NLWJC - Kagan

Counsel - Box 023- Folder 003

Headwaters Forest Complex [2]

Headwaters Forest Complex

The following text refers to areas delineated on the map which accompanies it. The information may be used as guidance in determining which lands may be acquired or otherwise protected by the U.S. Government. Acquisition of Headwaters Forest or other forest lands should be designed to protect the ecological integrity of the coastal forests and watersheds in Humboldt County, California. The area is located approximately 15 miles southeast of Eureka and 250 miles north of San Francisco.

Landscape

The watersheds within the Headwaters area rise from near sea level to over 2000 feet. They include the headwaters of Salmon Creek; the North Fork, the South Fork, and Little South Fork of the Elk River; Lawrence Creek and most of the Yager Creek drainage, which are major tributaries to the Van Duzen River, a waterbody listed under Section 303 (d) of the Clean Water Act as impaired from source to mouth by "excessive sediment loading" due to logging and overgrazing.

Protection for Headwaters will help maintain biodiversity by preserving the only significant ancient redwood forests between Redwood National Park and Humboldt Redwoods State Park, by maintaining critical habitat for the threatened marbled murrelet, and by protecting a significant percentage of spawning wild coho salmon in California.

Critical Habitat

In his decision in *Marbled Murrelet v. Pacific Lumber Company* (U.S. District Court for the Northern District of California), Judge Louis Bechtle wrote: "The harvesting of **THP 237 [dark green, labeled Owl Creek Grove]** or any other significant portion of the marbled murrelets' critical habitat in southern Humboldt County, will result in a high probability that the remaining population of marbled murrelets in the region will become extinct."

The *Draft Recovery Plan* for marbled murrelets issued by the U.S. Fish and Wildlife Service (U.S.F.W.S.) in July 1995 confirms Judge Bechtle's findings:

> "Essential nesting habitats that occur on forest lands under non-federal management include:...
>
> Suitable nesting habitat on Pacific Lumber Company lands in Humboldt County, California. These areas are the only available nesting habitat for the southern portion of Zone 4 [Siskiyou Coast Range Zone]. This area has known nest sites and is situated in a key area, close to the coast, with no Federal lands in the immediate area that are able to provide similar recovery contributions."

The forestland **designated CA-03-A (pink line) by the U.S.F.W.S. as critical habitat** for marbled murrelets combined with the other nearby groves occupied or with murrelet presence detected (dark green) should be protected by government acquisition. Areas exhibiting presence of murrelets or occupied behavior outside CA-03-A should be protected to the standards promulgated in Section C of *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (*Standards & Guidelines*) dated April 13, 1994. These standards call for a 0.5 mile buffer around activity centers.

Most of this designated critical habitat is owned by the Pacific Lumber Company which has been aggressively logging in the residual old growth and second growth between the occupied stands. Roughly 4200 acres adjacent to the north of the largest Headwaters Grove, is owned by Elk River Timber Company which began clear-cutting and road building within the critical habitat in September 1995.

Other Habitat

A variety of landscape types are found within Headwaters, including lowland riparian forests, ancient redwood forests, oak woodlands, residual old growth, and second growth stands. The area provides habitat for many species listed by the federal and/or state ESA as endangered or threatened, and for others that are candidates for listing.

Among **mammals** present are black bear, Pacific fisher, marten, mountain lion, coyote, black tail deer, flying squirrel and red tree vole. **Birds** include Northern spotted owl, marbled murrelet, goshawk, and migratory and resident songbird populations. **Amphibians** include Pacific giant salamander, tailed frog, and southern torrent salamander. **Anadromous fish** runs of steelhead, trout, coho and other salmon complement resident fish populations.

Headwaters Forest Descriptions

Ancient Forest Groves (dark green)

Acquisition of the Headwaters Forest area provides an opportunity to preserve the last significant unprotected groves of ancient redwoods in the world. These forests include large live trees up to 2000 years old, 300 feet tall and 16 feet in diameter, with multi-layered canopies, standing dead trees (snags), large down logs, clear-flowing perennial streams, and a thick organic soil layer. **All of the ancient redwood forest groves have presence of marbled murrelets detected, and most support occupied nesting behavior.**

With their acreage in parentheses, the groves include Headwaters (3000), Elk Head Springs (307), Boulder Creek (290), All Species (307), Shaw Creek (412), Owl Creek (455), Allen Creek (471), Nanning Creek (60 ac virgin, 120 ac residual), Mt. Bemis/Grizzly Creek (420), Larabee (200), Jordan Creek (300), Giacomini Prairie (120), Monument Creek (120), and Freshwater Creek (70). These groves are all identified on the map and are colored dark green.

Old Growth Residual (not mapped separately, but lying within pink critical habitat line and orange preliminary injunction lines)

Pacific Lumber Company's pre-Maxxam policy of selection logging left a legacy of residual old growth trees that retain much habitat value. Key areas for enhancing the biological value of the remnant untouched groves, they retain the multi-story canopy which protects stream temperatures essential for anadromous fish like salmon, as well as provide prime habitat for many threatened species, including the northern spotted owl. Murrelet presence has been detected in many residual old growth groves.

Younger Stands (not mapped separately, but lying within pink critical habitat line and orange preliminary injunction lines)

Second growth stands up to 100 years of age exist throughout Headwaters, with trees standing up to 120 feet tall and 3-5 feet in diameter. These stands offer potential for enhancement of ancient forest maintenance and recovery. When adjacent to "islands" of ancient forest these stands provide buffers and habitat with high potential for re-colonization by old-growth dependent species. The inclusion as critical habitat of the residual old-growth and younger stands surrounding the virgin groves exhibiting presence or occupied behavior of murrelets is consistent with the U.S.F.W.S. regulation which provides that *"when several habitats, each satisfying the requirements for designation as critical habitat, are located in proximity to one another, an inclusive area may be designated as critical habitat "* (50 CFR Sec. 424.12(d)).

Elk River Timber (dotted black line)

Part of the Elk River Timber property to the north of the main virgin grove, with stand age up to 100 years, provides an important buffer, contains excellent coho salmon habitat, provides the best road access into Headwaters and has been designated as critical habitat by the U.S.F.W.S. In spite of the designation, the company began clear-cutting in September 1995.

Headwaters Ancient Forest Groves
(dark green within pink boundary)

Wildlife surveys have shown that **each of the following groves is "occupied" by marbled murrelets demonstrating breeding behavior.** The U.S. Fish and Wildlife Service has included all of the following groves and the surrounding residual old-growth and younger stands in its draft designation of critical habitat for marbled murrelets.

Headwaters - 3000 acres

The largest grove of unprotected ancient redwoods in the world is the origin of the Little South Fork of the Elk River and Salmon Creek, both of which flow into **Humboldt Bay (blue)**. Ranging from 1000 to 2000 feet in elevation, it is home to the marbled murrelet and the northern spotted owl, both listed as threatened by the U.S. Fish and Wildlife Service.

Elkhead Springs is an **additional 387 acre** virgin grove 1/2 mile east of Headwaters. It includes the source of the South Fork of Elk River. **During negotiations in 1994 regarding HR 2866, the Headwaters Forest Act, the Pacific Lumber Company offered to sell a total of 7500 contiguous acres which included the 3000 acre main grove, the rest of the Salmon Creek Lands (which totals 6000 acres including the main grove) and the Elkhead Springs Grove.**

Boulder Creek - 290 acres

Murrelets are exhibiting occupied breeding behavior in this grove.

All Species - 307 acres

The headwaters of Lawrence Creek flows through this most diverse of the groves. Ancient redwood, Douglas fir, western red cedar and hemlock occur here. Bear and deer utilize the forest for cover after feeding in adjacent oak woodlands and prairies while vine maples shimmer over Booth's Run Creek. This grove provides a stepping stone to the cliffs and old growth of the Bureau of Land Management's Iaqua Buttes, which rim the greater Lawrence-Yager Creek watershed. **Murrelet eggshells have been recovered in the Booth's Run Grove**, a portion of All Species.

Shaw Creek - 412 acres

A gently sloping forest of giant redwoods and Douglas fir. Logging in the upper watershed has caused a need for restoration

Owl Creek - 455 acres

Despite court-ordered murrelet surveys and an injunction, the company briefly logged twice in this grove. Still, it retains much of its beauty and habitat value, its towering trees and rugged terrain glimmering over the South Fork of Yager Creek. A transition from lowland redwood forest to upland prairie and butte, there are a

profusion of small streams feeding deep ravines. **All logging in 237 acres of Owl Creek has been permanently enjoined by the U.S. District Court.**

Allen Creek - 471 acres

Visible from Highway 36 near Hydesville, Allen Creek's untouched ancient forest anchors the southwest corner of the Headwaters area. Pacific Lumber has submitted a Timber Harvest Plan for this area. **Rare Pacific fishers, a large member of the weasel family, have been detected here.**

Remnant Islands - 2 to 100 acres

The pre-Maxxam Pacific Lumber Company left many scattered stands of old growth that contribute to the genetic and habitat diversity of Headwaters. **Some 60-acre stands demonstrate presence or occupied behavior of marbled murrelets.**

Occupied Groves Not Yet Designated as Critical Habitat
(dark green within orange boundary)

South of the CA-03-A designated critical habitat for murrelets are several groves of virgin redwood or virgin douglas fir, some of which are adjacent to residual old growth. These stands demonstrate either presence of murrelets or occupied nesting behavior and should be designated as critical habitat islands and protected to the standard in the *Standards and Guidelines* of April 13, 1994 document referred to above.

Bemis/Grizzly Creek - 420 acres

This mixed block of virgin and residual redwood is **adjacent to Grizzly Creek State Park** which contains an additional 250 acres of virgin redwood, bringing the total grove to 670 acres. This grove is occupied by murrelets demonstrating breeding behavior. **Bemis/Grizzly Creek is the only private land nominated by the State of California for inclusion in the designation of critical habitat for marbled murrelets.**

Larabee - 200 acres

This is a grove of virgin douglas fir. Murrelet presence has been detected and there is a high likelihood the site is occupied by breeding murrelets.

Jordan Creek / Demonstration Forest - 300 acres

This grove is adjacent to Avenue of the Giants and is occupied by murrelets demonstrating breeding behavior.

Monument Creek / Eel River - 120 acres

Near the town of Scotia, this grove is occupied by murrelets.

Nanning Creek - 280 acres

Although only 60 acres are still virgin, murrelets have been detected here as many as 50 times in one morning.

Other Groves

The map indicates other groves where murrelets have been detected or are known to be exhibiting breeding behavior.

Elk River Coho Protection Area
(dark blue line)

Directly to the north of Headwaters Grove is the Elk River, some of the best habitat for coho salmon remaining in California. The Elk River watershed includes the lands in the northern area of the designated critical habitat (pink line), Maxxam land north of the critical habitat (blue line), and Elk River Timber lands (dotted black line).

Dr. Peter B. Moyle, Professor of Fisheries Biology at the University of California, Davis, provided testimony for the U.S. House of Representatives about the Elk River area in 1994. To quote from the Congressional Record regarding HR 2866:

> **"By present-day standards, the Elk River is an exceptional stream for coho salmon.** This is because the channel in many areas is in reasonably good condition, protected by having old-growth redwood forest in the headwaters. Although exact numbers of spawning coho are not known for the Elk River, counts of redds, carcasses, and living fish indicate that the run probably averages at least 400 fish per year. For example, a CCC survey on 23 January 1991 (peak run time, in some of the best habitat) of three miles of the north fork of the Elk River counted 51 coho. A run of 400+ coho may not seem like much, but it **could represent about 5% of all wild coho spawning in California!"**

The upper reaches of the South Fork and the Little South Fork of the Elk River are mostly owned by Elk River Timber, which has indicated a willingness to sell this area. The upper reaches of the North Fork of the Elk River is mostly owned by Scotia Pacific Lumber Company (ScoPac)/Maxxam. Elk River Timber has begun logging this area, and ScoPac has many active Timber Harvest Plans in the area and plans more in the immediate future. At the current pace of logging, within five years this watershed will be severely degraded with substantial siltation and temperatures too high to support coho salmon.

Given the Administration's emphasis on multi-species ecosystem management, inclusion of the Elk River area for acquisition or significant riparian protection is appropriate.

Virgin Douglas Fir Northern Spotted Owl Habitat
(light green)

The entire Pacific Lumber/Scotia Pacific ownership is operating under a so-called "no-take" permit for northern spotted owls. This permit is due to be renewed by January 1, 1996. The effectiveness of this no-take regulatory method has not been demonstrated. A Habitat Conservation Plan should be developed to replace the "no-take" permit. Special emphasis should be placed on the remaining virgin douglas fir and redwood outside the murrelet habitat to ensure adequate nesting opportunities for the northern spotted owl.

Preliminary Injunction Bars Logging Without Permit
(orange line)

California regulation allows logging of dead, diseased, or dying trees without a Timber Harvest Plan. The U.S. District Court has issued a preliminary injunction which bars logging without a permit within the area of the orange line so regulators can evaluate protection for threatened and endangered species during logging operations. The company is appealing.

Salmon Creek Watershed
(purple line)

West of Headwaters Grove, Salmon Creek flows approximately seven miles out to the **Humboldt Bay National Wildlife Refuge (yellow)** where it empties into the Pacific Ocean at Humboldt Bay. Multiple ownership complicates acquisition in this area. The purchase of conservation easements to protect the riparian areas could ensure that this link with existing Federal lands continues to provide a viable wildlife corridor to Headwaters. At a minimum, conservation easements should be sought which meet the Standards and Guidelines for fish-bearing streams adopted in the April 13, 1994 document referenced above. These include no-cut zones on each side of the stream "extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest."

