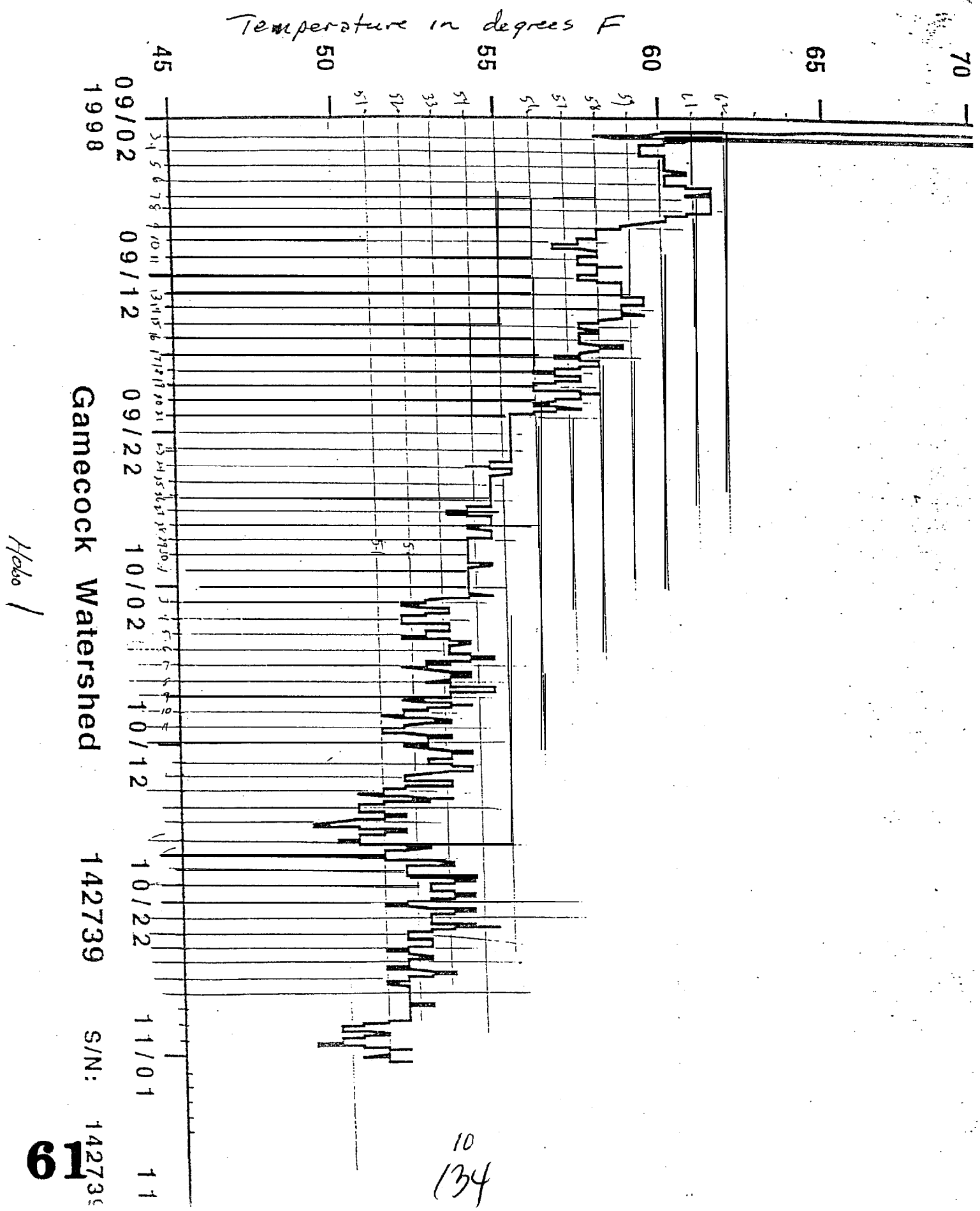

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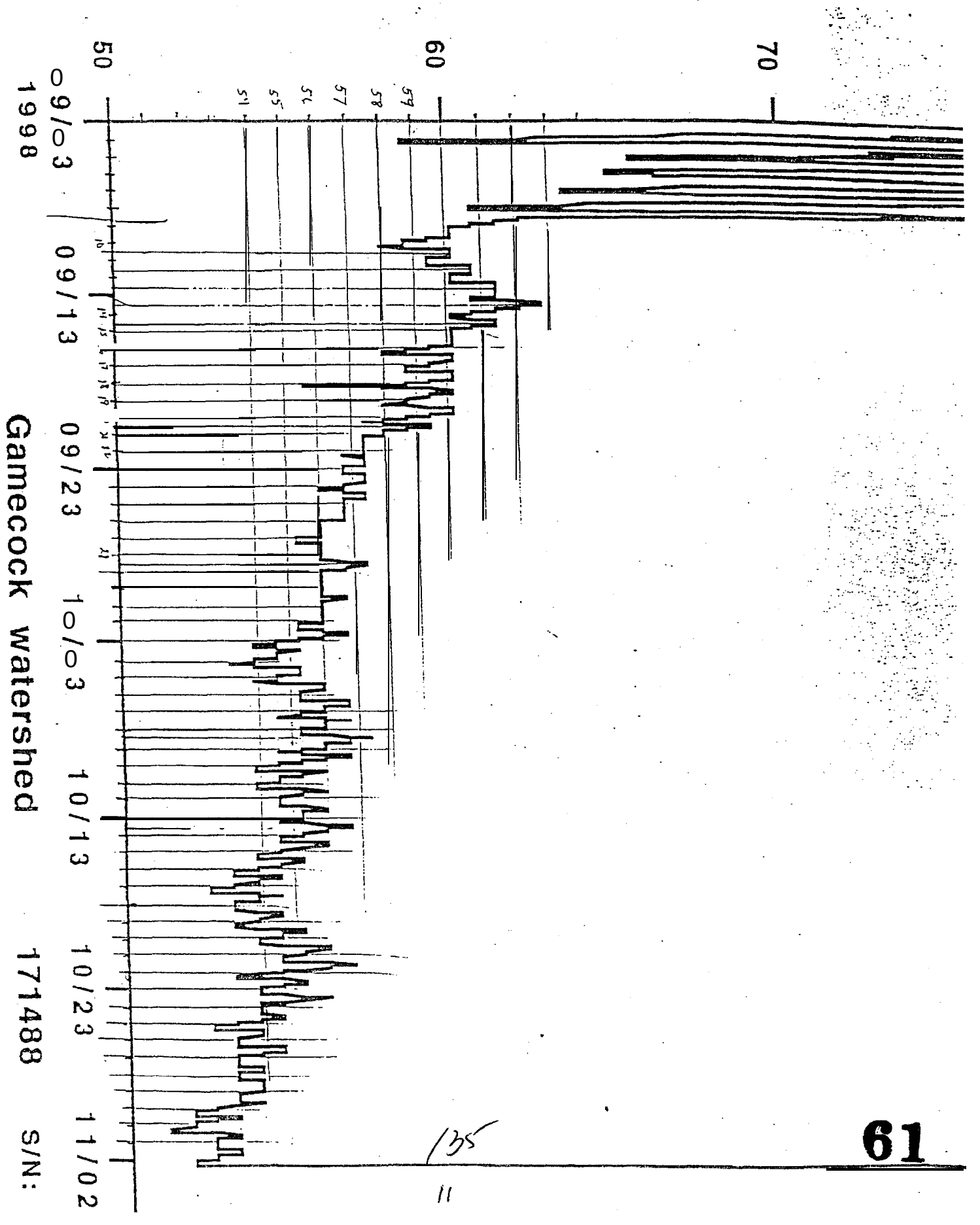
Water Temperature and Canopy - Gamecock Creek 4/15/99