Map and Text prepared by the Headwaters Forest Coordinating Committee
November 1, 1995

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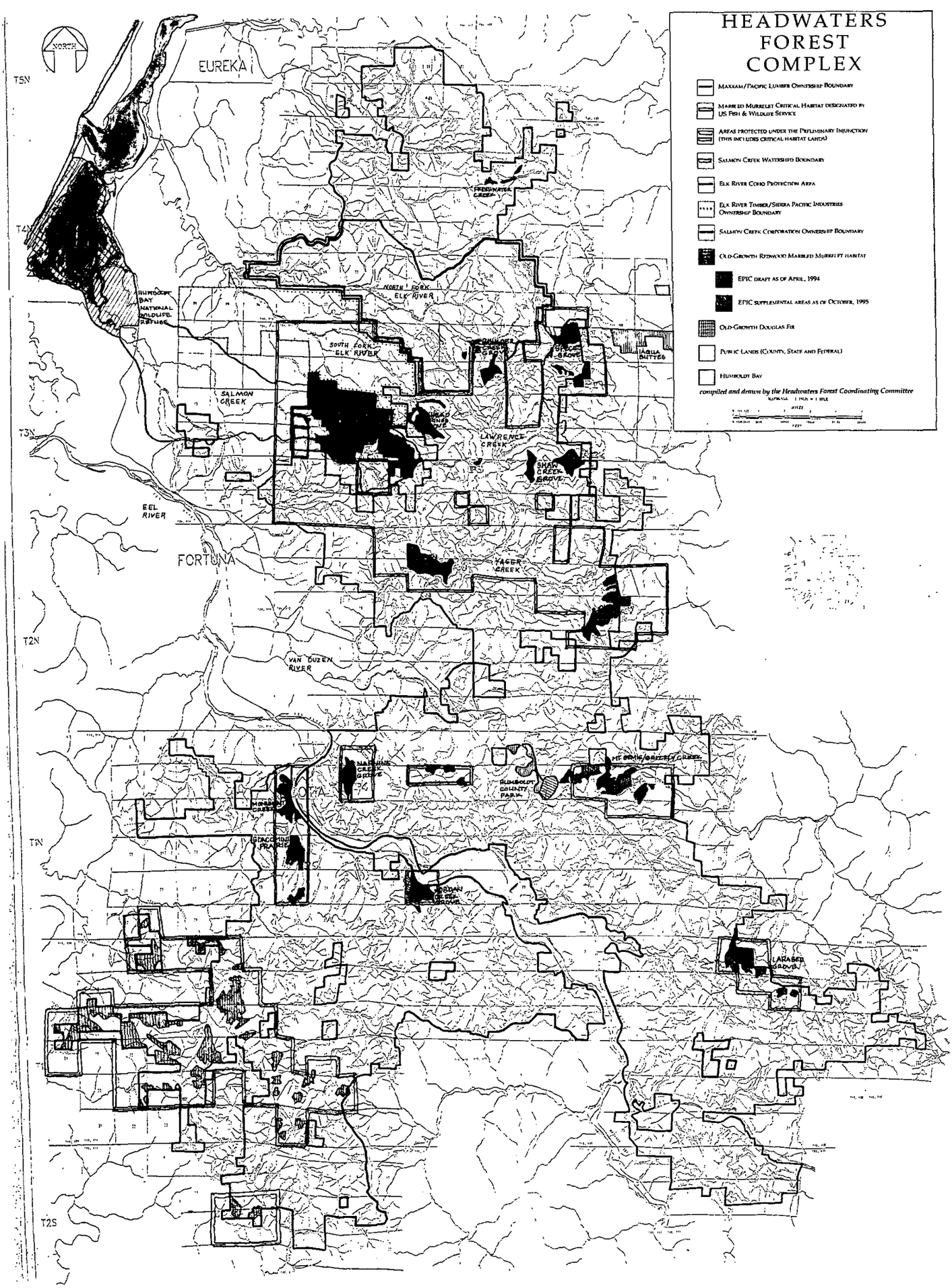

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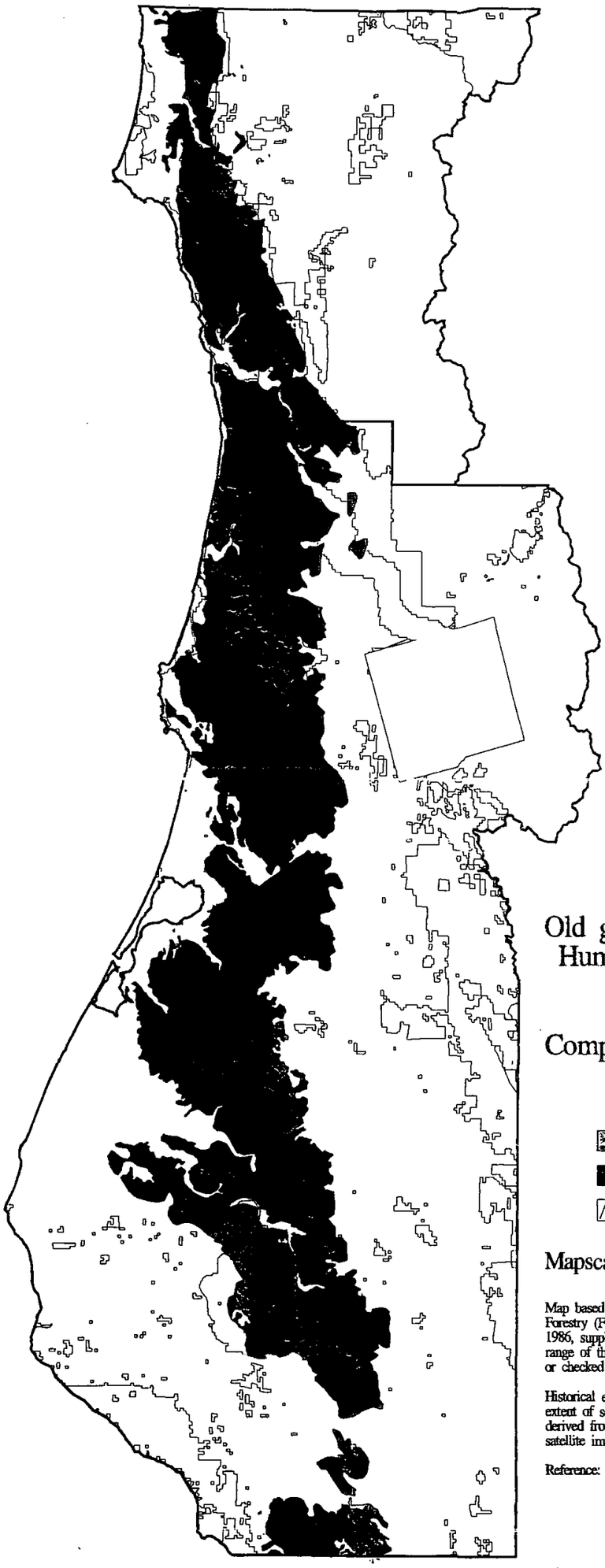


Old growth Coastal Redwood Forest Humbolt and Del Norte Counties California

Comparison of Original Extent to Extent in 1992

- Original redwood extent
- 1992 redwood extent
- Boundaries of public lands

Mapscale: 1:600,000 or 1 inch = 9.47 miles

Map based on Redwood GIS layer supplied by California Department of Forestry (Fox 1988). Color infrared photos at 1:130,000 scale from 1986, supplemented with NASA and USGS aerial photos in the southern range of the redwood. Fox's data were ground checked where possible or checked from low flying aerial surveys.

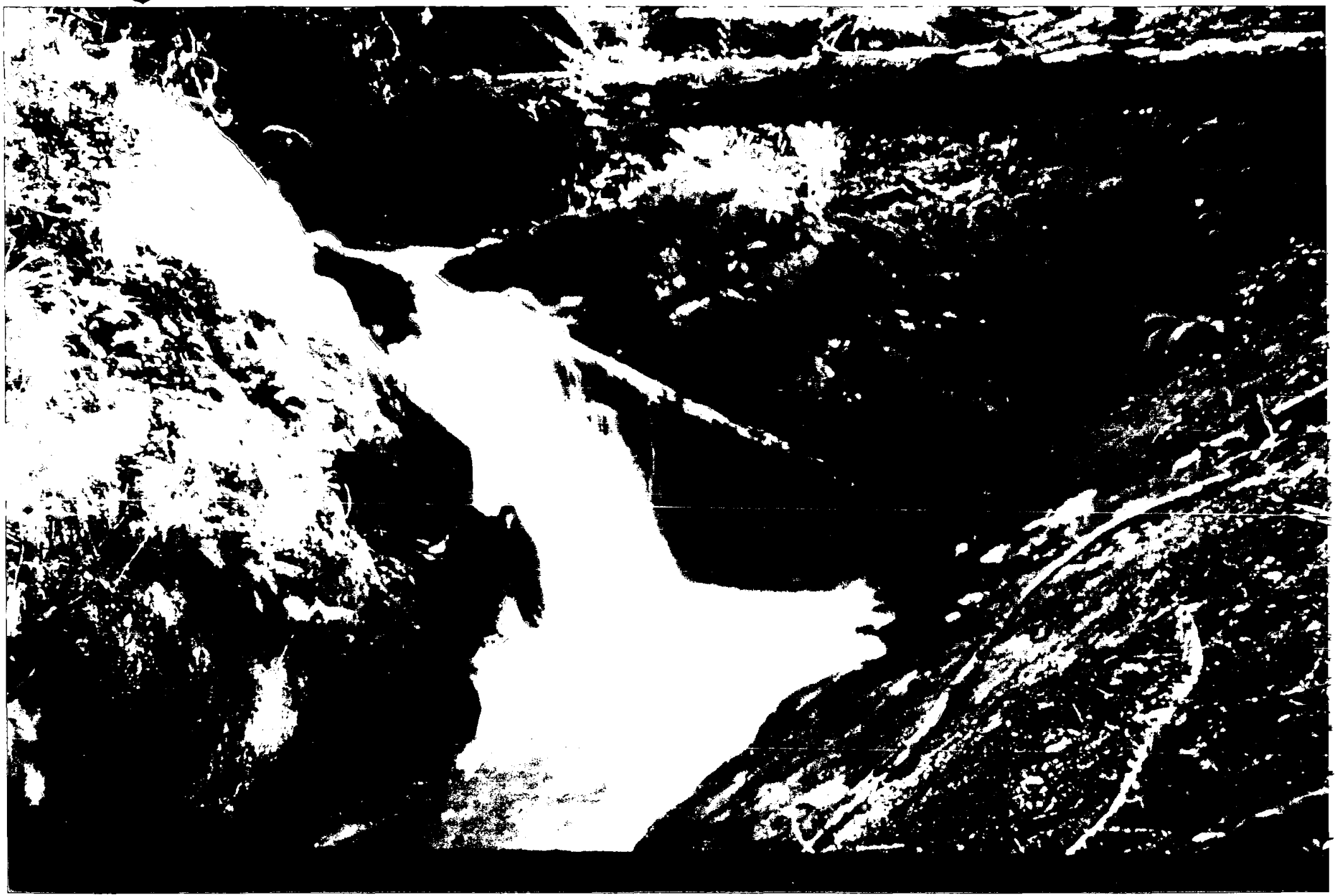
Historical extent of old growth redwoods inferred from current extent of second growth plus old growth. 1992 old growth extent derived from updating historical extent with 1992 Landsat MSS satellite imagery.

Reference: Fox, Lawrence III. 1988. A classification, map and volume estimate for the coastal redwood forest in California. FRAPP Contract 8CA52849.