Hobo Site 2

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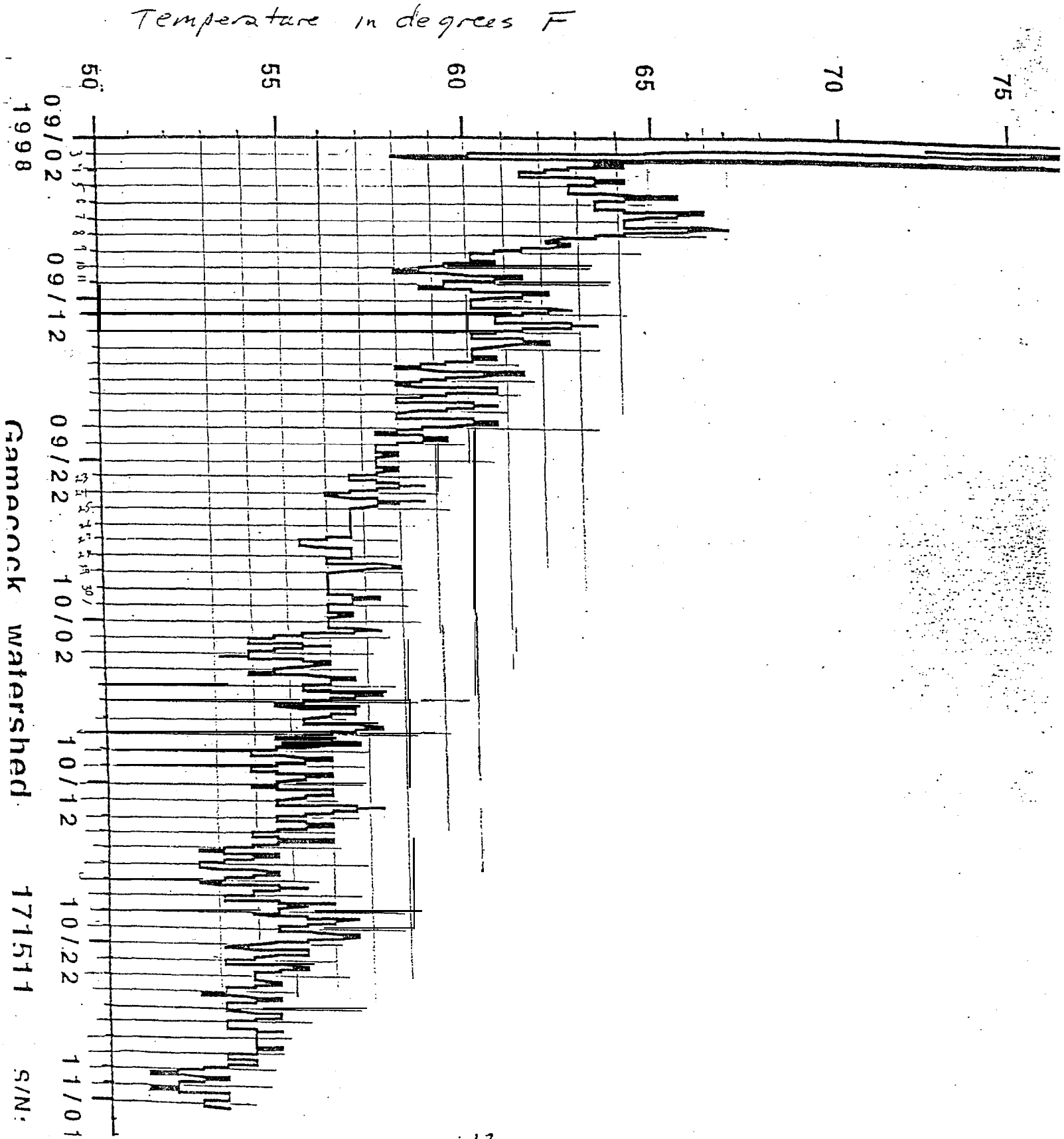