Sierra Biodiversity Institute 1994

Headwaters Forest

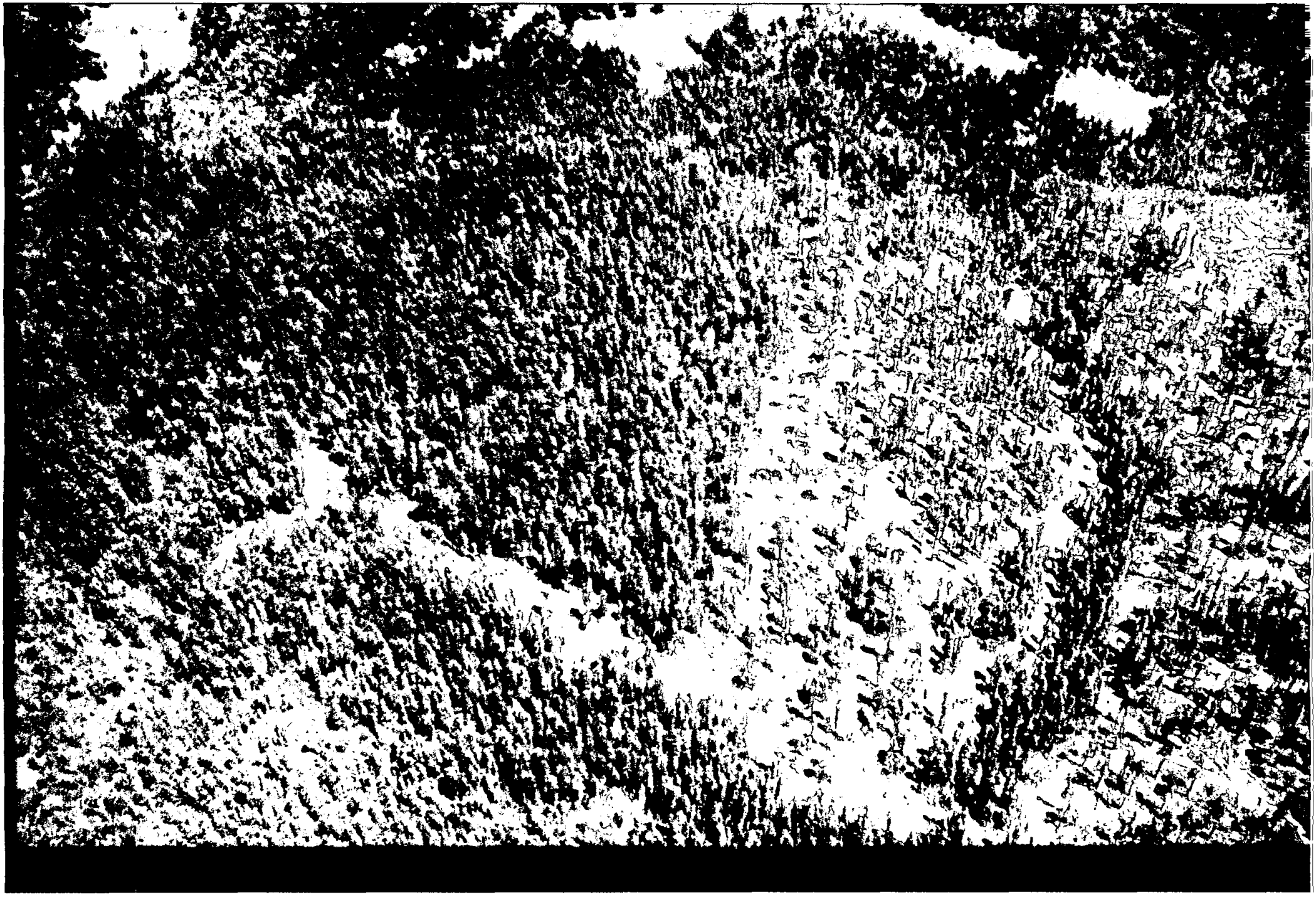
Ancient redwoods are the world's densest rainforest.



Salmon Creek in the Headwaters Forest

Home to Coho Salmon, Tailed Frogs, Olympic Salamanders, and other threatened and endangered species.

Shaw Creek Ancient Redwood Forest
Coho salmon still live in this grove's water.

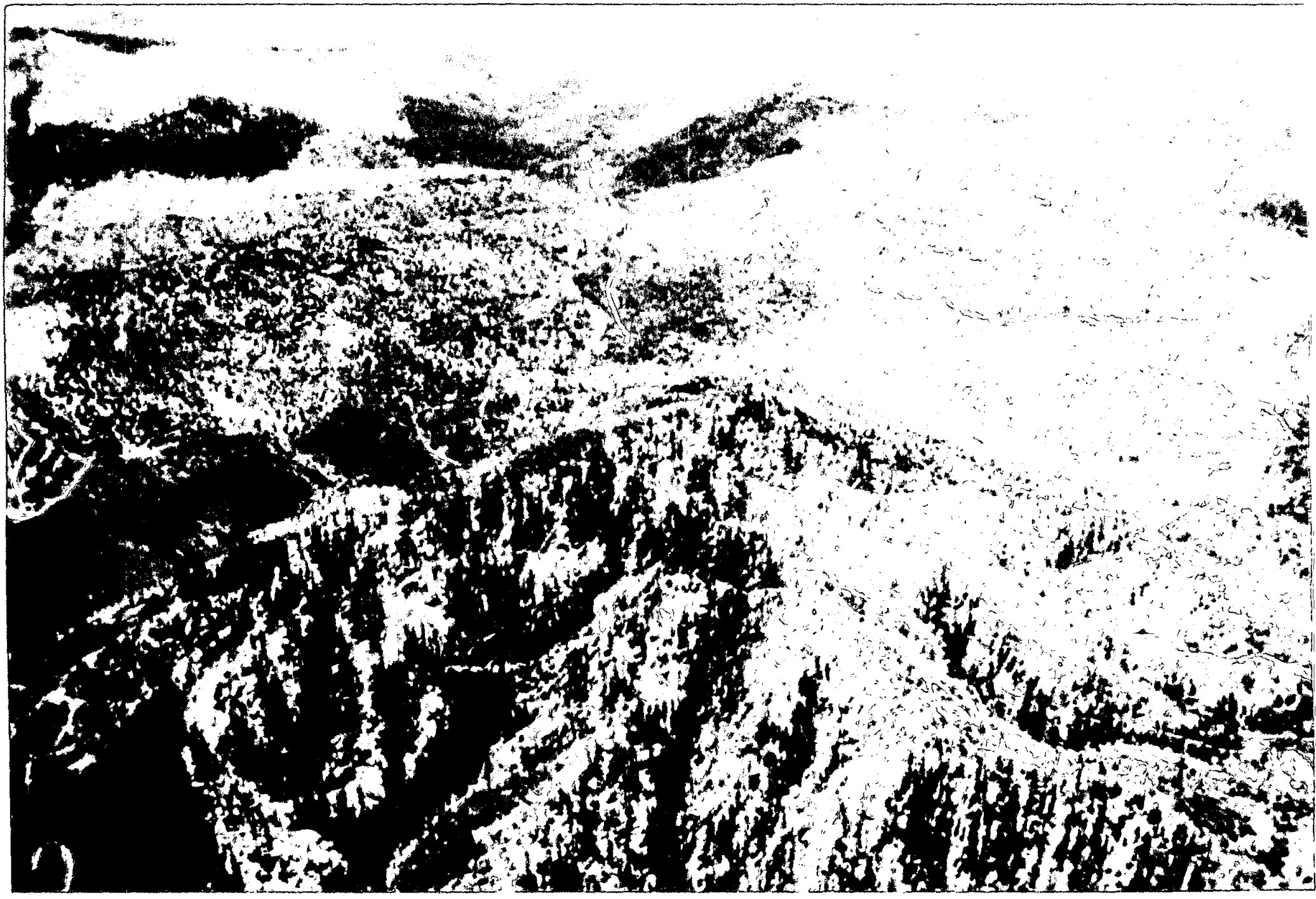


All Species Grove

Allen Creek Ancient Redwood & Douglas Fir Forest

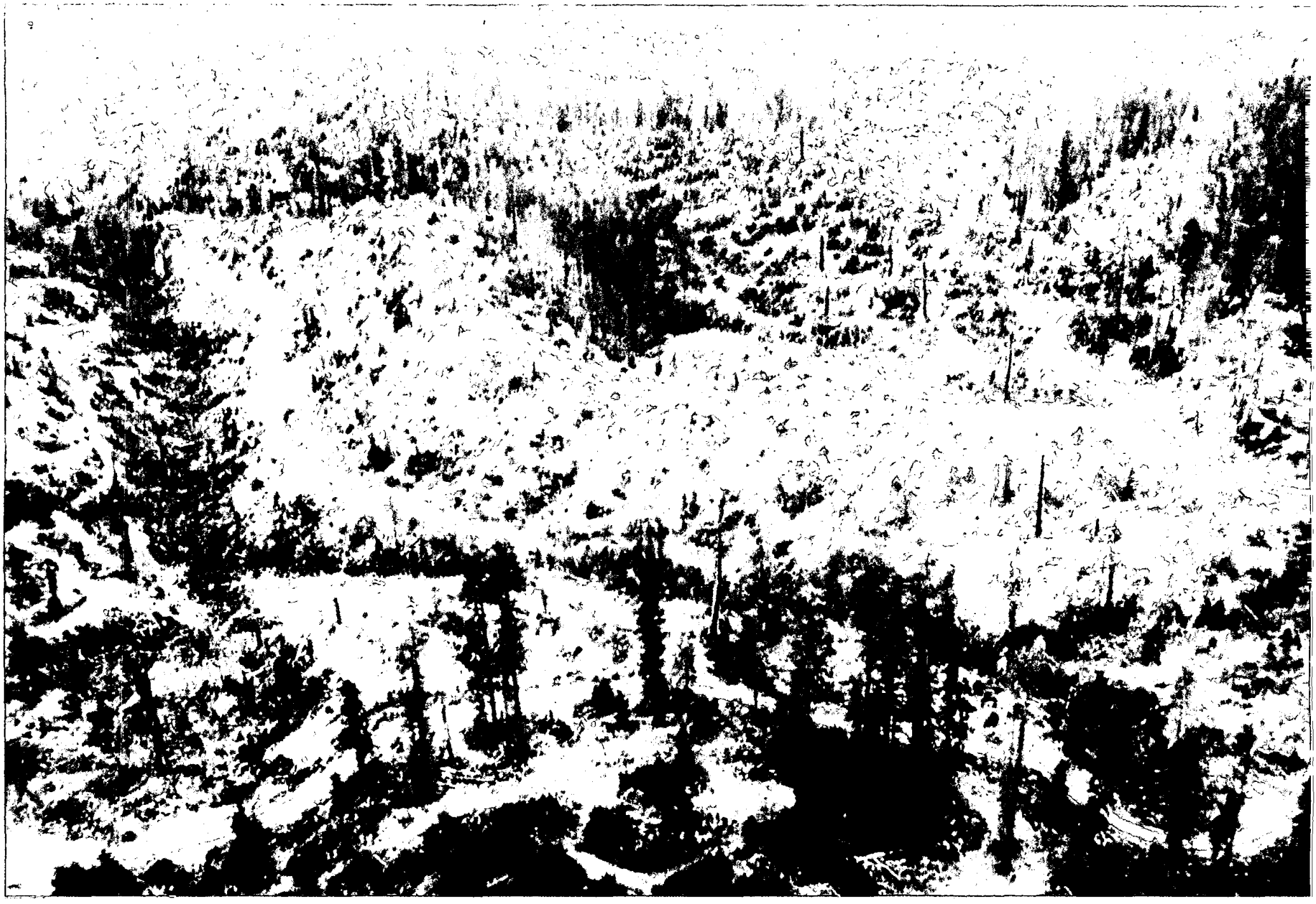
Yager Creek with Owl Creek Grove in the foreground

Center strip of trees along Yager Creek was logged this summer.



Lawrence Creek

More than 13 square miles of clearcuts can be seen in this photo. Most of this was ancient forest in 1985.



Clearcutting by Pacific Lumber east of Headwaters

This area was an ancient redwood forest in 1985.

Ancient redwood marked for cutting by Pacific Lumber in Headwaters Forest

This tree along with hundreds of others would be cut soon if P.L. gets approval to extend their "wildlife study trail".

Headwaters Forest to the left, Elk Head Springs Forest to the right
(300 acres) clearcutting by Pacific Lumber surrounding the groves.

Owl Creek Grove- Pacific Lumber clearcuts surrounding the Grove

Bootjack Prairie in upper left corner is one of the last upland prairies in the world completely surrounded by ancient redwoods & Douglas Fir

PACIFIC WATERSHED ASSOCIATES

WATERSHED RESTORATION PLAN FOR PROPOSED HEADWATERS REDWOOD FOREST COMPLEX

INTRODUCTION

The purpose of this document is to describe actions which must be undertaken to restore and rehabilitate the ecosystem within the proposed Headwaters Redwood Forest Complex of Humboldt County, California.

The major goals of the forest and ecosystem rehabilitation program include: 1) to encourage the return of a natural pattern of native vegetation, 2) to minimize and eliminate man-induced erosion and sediment yield to stream channels, and 3) to restore the area and its stream channels to pre-disturbance biological health and diversity.

In the long term, the program should result in the restoration of a naturally functioning, self-perpetuating ecosystem which contains components similar to what would have existed without disturbance by man.

PROGRAM APPROACH

The restoration approach for the Headwaters Redwood Forest Complex employs well established principles of watershed dynamics, ecosystem function and conservation biology to develop a drainage basin-wide strategy that restores altered hillslope, riverine and biological processes at the watershed level. The approach places emphasis on preventing future cumulative impacts to the physical and biological system from past timber harvesting and road construction, controlling existing watershed and biological damage and restoring natural physical and biological processes.

The restoration program will consist of several major inter-related projects to be carried out over a 10 year period. The principal components or steps of the program are outlined below.