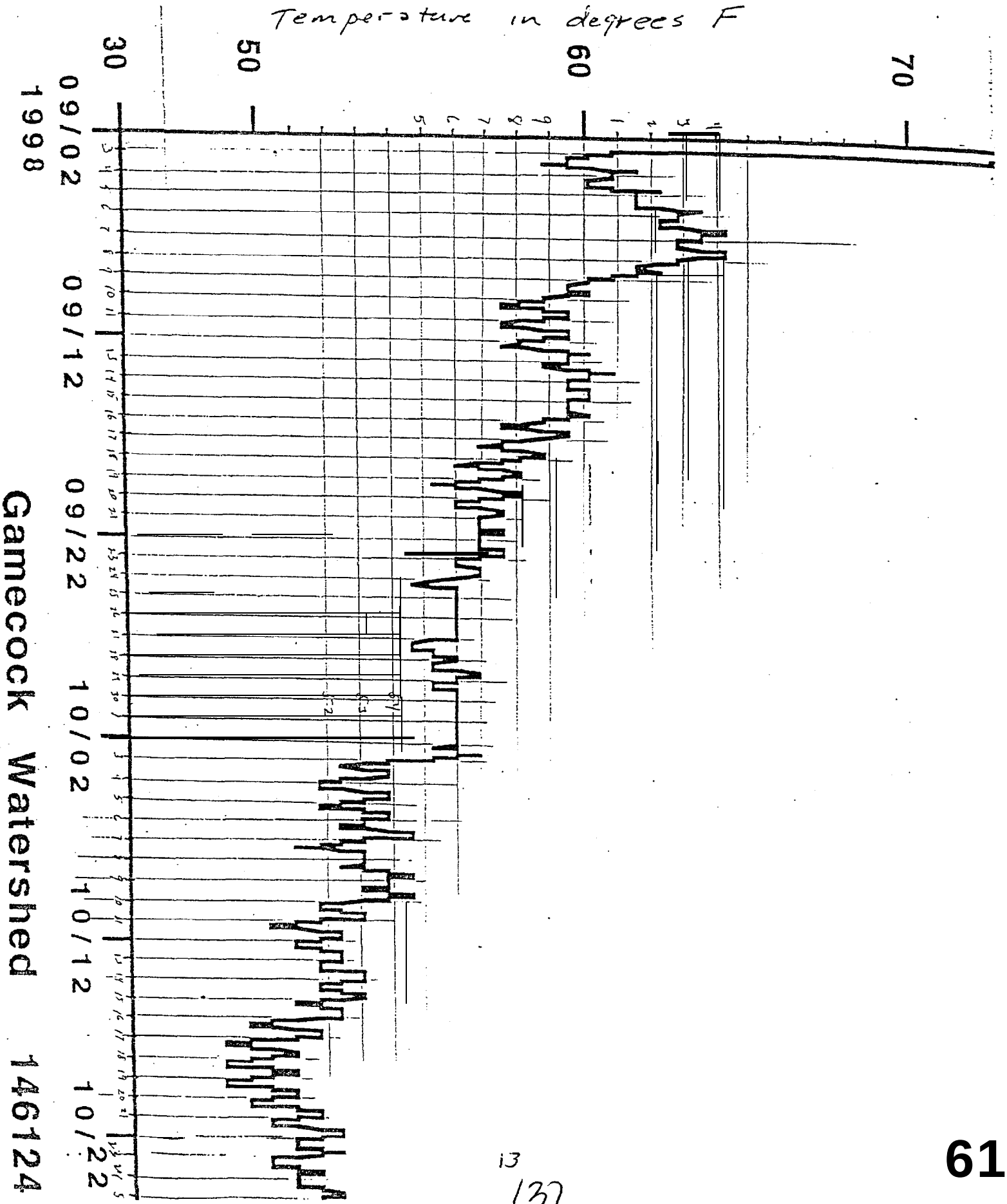
Water Temperature and Canopy - Gamecock Creek 4/15/99



Water Temperature and Canopy - Gamecock Creek 4/15/99



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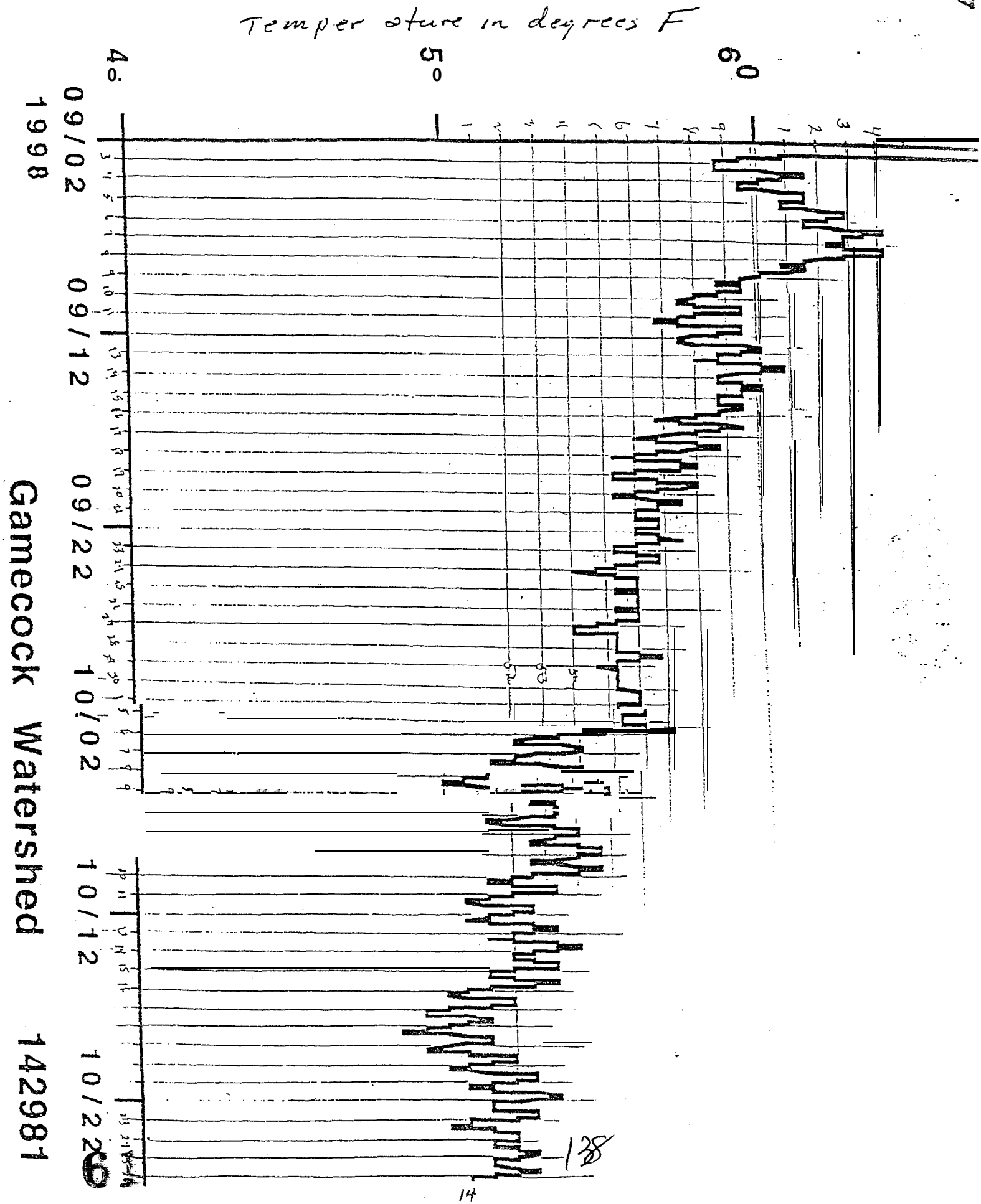


Water Temperature and Canopy - Gamecock Creek 4/1 5/99

APPENDIX B

1. Standardization of water temperature measurements with 5 Hobo temp. devices

The devices were placed together in a 20 gallon (approx) ice water bath on 1 1/4/98 following their monitoring time in the creeks. They were left outside where the sun could hit the tank for 5 days. The ice was renewed in the tank on 11/5. Temperature graphs were overlapped to determine the temperature variations between devices. The reported results have been adjusted to show the standardized temperatures.