1) Assemble restoration team: Recruit and assemble core multi-disciplinary professional, technical and administrative staff needed to conduct and coordinate a detailed ecosystem-based watershed restoration program (year 1);

2) Conduct reconnaissance assessment: Conduct a reconnaissance level basin-wide assessment involving aerial photograph interpretation and cursory field surveys and investigations to identify major problems and high priority sub-basins for later detailed assessments. Compile existing data, reports and literature to determine the current status and disturbance levels in stream channels, on hillslopes and to the biological community (year 1);

Geomorphic Studies• Erosion & Sedimentation Processes• Wildland Hydrology• Erosion Control
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3) Prepare environmental documents: Professional staff or consultants will prepare mandated environmental compliance assessments and documents for the conduct of restoration activities covering the remainder of the program (years 1 through 2);

4) Develop mapping and database capabilities: Concurrently develop computerized mapping capabilities to ensure physical and biological watershed data is collected and stored in a useable, readily reproducible digital and spatial format (years 1 through 10);

5) Develop resource base maps: Based on the reconnaissance level assessment of resource status, and aerial photo analyses, develop base maps identifying and classifying the current condition of the land base (road systems (including landings and stream crossings), landslides, impacted stream channels, harvest areas, altered vegetation types) and biological community in order to eventually direct the prioritization of rehabilitation needs (year 1);

6) Establish criteria to prioritize work sites: Develop site specific selection criteria to be used to prioritize the immediacy of both physical and biological restoration and rehabilitation needs throughout the watersheds and sub-watershed areas of the Headwaters Redwood Forest Complex (year 1);

7) Prioritize watersheds for detailed inventories: Apply selection criteria to reconnaissance level inventory data to determine the sequence at which detailed watershed inventories will be conducted on the total land base (ie. a detailed listing of the most critical to the least critical areas in need of physical and biological restoration) (year 1);

8) Conduct watershed inventories: Healthy watersheds will be inventoried for potential problems and treated first so that biological and physical conditions of these comparatively intact systems can be maintained and protected. Within more impacted sub-watersheds or areas (those exhibiting relatively degraded biological integrity and reduced complexity), professionals will begin conducting detailed watershed inventories. The purpose of each inventory will be to identify specific potential and existing threats to resources, and to prescribe appropriate corrective or preventive measures needed to reverse resource damage (years 2 through 10);

9) Estimate cost-effectiveness of proposed work: Based on the results of the detailed watershed inventories, recommended treatments will be carefully and systematically reviewed and analyzed by the restoration team. Effectiveness and cost-effectiveness analyses of proposed treatments will be performed to ensure they efficiently and effectively accomplish restoration goals. This analysis will result in a prioritized listing of all proposed restoration work within each sub-watershed of the Headwaters Redwood Forest Complex (years 2 through 10);

10) Implement restoration work: Based on the recommendations and priorities established by the watershed assessments and cost-effectiveness evaluations, a local heavy equipment and labor intensive work force will be hired or contracted to implement on-the-ground erosion control, revegetation, fisheries and wildlife improvement, and stream channel restoration activities. The bulk of expenditures for the Headwaters restoration work will occur during this phase of the program. Most of the funds will be directed to local heavy equipment operators for use in

erosion prevention and restoration work on logging roads and in stream channels (years 2 through 10);

11) Monitor, document and evaluate restoration work: Develop and implement a qualitative and quantitative monitoring plan designed to determine the effectiveness of individual rehabilitation measures and the overall rehabilitation effort, as well as measure recovery of the ecosystem as a whole and in part. Results and findings from monitoring and evaluation data will be used to modify and improve restoration activities throughout the remainder of the program (years 2 through 10).

SPECIFIC RESTORATION ACTIONS TO BE UNDERTAKEN

Likely restoration activities associated with a basin-wide ecosystem restoration program for the Headwaters Redwood Forest Complex include, but would not be limited to, the following:

1) erosion control and erosion prevention activities at hundreds of specific locations on logged and roaded hillslopes,

2) complete removal and stabilization of unnecessary, unstable or poorly located roads,

3) upgrading and "erosion-proofing" roads that will continue to be needed for wildlife and fisheries management, and for other purposes,

4) where possible and desirable, stabilize eroding or unstable stream beds and stream banks along ephemeral, intermittent and perennial stream channels,

5) where appropriate, implement fisheries and aquatic habitat improvement and restoration projects designed to protect, secure or restore wild stocks of anadromous fish and other native aquatic life,

6) in the conduct of restoration work, utilize native vegetation and mulches to revegetate logged and roaded areas, riparian zones and disturbed grasslands,

7) implement a program to systematically remove exotic and non-native vegetation and seed sources, and

8) if deemed appropriate, implement thinning and/or management of second-growth stands in cutover areas to benefit wildlife habitat, to hasten successional rates and to speed the re-establishment of an ecosystem characteristic of the previous old growth forest.

HEADWATERS REDWOOD FOREST REHABILITATION JOBS PROGRAM

INTRODUCTION

The Forest Rehabilitation Jobs Program offers a viable plan to unite the needs of displaced timber workers for local employment with the needs of the forest for restoration. The basic principle behind this proposal is that timber families are not responsible for MAXXAM's policy of forest liquidation, and they should not have to bear the brunt of it. The cost in monetary terms is insignificant, but the long-term benefit to the community and the forest is great. This is a perfect opportunity to implement President Clinton's ideas for ecosystem management, and putting America back to work building for our future. This plan, will at once serve the goals of social and ecological justice.

This proposal offers displaced workers a severance package that creates an opportunity for equivalent jobs at equivalent pay to those jobs lost through the creation of the Headwaters Complex. This plan calls for providing those jobs in restoration, using the existing skills of the displaced timber workers as part of a forest rehabilitation plan for the damaged lands within the Headwaters Complex.

In addition to providing jobs, this plan has two other advantages. First., it can help foster peace and understanding within the community between timber families and environmentalists. Second, it serves the needs of the forest itself. The 73,000 acre Headwaters Complex consists of isolated groves of ancient forest connected by cut-over lands in various states of disrepair. The rehabilitation of damaged connecting lands is essential to the long term viability of the old growth. This is not a make-work program--it is an integral part of ecosystem management, and an investment in the future productivity of the forest.

It is possible that the addition of a restoration jobs program, no matter how connected to the environmental component of a forestlands acquisition bill, would necessitate additional and uncertain Congressional Committee approvals for the bill. Therefore, there is the option of introducing this package as companion legislation to an acquisition bill. Should this occur, the two bills must be developed and presented in tandem.

JOBS AND SEVERANCE PACKAGE

Based on the recent history of PL employment and cutting rates, an educated estimate can be made of how many jobs at Pacific Lumber would be eliminated through the creation of the Headwaters Complex. An in-depth study would be required to predict the exact number. The following program outline was derived from interviews with Pacific Lumber employees, other timber workers, and those familiar with PL operations.

Since the MAXXAM takeover, PL has employed between 1200 and 1300 people. Initial estimates of lost jobs total 400 positions over 5 years or 200 positions lasting 10 years at pre-MAXXAM cutting rates. The rehabilitation of the damaged forestlands, however, will create approximately 100 jobs. Therefore, this proposal offers a way for displaced workers to either continue forest-based employment or to opt out of the timber job market. A voluntary 6-point option package for PL workers would include:

1) Incentives for early retirement
2) Monetary assistance for relocation and job search
3) Scholarships and monetary support for school or retraining
4) Low Interest loans for starting of small businesses
5) Priority hiring for Headwaters restoration jobs
6) Or (if none of the other options are exercised), a lump sum severance payment

These options would be offered on an incentive basis, with more value being placed on those options that provide re-employment opportunities, and less on the lump-sum payment. By offering this option package, the number of people competing for the restorations jobs will be reduced to something approximating 100 jobs available. Although displaced PL workers will have priority for hiring, some non-PL workers with special skills in restoration work may also be hired.

LAND MANAGEMENT

The cut-over lands in the Headwaters Complex will be managed for the restoration of old-growth characteristics and for the general health of the ecosystem, including forests, soils, waterways, fisheries and wildlife. The Headwaters project can serve as a laboratory to learn the skills of ecosystem and old growth habitat restoration.

Although the original ancient forests in the Headwaters Complex must remain undisturbed, this proposal does not have to necessarily prohibit forest practices on all 73,000 acres. After the cut-over lands have been restored into a functioning old growth ecosystem, they could be gradually brought back into production. Forestry methods would not resemble those of MAXXAM, however, and any form of depletion logging would be banned. Rather, the lands would be used to implement sustainable methods such as all-age, all-species management, and/or the 150 year rotation system proposed by the PL Takeback Committee. In this way, the forest rehabilitation program will be an investment in the future, providing both jobs and forests for our grandchildren and their grandchildren, as well. We will be planning ahead, as the Native Americans have done, for the next seven generations.

PROJECT MANAGEMENT

One of the most important elements of a successful land rehabilitation program is that it be controlled by local people with a long-term interest in and knowledge of the land and community. This proposal therefore recommends that the Headwaters Forest Rehabilitation Project be set up as a locally controlled ESOP (Employee Stock Option Plan) company.

Before MAXXAM can receive any monetary benefit from the sale of Headwaters, they must be required to pay back the PL Pension Fund. This fund was looted of $55 million during the MAXXAM junk bond takeover of PL, and replaced with unsecured annuities from the now bankrupt Executive Life Insurance Co. PL workers, both past and present, must be assured of a guaranteed pension plan.

COSTS

The provision of 100 jobs at $30,000/year (including wages and benefits) totals $3 million a year. Over a 10 year period this would total $30 million. In addition, the worker severance plan would cost $10 to $15 million to implement, on a one time basis. With start up costs, the entire plan should cost under $50 million over the ten year period, costing an average of $5 million per year. These amounts are miniscule compared to the annual subsidy given by the Forest Service to timber corporations in the form of below-cost sales. That subsidy reached $400 million/year during the Reagan/Bush era.

These small costs could also be offset by a boost of the local economy, the creation of secondary jobs, increased tax revenues and by the marketing the products of restoration. These include harvested overgrown hardwoods, crowded young conifers that need thinning, and even mushrooms and floral greens. A value-added local industry utilizing these resources (such as for furniture and wood flooring manufacturing) can be developed as part of the restoration project.

PATRICK HIGGINS
CONSULTING FISHERIES BIOLOGIST

791 Eighth St., Suite N
Arcata, CA, 95521
(707)822-9428

January 16, 1995

Mr. Tom Osipowich
Resource Manager
California Department of Forestry
P.O. Box 670
Santa Rosa, California 95402

Dear Sir,

I am offering comments below on THP 1-94-558 HUM which is within the Yager Creek watershed, a major salmon and steelhead producing tributary of the Van Duzen River in the Eel River Basin. I have reviewed the timber harvest plan, California Department of Fish and Game (CDFG, 1992) file information on fisheries in the basin which are appended to THP 1-94-558 HUM. Other scientific documents that have bearing and that were also reviewed are listed in the references section. Yager Creek water temperatures already exceed stressful or lethal limits for salmonids and less than 4% of the canopy shading the stream remains. Despite these serious ecological problems, old growth timber shading the stream will be harvested if this plan is approved.

Ecosystem function of the entire Eel River is severely impaired (Brown and Moyle, 1990). Coho salmon (Oncorhynchus kisutch), chinook salmon (O. tshawystcha) and steelhead trout (O. mykiss) stocks endemic to the Eel River basin are currently at risk of extinction (Nehlsen et al., 1991; Higgins et al., 1992; Brown et al., 1993) and this timber harvest will contribute substantially to further degradation of their habitat.

My Qualifications

I am a consulting fisheries biologist with a specialty in salmon and steelhead restoration. I hold a degree in Biology (B.A.) and have completed all course work required for a M.S. degree in Fisheries at Humboldt State University. My studies in the latter pursuit included classes in soils, geology, geomorphology, and hillslope processes to better understand the impact of watershed disturbances on fisheries resources in our region.

I recently contributed fisheries chapters to the *South Fork Trinity River Watershed and Fisheries Restoration Action Plan*, (Pacific Watershed Associates, 1994) under contract to the Trinity River Restoration Program. I also was the primary author of several chapters in the *Long Range Plan for the Klamath River Basin Conservation Area Fishery Restoration Program* (USFWS, 1991) under contract with U.S. Fish and Wildlife Service. Chapters that I wrote included Habitat Restoration, Fish Population Identification

and Protection, and Use of Hatcheries in Fish Population Restoration. On behalf of the Humboldt American Fisheries Society, I served as principal author of *Factors in Northern California Threatening Stocks with Extinction* (Higgins et al., 1992) which details the potential loss of salmon, steelhead and coastal cutthroat trout regionally. This document was peer reviewed by over 100 fisheries scientists.

Among my other publications is a chapter on the importance of preserving native stocks of salmon and steelhead in *California Salmon and Steelhead: The Struggle to Restore an Imperiled Resource* (Lufkin, 1990). I was retained to review the Aquatic Elements of the Forest Ecosystem Management Plan (FEMAT, 1993) and acknowledged as a member of President Clinton's Ecosystem Management Assessment Team.

Canopy, Shade and Large Wood Recruitment

The stream habitat inventory of lower Yager Creek, which covered over 14 miles (77,332 feet), was conducted by California Conservation Corp (CCC) members on behalf of CDFG (1992). **The survey found that 96% of the reach survey lacked shade with 3% shaded by deciduous trees and less than 1% shaded by conifers** (Figure 1).

The canopy is also extremely sparse over most other tributaries of Yager Creek surveyed (Table 1). Lack of shade is an acute problem on the North Fork (Figure 3), Middle Fork (Figure 5) and South Fork (Figure 7) of Yager Creek, with no shade on 91%, 60% and 63% of the reaches surveyed, respectively. Lower Lawrence Creek also lacks canopy over 65% of the reach surveyed (Figure 9), while Shaw Creek lacks shade over 39% of the creek (Figure 11).