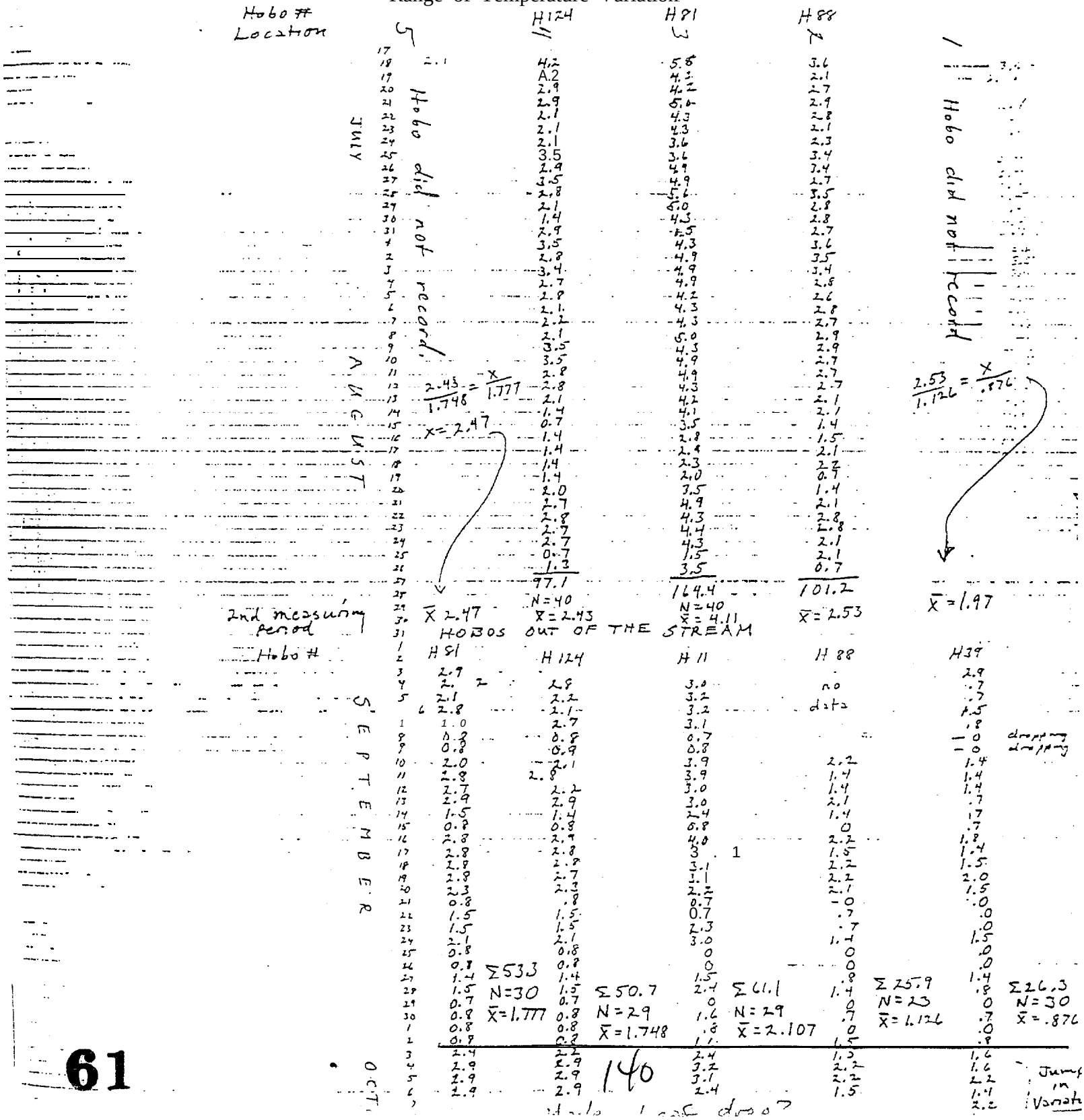
Hobos 11 and SS measured identically on all lows. but differed on one high by about 8°, and another high by 1". Hobo 81 was 1° lower than 2 hobos, agreed with 2 others in the range of 38" to 43° but measured 1.5° to 2" higher than 3 other Hobos at 65" on one measurement, and 1" higher than 5 Hobos at two other 65° peaks. S 1 did not record the 16" spike in temperature (sun on the tank?) on 1 1/6, and was 1° to 2" higher than 3 hobos at the 76" to 77.5" range. The spike is not counted in the averages below.