As shown by Photo #1, some of the conifers slated for harvest do cast shade onto Yager Creek. Riparian areas immediately adjacent to the THP have been harvested in recent years (Photo #2). Water temperatures measured during the survey showed a maximum stream temperature of 77 degrees F even though maximum air temperature was only 80 degrees F (CDFG, 1992). It is likely that even higher stream temperatures occur in this reach during warmer weather. Salmonids become stressed at temperatures of over 68 degrees F and 77 degrees is generally considered to be in the lethal range (Reiser and Bjornn, 1979). Stream surveys observed dead juvenile steelhead (CDFG, 1992). **Removal of some of the last large conifers shading Yager Creek, when water temperature for salmonids is already at a critical level, shows a blatant disregard for protection of fisheries resources.**

The recent FEMAT (1993) report demonstrated conclusively that larger tributaries, such as Yager Creek, that harbor anadromous salmonids, should have a riparian buffer strip as wide as two site potential tree heights. This would amount to about a 600 foot buffer on both sides of this stream which encompasses most of this THP (Photo #3). The reasons given for protecting riparian zones

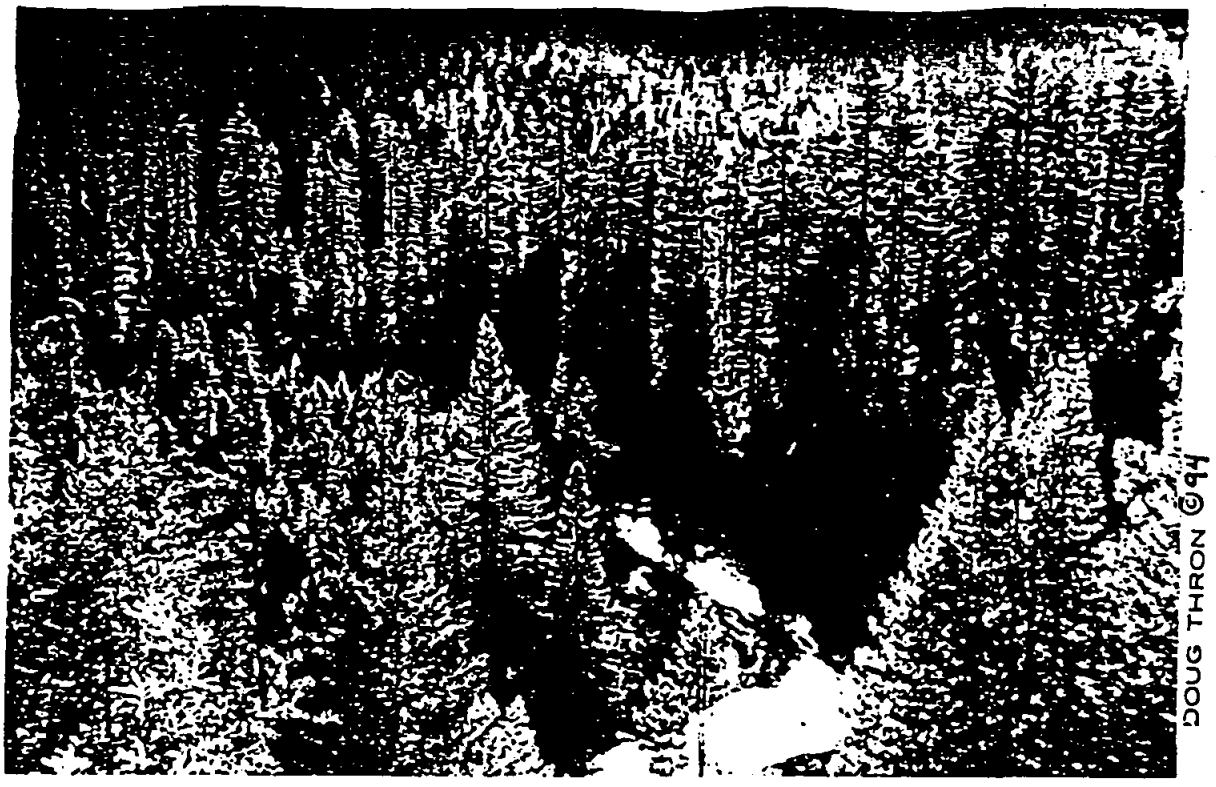

Photo #1. Because of the sinuous nature of Yager Creek within the area of THP 1-94-558, some of the large redwoods to be cut do shade the creek.

Photo #2 Riparian areas on the south bank of Yager Creek accross from and adjacent to THP 1-94-558 HUM have been harvested in recent years as shown in the center of the photograph.

Table 1. Amount (in percent) and Type of Shade on Yager Creek and Its Tributaries (from CDFG, 1992)			
Stream	No Shade	Deciduous Trees	Coniferous Trees
Yager Creek	96%	3%	1%
N.F. Yager Cr.	91%	6%	3%
M.F. Yager Cr.	60%	24%	16%
S.F. Yager Cr.	63%	18%	19%
Lawrence Creek	65%	30%	5%
Middle Reach Lawrence Creek	62%	31%	7%
Upper Reach Lawrence Creek	41%	50%	9%
Shaw Creek	39%	45%	16%
Cooper Mill Cr	58%	42% (not broken down)	
Booth's Run	63%	34%	3%
Blanton Cr.	34%	39%	27%
Strawberry Cr.	18%	59%	24%

are to maintain shade and cool ambient air temperatures near salmonid streams and to allow for recruitment of large wood into the stream channel (FEMAT 1993). Seddell et al. (1988) have demonstrated that large wood provides habitat complexity for salmonids. The lack of canopy cited above also indicates a lack of large wood for potential recruitment into Yager Creek (Photo #4). This timber harvest will further diminish this potential supply of large organic debris, increase ambient air temperatures surrounding the stream and remove shade canopy.

High Sediment Levels and Continuing Stream Widening Trends

Yager Creek and its tributaries show significant problems with high levels of sediment, as shown by embeddedness measurements and widespread bank cutting (CDFG, 1992). In addition to sediment in storage reflected by embeddedness, widespread logging in the Yager Creek watershed has continued (Photo #5) and is likely to yield additional pulses of sediment in future storms. Stream channels respond to elevated sediment loads by increasing in width, which also leads to increased water temperatures (Frissell and Liss, 1986). The combination of stream widening and direct reduction of shade canopy in tributaries through logging are likely to continue warming trends in Yager Creek for some time.

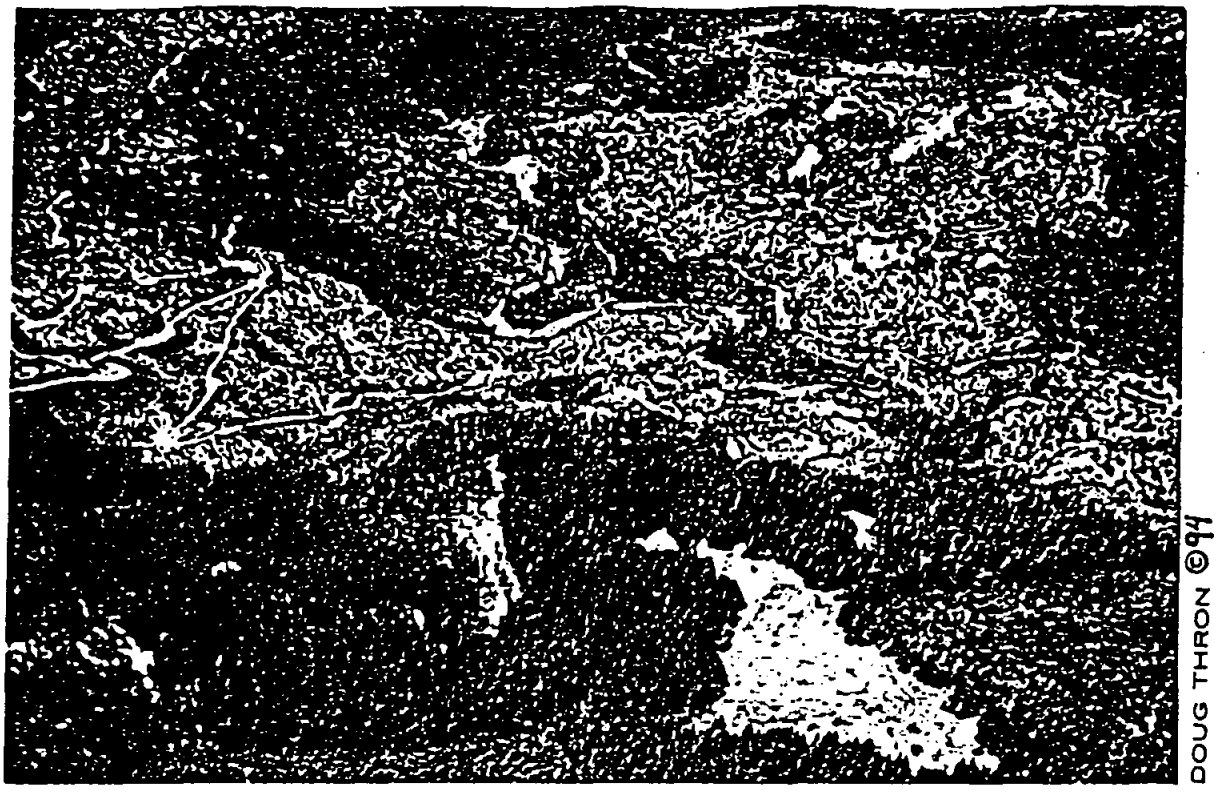

Photo #3. Most of THP 1-94-558 HUM (center of photo) lies within what is considered a functional riparian zone under FEMAT.

Photo #4. Many of the tall redwood trees to be harvested under THP 1-94-558 HUM might otherwise replenish large woody elements in the stream which are needed to add complexity to fish habitat.

Nawa et al. (1990) studied cumulative watershed effects in southwest Oregon streams and found an interesting relationship between timber harvest in tributaries and changes in mainstem temperatures. Tributary temperatures were elevated after logging as a result of direct canopy removal and stream widening. After about a decade of recovery, canopy in these sub-basins had grown back and stream temperatures started to decrease. However, they found that larger order stream channels lower in these basins showed a lag time in cooling trends. The reason for this seemed to be that sediment routed from sub-basins accumulated in downstream areas which promoted continued widening of channels.

Yager Creek is very likely experiencing a similar pattern of disturbance and recovery shown by southwest Oregon streams. The habitat typing reports (CDFG, 1992) document widespread problems with bank erosion in the Yager Creek watershed. Such landslides are in evidence along Yager Creek within the area covered by the THP (Photo #6). The problems are also particularly acute in the North Fork of Yager Creek, where 22 large scale bank failures exist in the less than four miles of stream surveyed.

Table 2 shows the relative embeddedness of pool tail crest in Yager Creek and its tributaries. Embeddedness is the degree to which cobbles at pool tail crests are buried in fine grained material. The surveys catagorized four levels of embeddedness using a range of 0-25% (Value 1), 26%-50% (Value 2), 51%-75% (Value 3) and 76%-100% (Value 4). The amount of fine sediment surrounding cobbles

Table 2. Relative Embeddedness of Yager Creek and Its Tributaries (CDFG, 1992).

Stream	#1 (0-25%)	#2 (26-50%)	#3 (51-75%)	#4 (76-100%)
Yager Creek	3%	27%	29%	41%
N.F. Yager Creek	0	24%	66%	10%
M.F. Yager Creek	17%	30%	52%	0
S.F. Yager Creek	4%	15%	63%	19%
Lawrence Creek	0	40%	40%	20%
Middle Reach Lawrence Creek	0	28%	62%	10%
Upper Reach Lawrence Creek	17%	41%	42%	0
Shaw Creek	8%	42	47%	3%
Cooper Mill Creek	31%	32%	12%	23%
Booths Run	5%	51%	34%	10%
Blanton Creek	35%	26%	30%	9%
Strawberry Creek	8%	31%	57%	4%

Photo #5. Aerial photograph of the Lawrence Creek watershed taken in 1994 showing that over 80% of Pacific Lumber Company's holdings in the drainage have been logged within the last decade.

Photo #6. Typical landslide along Yager Creek adjacent to THP 1-94-558 HUM. Extensive bank cutting in the basin is related to aggradation.

reflects the amount of sediment in transport in a stream. Pool tail crests are adjacent to areas normally selected by salmonids for spawning and embeddness reflects spawning habitat quality.

According to the CDFG (1992) habitat inventory report " A rating of 2 or more (>26%) is considered poor quality for fish habitat." Almost all reaches surveyed in the Yager Creek Basin were found to be poor habitat using this measurement. Only 3% of pool tail crests measured in the main stem of Yager Creek had less than 25% embeddedness. No measurements below 25% were recorded in the North Fork of Yager Creek, lower Lawrence Creek and the middle reach of Lawrence Creek. The main stem of Yager Creek and all major tributaries except upper Lawrence Creek had embeddedness greater than 50% in more than half of the sites measured (Table 4).

The high degree of embeddedness reflects a large amount of sediment in storage in Yager Creek and its tributaries. This sediment, and additional sediment from recent timber harvests, will continue to be routed through lower Yager Creek promoting stream bed widening and increases in water temperature. Therefore, it is very unwise to allow removal of large conifers shading Yager Creek that will help to buffer this effect both through direct shading and decreased ambient air temperatures adjacent to the stream.

THP 1-94-558 HUM Threatens Salmonids and Helps Squawfish

Salmon and steelhead require cold water for their survival. High stream temperatures related to removal of riparian canopy and channel widening are making Yager Creek increasingly hostile for chinook salmon, coho salmon and steelhead trout. The habitat typing report for Shaw Creek (CDFG, 1992) found juvenile coho salmon in that tributary. Brown et al. (1994) noted that coho salmon also occurred in very low numbers in Cummings Creek and Grizzly Creek in the Van Duzen River basin. Their report stated that coho salmon deserved a threatened status under state law. The National Marine Fisheries Service (NMFS) is expected to propose listing of coho salmon under the Endangered Species Act in early 1995.

NMFS will also put forth a determination on the need for protection of steelhead under ESA by May 14, 1995. The lower Yager Creek field report (CDFG, 1992) noted an 18-24 inch long steelhead holding in the stream during August. It is quite possible that this fish was a summer steelhead which is a species at high risk of extinction in the Van Duzen sub-basin (Higgins et al., 1992).

The Eel River is now experiencing an invasion of a predacious non-native species, the Sacramento squawfish (Ptychocheilus grandis). Squawfish predation on salmonids is thought to be responsable for the percipitous decline of salmon and steelhead in portions of the Eel River basin in recent years (Weeks, 1992). Squawfish thrive in warm water and have already begun colonizing the Van Duzen River basin, including Yager Creek (Brown and Moyle, 1992). There seems to be a direct relationship between lack of canopy in Yager Creek

sub-basins and dominance of warm water adapted species. Further removal of stream canopy aids squawfish colonization of Yager Creek.