	Average temperature at highs & lows	Hobo # and adjustment within each temperature range				
		H11	H24	H39	H81	H S S
1	42.75	-.4	+.28	+.28	+.28	-.4
2	66.26	+.56	-1.54	+1.26	-.74	+.56
3	39.22	-.28	+.42	-.28	-.28	-.28
4	65.42	-.28	+.42	i-.42	-.28	-.28
5	61.02	+.22	+.22	+.22	-.48	+.22
6	65.32	+.32	+.32	+.22	-.38	-.38
7	56.94	+.14	+.14	+. 14	-.56	+.14
S	63.04	+.14	+. 14	+. 14	+.14	-.56
9	54.92	+.22	+.22	+.22	+.48	+.22
10	76.84	+.84	0	+.84	-.46	-.46

Various analyses of averages with and without extremes indicates too much variability between Hobos and within each Hobo reading to permit any simple adjustments for this small sample. I think one must conclude that the temperatures measured by each Hobo is accurate ± 0.5°F.

APPENDIX C

Range of Temperature Variation



APPENDIX D

Canopy Measurements:

Solar Pathfinder measurements 4/20/98

Lightly cut WLPZ: 45 Solar Pathfinder measurements at 50 foot intervals.
Average canopy = 56% with a standard deviation of 6%
Moderately cut WLPZ: 16 Solar Pathfinder measurements at 50 foot intervals.
Average canopy 81.6% with a standard deviation of 6%

Solar Pathfinder measurements on 7/10/97 on the lower 1200 feet of the THP (below the 1st fork) taken at 30 foot intervals:
14 measurements indicated 89% canopy with a standard deviation of 3% for September.
13 measurements for August indicated 52% with a standard deviation of 9%.
A sample of 7 points for June indicated 77% canopy with a standard deviation of 12%.

Vertical Sighting Tube measurements, October 2. 1997, by Hollett & Twight
A 250 foot sample was taken running transects approximately perpendicular to the Creek with sample points (hit or miss) readings taken at about 30 foot intervals. Most transects had 13 sample points. Hollett's raw data per transect was not recorded. The sample indicated an average 85% canopy on the west side with a standard deviation of 8%. 77% canopy on the east side for an average canopy of 81% probably with, a standard deviation of 8%.

Vertical Sighting Tube measurements. January 14, 1998. by Roger Thompson. S Hollett. P Twight & D Van Lennep.
A 500 foot sample of transects was taken perpendicular to the creek at 50 foot intervals with 6 measurements of hit or miss per transect. The actual data was not retained per transect so statistical analysis of transects could not be done. The transect average showed 60% canopy with a standard deviation of 10%. The variation in data between point sample transects is obviously very high.

Vertical Sighting Tube measurements were taken by Twight on 7/7/98
A 100 foot transect parallel to the stream at about 50 feet distant was taken with measurements at 10 foot intervals in the no-cut zone of the WLPZ near the property line. indicating 90% average canopy.
A 100 foot transect parallel to the stream at about 50 feet distant was taken with measurements at 10 foot intervals in the uncut area of the WLPZ above the property line. indicating 86% average canopy.

APPENDIX E

Water Temperature and Canopy - Gamecock Creek 4/15/99

Notes and Literature Reviewed

NOTES ON WATER TEMPERATURE ISSUES FOR GAMECOCK/RAMSEY PROJECT:

Peter H. Caferata, 1990. "Water Temperature Evaluation"

"Elevated stream temperatures can reduce juvenile survival rates and lower the abundance and diversity of food organisms for fish (Beschta et. al. 1987)." [this is not the gist of Beschta et al, in fact it seems to me the opposite. - PAT]

"Stream temperatures increase after logging largely because of the increased exposure of the stream surface to solar radiation (Brown, 1969)."

"While buffer strips supply benefits beyond just stream shading (i.e., sediment filtering, wildlife habitat, etc.), for the purposes of this discussion . . ."

"About 90 percent of the maximum [shading ability] will be reached in the first 55 feet (Brazier and Brown 1973). The size of **a** stream, its orientation, surrounding topography, and type and density of vegetation need to be considered when designing a buffer strip."

sand, gravel or boulder stream bottoms heat and cool more quickly.

The best method of measuring canopy shading where temperatures are critical is the Solar Pathfinder.

description of how to predict temperature increase: Stream surface area, cfs measurement, travel time of water, 15 - 20% reduction for bedrock conditions, estimate canopy change from harvesting.

Robert L. Beschta et al. 1987.

"Bedrock channels are more efficient than gravel-bed channels at conducting heat." p192. "" . . .conductive heat transfers are usually insignificant (Brown 1969)." p193

If temp change after logging lie within the bounds of natural variability, then any effects related to temp change might be difficult to detect. Furthermore, even if measurable, such effects might be relatively unimportant if they would be expected to result from climatic variability anyway." p194-5

" Peak daily temperatures are usually achieved during the late afternoon, and minimums just before dawn. p195

Small streams change temperatures of large in proportion to water volume.

Thermal stratification usually only takes place in pools, may be 5 to 10°C cooler' than surface. "Cool-water sources usually result from a, tributary stream, groundwater, or an upwelling of stream water that has been cooled through flowing through the stream beds (figure 4)." p197

Water Temperature and Canopy - Gamecock Creek 4/15/99

"Again, the principal source of energy for heating small streams during summer conditions is incoming solar energy striking the water surface." "Most of this incoming energy is stored in the stream . . ." heat gain by convection will tend to be offset by heat loss through evaporation. " . . .High air temperatures do not cause stream temperature to increase following canopy removal even though daily maximum air temperatures are usually at their highest during clear sunny weather just as temperatures of streams are. However, the two variables are often highly correlated." p199 [I guess this means loss of canopy in this instance did not involve solar radiation hitting water}

Exposed streams have large diurnal fluctuation

" . . .The effect of partial canopy removal is directly proportional to the reduction in canopy providing shade to the stream." p205 "The importance of a buffer strip for preventing increases in stream temperature can be determined by measuring its angular canopy density (ACD)." p205 [hence solar pathfinder] The ACD of old-growth stands in W Oregon generally falls between 80 and 90%

predicting change in stream temp is more difficult in partial cut because it is harder to predict the change in exposed surface. p205 on reaches of more than 1000 feet, evaporation and conductive transfers make prediction more difficult, as well as inflow of ground water. p206 Flow through a shady reach will result in little change in water temperature., therefore changes in headwater temperatures can increase temperatures downstream. The magnitude of downstream effect depends on the relative increase in temperature and the amount of stream flow from the exposed tributaries. p207

Thermal effects

"The energy base for stream biota comes from . . . algal production and . . . needles, leaves, twigs, etc." p209 With increased temperature microflora develop more rapidly and utilize available organic matter at a higher rate. Rapid decomposition of organic material may increase invertebrate production more quickly leading to additional fish food at an earlier time. Org matter would be consumed over a shorter period.

Increase in stream light and temperature increases algae and often species composition. Increases in filamentous algae tends toward more worms which fish eat less.

despite potential for deleterious effects, clear cuts increased invertebrates in streams, so apparently deleterious effects are outweighed by increase primary production resulting from increased temperatures, light, and nutrients." p210-11

Higher temperatures may accelerate insect larvae development, and earlier adult emergence. The emergence of fry and feeding coincides with spring and early summer hatches of insects.

"Thus increased temperatures would probably eliminate the fish before their food resource was affected." p211

ATTACHMENT 7 ATTACHMENT A

Water Temperature and Canopy - Gamecock Creek 4/15/99

Increased temp increases food available to salmonids, so must consider effects in the entire system. p212

Thermal tolerances and preferences

"Apparently salmonids are tolerant of the extremes in temperature they are likely to encounter over their life spans and geographic ranges. In particular, the life stages of salmonid species that rear in freshwater seem especially tolerant of extreme high temperatures (extreme in the sense that most species can tolerate temperatures that are many degrees higher than any they are likely to encounter).temperature" p212-13

Lethal temperatures identified in laboratories do not exist under natural conditions. p213

Coho fry tend to migrate downstream as water temp increased. p215

fish species competition changes with temp change - trout dominate in cool water, shiners in warm.

Following clearcutting, temp increases by themselves do not have significant deleterious effects ***on*** salmonid abundance. Temps did not exceed tolerance limits for extended periods. Fish are behaviorally "plastic" and act to reduce temperatures exposed to and duration of exposure by moving to cooler areas p215

"Environmental changes Tess favorable to salmonids, such as increased water temperatures in higher order streams, could offset any increase in abundance or production of anadromous salmonids that might occur from opening the canopy along lower order streams, or could even result in an overall decrease in population." p216

Coho required twice the food at 17" C than at 5°C, but decrease in growth and swimming performance occurs primarily at temperatures near lethal thresholds. p217

Steelhead slowed growth at higher temperatures only if food was limited. couldn't be confirmed in nature.

Coho preferred temperatures: 53.2" to 58.3°F Upper lethal = 78.4°F

S teelhead preferred: 45.14°F to 58.3°F Upper Lethal = 75.38°F

Effects of temp (logging temperature increases 58%, climate temp increases 42%) on life history events: (1) increases in length of growing season from earlier emergence led to increase in fry size during 1st winter; increase fry size led to increased pop survival through 1st winter; led to increased numbers and sizes of smolts; and accelerated seaward migration by 7 to 10 days. Early release of Coho resulted in more mortality, therefore, earlier migration of larger population may be wholly offset by increased saltwater mortality. p220 Changes in life history events may affect fish production p221

"There are many reasons why the observed logging-related temperature increases have not had significant deleterious effects on resident salmonids. Among these are (1) the wide thermal tolerances of the freshwater forms of most of the resident salmonid species,