Fish samples taken during habitat inventories noted that roach out numbered salmonids in both the main stem (Figure 2) and North Fork (Figure 4) of Yager Creek. California roach (Lavinia symmetricus) can live in water temperatures exceeding 95 degrees F and gain a competitive advantage over salmonids as stream temperatures increase. There seems to be a direct correlation between that amount of shade canopy retained in various reaches of Yager Creek and the dominance of salmonids or warm adapted species. This relationship can be seen by contrasting shade canopy graphs (Figures 1,3,5,7,9,11) and fish community graphs (Figures 2,4,6,8,10,12).

Lower Yager Creek has less than 4% shade (Figure 1) and its fish community structure, as indicated by electroshocking samples of index reaches, is dominated by California roach (Figure 2). The North Fork Yager Creek has a similar lack of canopy with less than 10% shade (Figure 3) and roach are also more numerous than salmonids (Figure 4). In the Middle Fork Yager Creek canopy is greater with approximately 40% shade (Figure 5) and roach are present but not more numerous than steelhead (Figure 6). Results for the South Fork Yager Creek are similar, with 37% shade (Figure 7) and steelhead out numbering California roach (Figure 8). Shaw Creek retains over 60% shade canopy (Figure 11) and has no roach and even retains coho salmon (Figure 12).

Brown and Moyle (1992) saw both California roach and Sacramento squawfish in the Van Duzen River basin and in lower Yager Creek in 1989. Squawfish have rapidly colonized most Eel River tributaries except where there are impassable barriers (Brown and Moyle, 1992). They also found that squawfish tended to displace California roach due to predation. Therefore, it is likely that Sacramento squawfish will become the dominant fish species in seasonally warm portions of the Yager Creek sub-basin if they have not already. It is difficult to distinguish between juvenile roach and squawfish juveniles so the "roach" in the 1991 may actually have been the vanguard of squawfish colonization. As logging under THP 1-94-558 HUM removes some of the last remaining shade canopy on Yager Creek and raises ambient air temperatures near the stream, it will further aid the rise to dominance of Sacramento squawfish in the Yager Creek sub-basin.

Cumulative Waterhsed Effects and Trends in Salmonid Abundance

Habitat typing results (CDFG, 1992) show that all Yager Creek tributaries have very few pools (Table 3). For optimal salmonid habitat, pools should constitute 50% of all habitat units. Lisle (1982) noted that aggradation of stream channels in northwestern California resulted in a considerable reduction in the number and depth of pools. The predominance of riffles and flat water (runs and glides) habitats is a result of severe problems with erosion in

Table 3. Comparison of Relative Abundance of Pools, Riffles and Flat Water Habitat Types by Length in Yager Creek and Its Tributaries (from CDFG, 1992)

Stream	Riffle	Flatwater	Pool	Dry
Yager Creek	21%	60%	20%	.1%
N.F. Yager Creek	33%	51%	16%	0
M.F. Yager Creek	50%	16%	32%	2.4%
S.F. Yager Creek	37%	48%	16%	0
Lawrence Creek	33%	54%	13%	.4%
Middle Reach Lawrence Creek	43%	38%	19%	0
Upper Reach Lawrence Creek	27%	36%	38%	0
Shaw Creek	46%	31%	23%	0
Cooper Mill Creek	26%	39%	35%	.7%
Booths Run	30%	56%	15%	
Blanton Creek	44%	36%	21%	0
Strawberry Creek	67%	10%	24%	0

the Yager Creek watershed which has filled in pools. Habitat in lower Yager Creek consisted of only 20% pools. On the North Fork and South Fork of Yager Creek, pools comprised only 16% of the habitat units by length. The lowest pool frequency occurred in lower Lawrence Creek where only 13% of habitats were pools.

Lisle (1982) also noted that steeper or more confined stream reaches flush sediment more rapidly and pools recover more quickly from aggradation. This may explain in part why the upper reach of Lawrence Creek and the Middle Fork Yager Creek had higher pool frequencies. Upper Lawrence Creek is also above recent timber harvests. The "dry" stream habitats are a result of severe aggradation where the stream course is buried so deeply that surface flows are lost during summer. The Middle Fork of Yager Creek is so severely aggraded that it is underground 2.4% of its length. The habitat typing survey also noted that Strawberry Creek was underground at its convergence with Yager Creek (CDFG, 1992).

Huge areas of the Yager Creek watershed have been clear cut, tractor logged within the last ten years. Lower Lawrence Creek, within Pacific Lumber Company ownership, appears to be over 80% logged since 1985 (Photo 5). All Yager Creek tributaries bear the imprint of severe cumulative watershed effects. Some of the sediment in the stream channel may have resulted from past logging

damage, but recent activities have greatly elevated erosion risk. The fisheries samples in 1991 (CDFG, 1992) are only snap shots and do not show trends. With the recent removal of stream canopy and continuing stream aggradation, the stage may already be set for a further decline of salmonids. **There should be at least a decade moratorium on all logging activity in the basin, until it is clear that further logging will not extirpate salmonids.**

Restoration Efforts Confounded by THP 1-94-558 HUM

Brown and Moyle (1992) concluded that "The best way to promote production of juvenile steelhead (and salmon) is to increase the amount of cold, tributary stream habitat available through stream restoration and habitat improvement efforts." The CDFG (1992) habitat typing reports end with similar recommendations: increase large wood in the stream channel, improve riparian conditions and decrease sediment inputs. **It will take decades to re-grow riparian zones and until that riparian recovery has advanced, no new timber harvest in riparian zones should be allowed.** A great deal of large wood could also be recruited from the area covered by THP 1-94-558 HUM and the large trees should be left in place. New roads with THP 1-94-558 HUM will also increase sediment yields. The current fisheries habitat improvement program that Pacific Lumber Company is pursuing cannot possible succeed if the company is destroying habitat faster than it is restoring it.

Cooper Mill Creek watershed has also had substantial timber harvest in the last decade and only 42% of the creek is now shaded (Table 1) despite the fact that it is the source of water for the Pacific Lumber Company salmon hatchery. Disease outbreaks have occurred in the last two years which have resulted in substantial reductions in the hatchery's output. Increasing incidence of disease at that facility is probably linked to the loss of shade on Cooper Mill Creek. **The runs of salmon and steelhead in Yager Creek cannot be replaced with hatchery fish, particularly if logging activities in the basin make stream temperatures unsuitable for salmonids.**

Conclusion

Thresholds for cumulative watershed effects have clearly been exceeded in the Yager Creek sub-basin. The viability of salmon and steelhead runs in this very important tributary of the Van Duzen River is threatened. Pacific Lumber Company has removed too much timber in too short a time period to avoid such impacts. Not only should THP 1-94-558 HUM be rejected, but all timber harvest in the basin should be deffered for at least a decade.

Sincerely,

Patrick Higgins

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Figure 1. Amount and Type of Shade on Lower Yager Creek