'he **(2) the natural** diurnal cycling of stream temperatures, which limits exposure to maximum temperatures, **(3)** the occurrence of localized cool-water sources, which fish seem readily able to locate and utilize, (4) the inability to extrapolate tolerance limits determined under homogeneous laboratory conditions to the spatially and temporally complex thermal environments of streams, and (5) the ability of fish to migrate to other locations or to curtail activities temporarily when temperatures become stressful. Although increased summer temperatures remain a concern to fisheries managers, it appears that fish are generally able to tolerate such increases without major adverse impacts on growth or mortality." p222

Areas further south may have more temperature impacts because of higher ambient water temperatures

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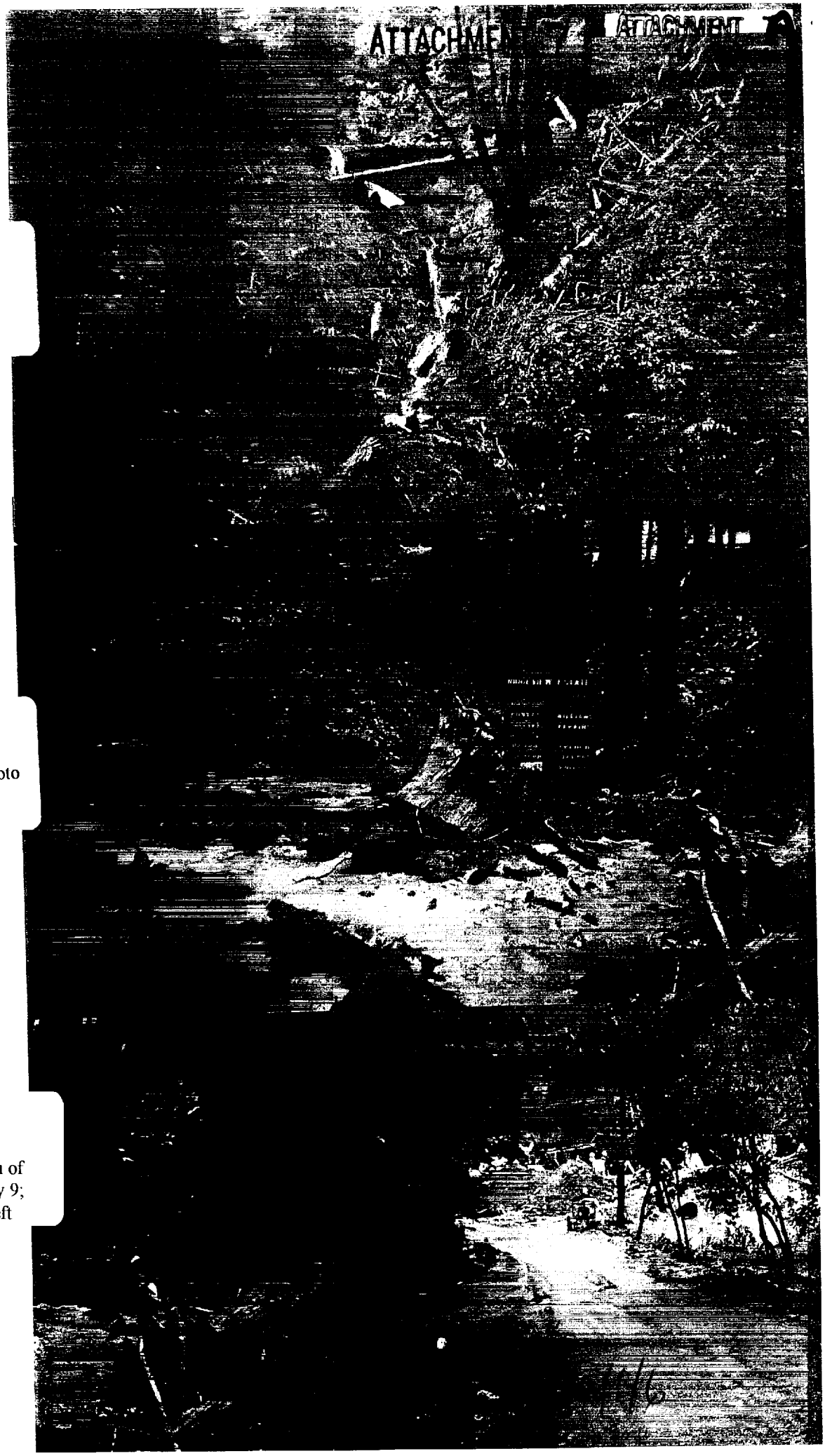

6. Quigg Way/Thompson THP
RPF - Paul

Slash in and around Class II stream

7. Quigg Way/Thompson THP
RPF - Paul

Plugged culvert immediately below Photo 16, note residential access affected

18. Quigg Way/Thompson THP
RPF - Paul

Highway 9 culvert failure downstream of photos 16/17; damage closed Highway 9; also note slash debris in foreground left

53. Love Creek

trees caught at Love Creek 1Road bridge, illustrates need to eliminate near stream cutting to reduce wood in stremns during wet weather flows