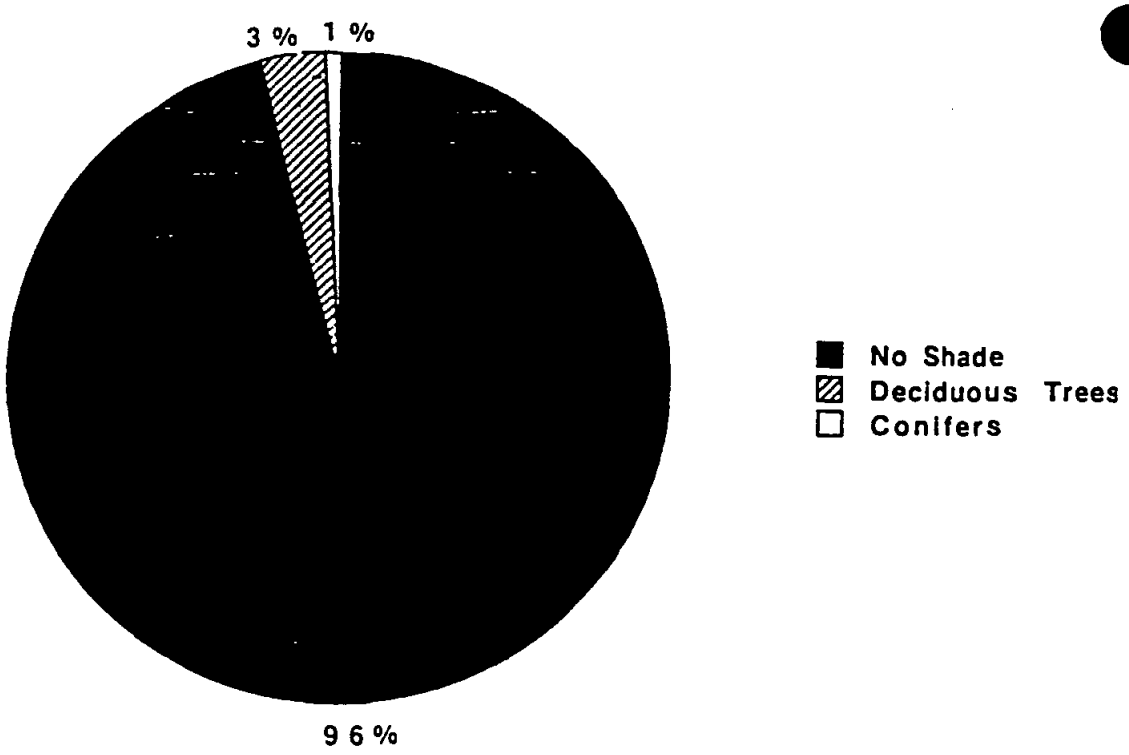


Figure 2. Number and Species of Fish in Lower Yager Creek

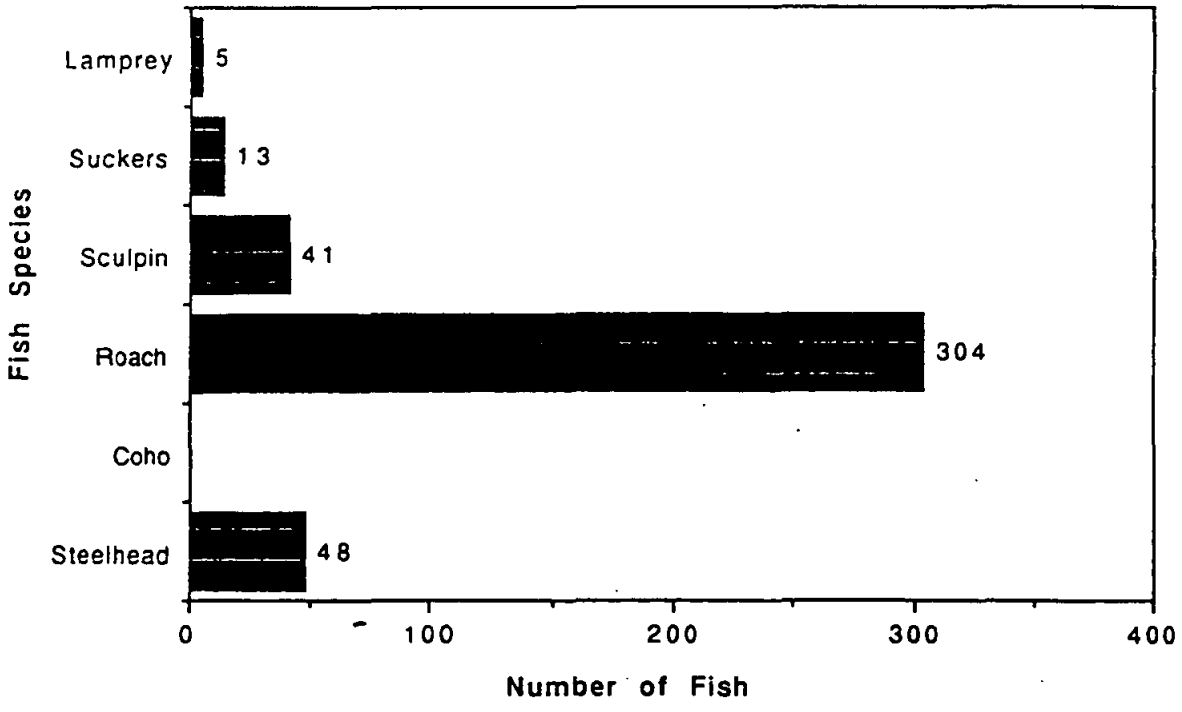


Figure 3. Amount and Type of Shade on N.F. Yager Creek

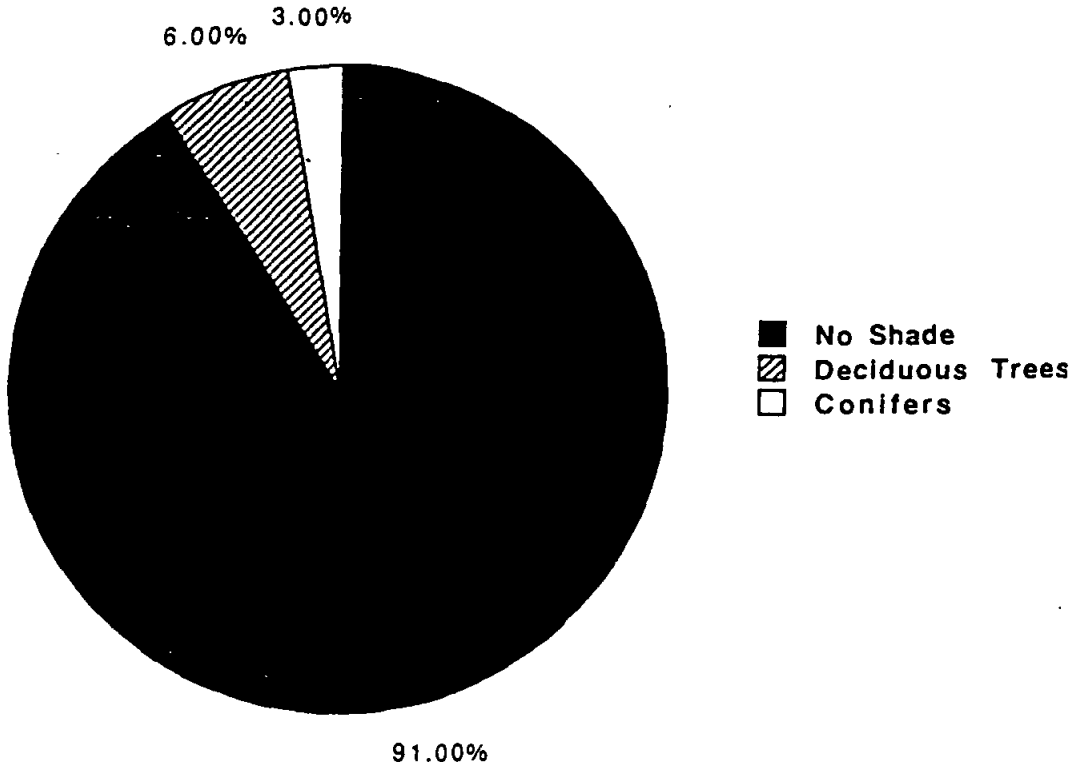


Figure 4. Number and Species of Fish in N.F. Yager Creek

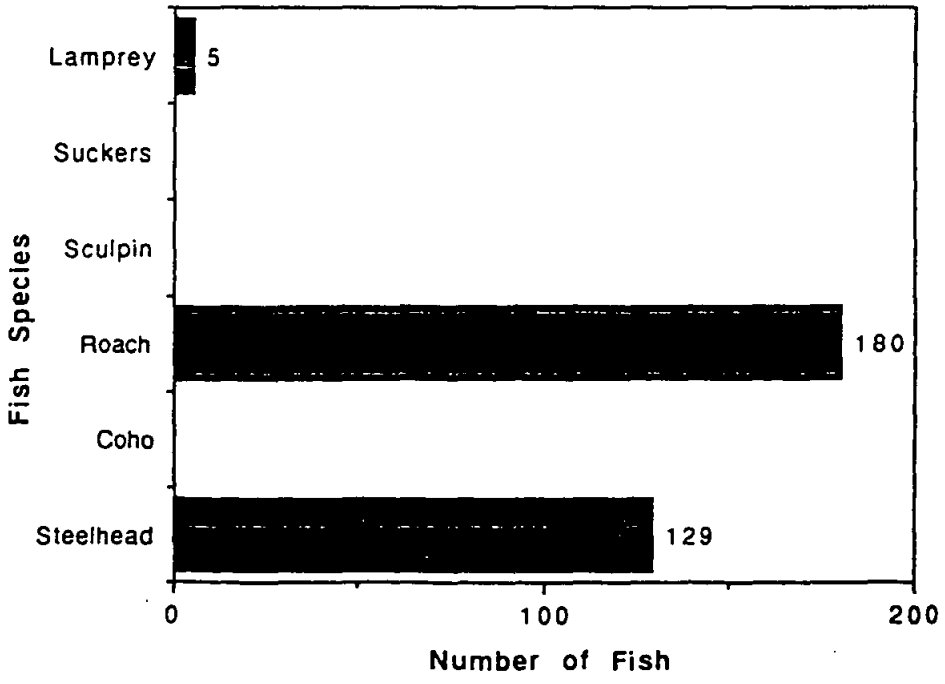


Figure 5. Amount and Type of Shade on M.F. Yager Creek

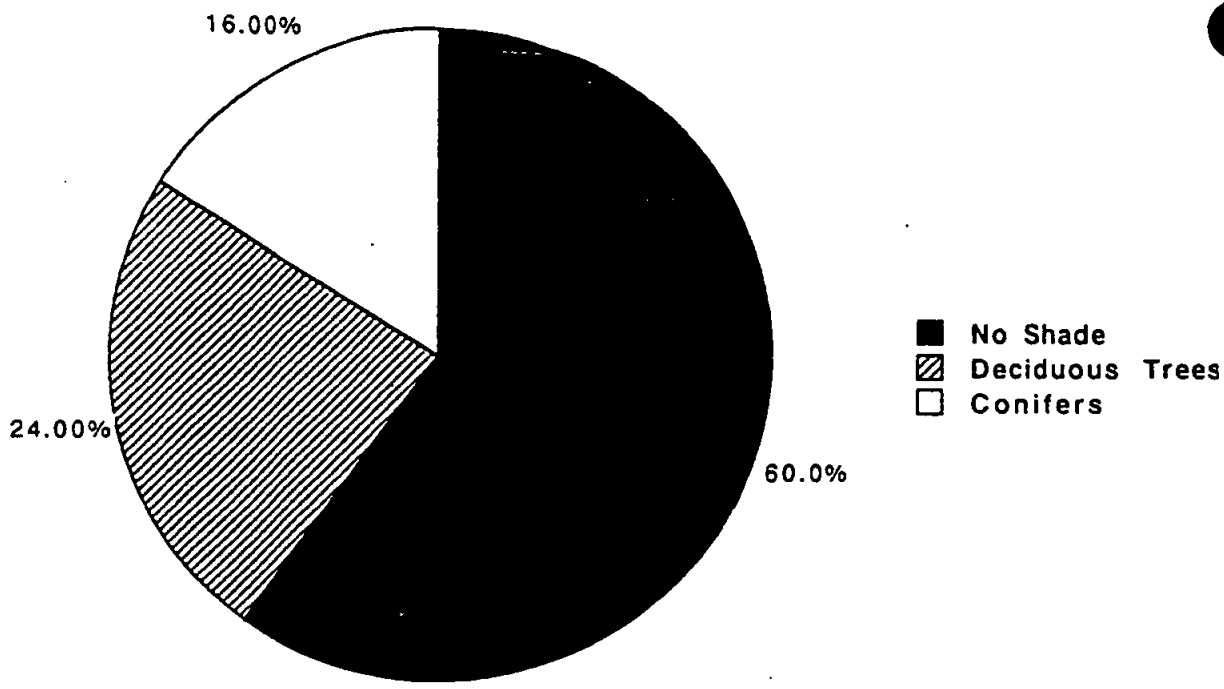


Figure 6. Number and Species of Fish in M.F. Yager Creek

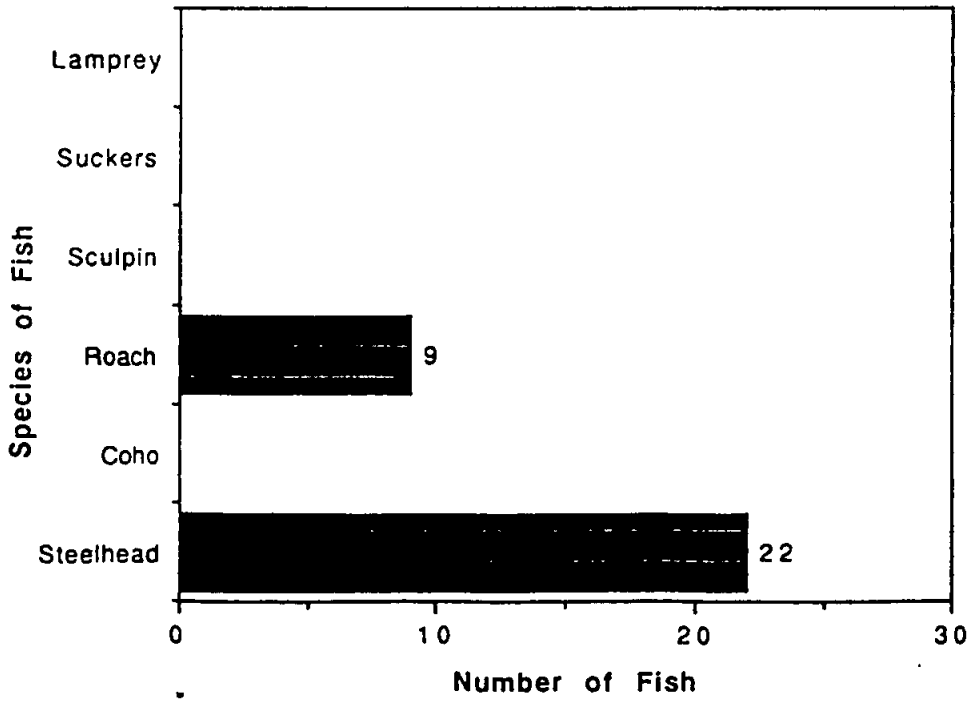


Figure 7. Amount and Type of Shade on S.F. Yager Creek

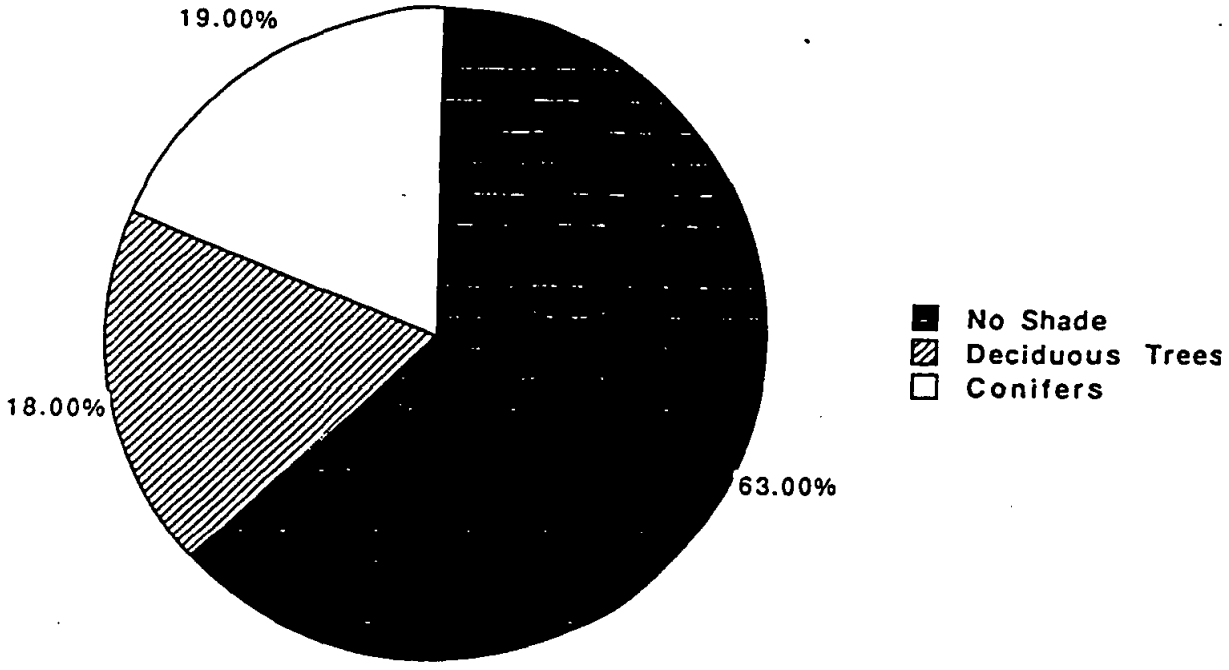


Figure 8. Number and Species of Fish in S.F. Yager Creek

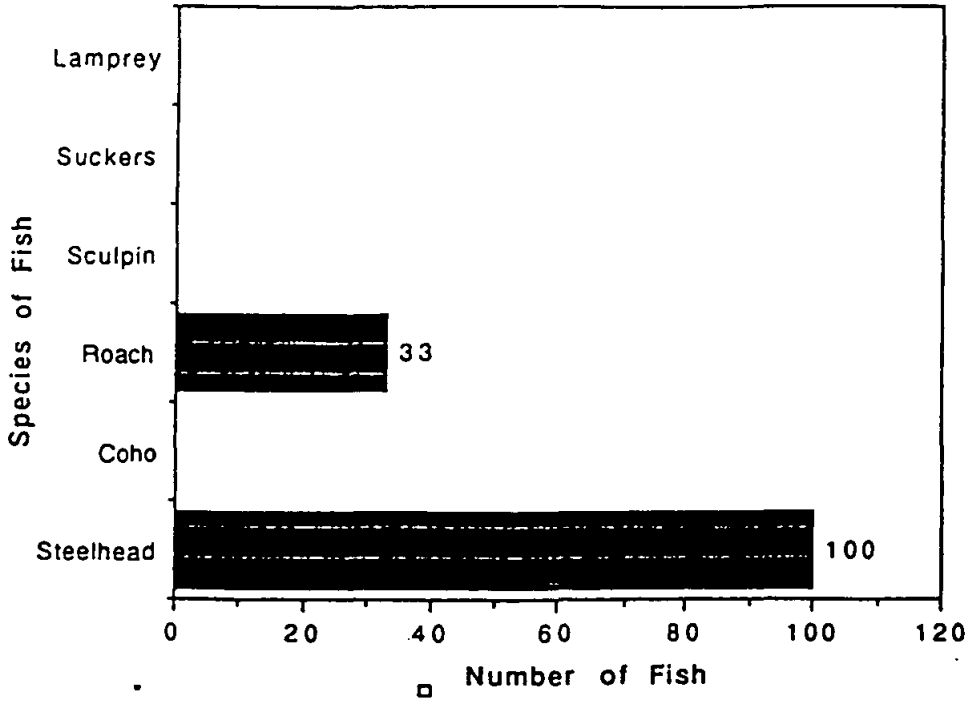


Figure 9. Amount and Type of Shade on Lower Lawrence Creek

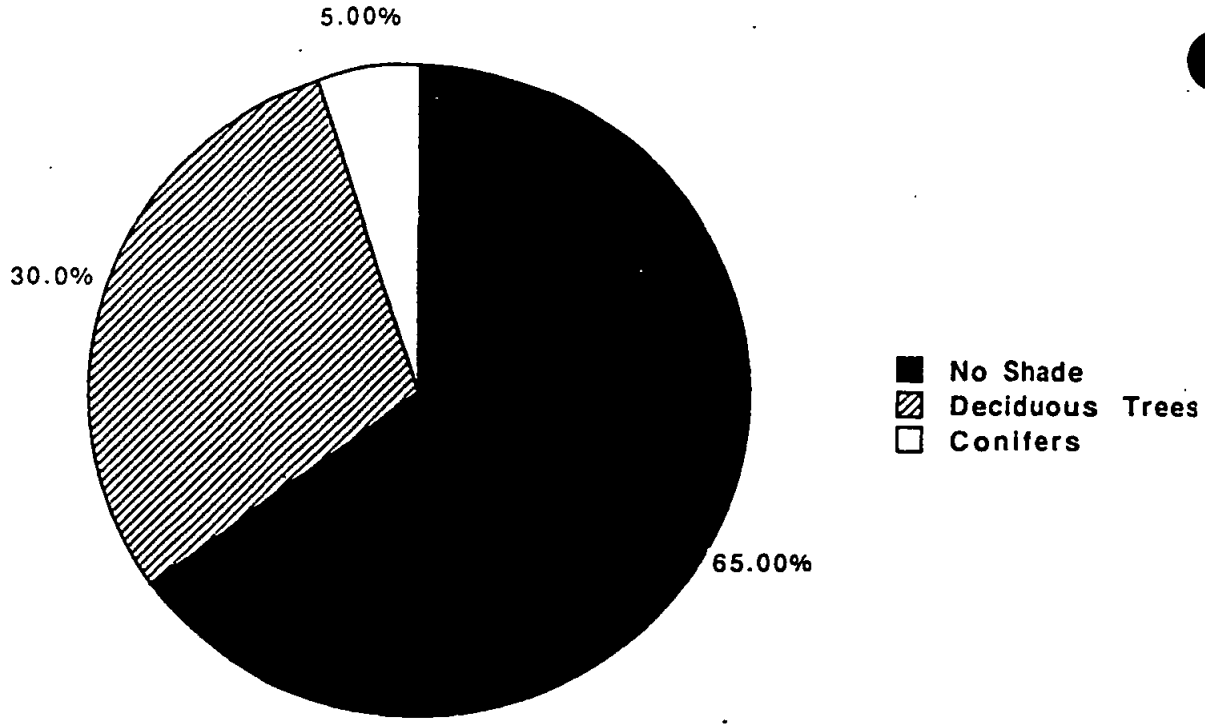


Figure 10. Number and Species of Fish in Lower Lawrence Creek

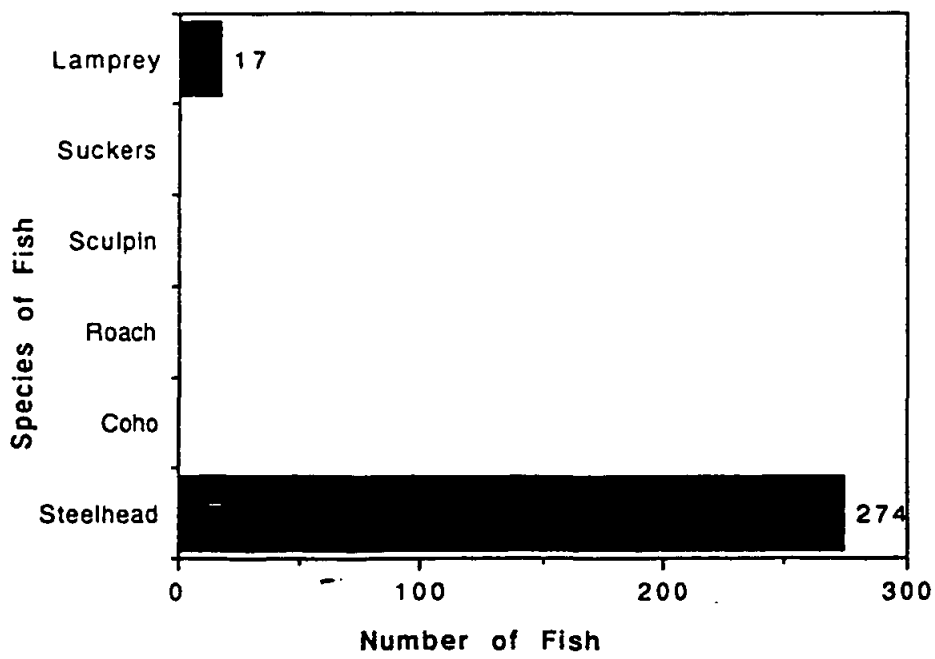


Figure 11. Amount and Type of Shade on Shaw Creek

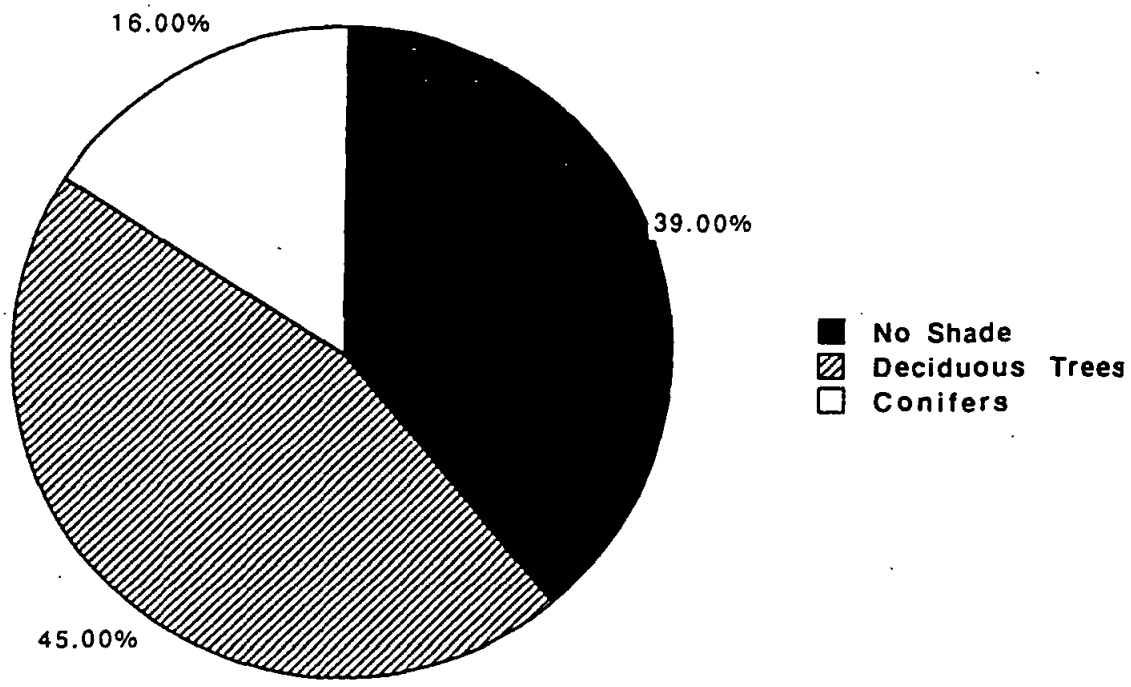
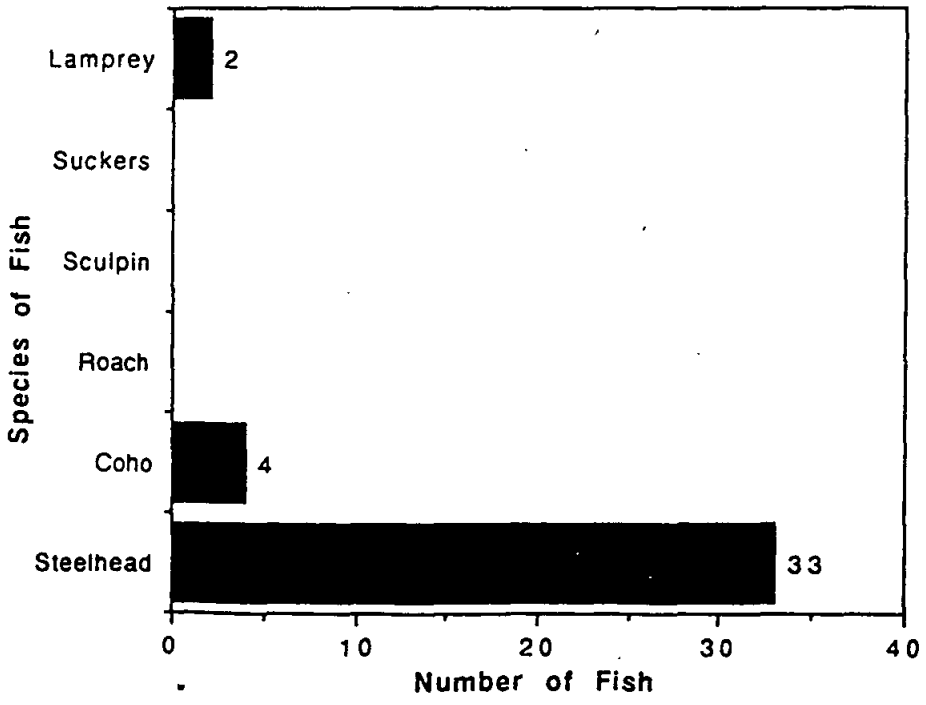


Figure 12. Number and Species of Fish in Shaw Creek



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IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

MARBLED MURRELET (*Brachyramphus marmoratus*); NORTHERN SPOTTED OWL (*Strix occidentalis caurina*) ENVIRONMENTAL PROTECTION INFORMATION CENTER, INC. Plaintiffs, v. BRUCE BABBITT, Secretary, Department of the Interior; MOLLIE BEATTIE, Director, United States Fish and Wildlife Service; MICHAEL SPEAR, Region 1 Director, United States Fish & Wildlife Service; U.S. FISH & WILDLIFE SERVICE; THE PACIFIC LUMBER COMPANY, a Delaware Corporation; SCOTIA PACIFIC HOLDING COMPANY, a Delaware Corporation; SALMON CREEK CORPORATION; a Delaware Corporation, Defendants.	Civil No. DECLARATION OF CHRIS MASER IN SUPPORT OF MOTION FOR TEMPORARY RESTRAINING ORDER

I, Chris Maser, do declare and if called as a witness would competently testify as follows:

1. I have spent over 20 years as a research scientist in natural history and ecology in forest, shrub steppe, subarctic, desert, and coastal settings. I am trained primarily as a vertebrate zoologist, and was a research mammalogist in Nubia, Egypt, (1963-1964) with the Yale University Peabody Museum Prehistoric Expedition. I also was a research mammalogist in Nepal (1966-1967) for the U.S. Naval Medical Research Unit #3 based in Cairo, Egypt, where I participated in a study of tick-borne diseases. I have conducted a three-year (1970-19730 ecological survey of the Oregon Coast for the University of Puget Sound, Tacoma, Washington. I also was a research ecologist with the U.S. Department of the Interior Bureau of Land Management for twelve years (1975-1987) -- the last eight studying old-growth forests in western Oregon -- and a landscape ecologist with the Environmental Protection Agency for one year (1990-1991).

2. Today, I am an independent author as well as an international lecturer, facilitator in resolving environmental disputes, and working toward sustainable community development. I am Chief Facilitator for the Center of Resolution, Vision, and Change, based in Corvallis, Oregon. I also am an international consultant in forest ecology and sustainable forestry practices. I have written over 240 publications (104 of which dealt with some aspect of forest ecology), including my last six books: *Forest Primeval: The Natural History Of An Ancient Forest* (1989, listed in School Library Journal as best science and technical book of 1989), *Global Imperative: Harmonizing Culture And Nature* (1992), *Sustainable Forestry: Philosophy, Science and Economics* (1994), *From The Forest To The Sea: The Ecology Of Wood In Streams, Rivers, Estuaries, And Oceans* (1994, with James R. Sedell), *Resolving Environmental Conflict: Towards Sustainable Community Development* (1995), and *The Seasons Of*

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My Ditch (1996). A copy of my curriculum vitae is attached hereto and incorporated by reference herein.

3. I have been asked by Sharon Duggan, on behalf of the Environmental Protection Information Center, to address the ecological implications that arise if logging in the Headwaters Forest and other old growth forest stands under exemption harvests proceeds. I have reviewed the regulations that govern exemption harvests under California law, and am aware that , in part, the harvests as proposed by Pacific Lumber will result in removal of downed woody debris in unentered forests regions, cutting of dying, diseased, and dead trees, and the reopening of roads in other forest stands that are old growth and late seral stage.

4. It is my opinion that entry through the logging operations into old growth, native forests stands, will result in an irreversible compromise of the forest ecology, altering the structure, composition and function of the stand that could well lead to extirpation of species and communities within a stand, thereby forever altering the entire forest landscape because we will never allow the old growth forests that exist today to be replaced.

5. To understand the effect of such logging operations, it is important to recognize why landscape patterns are important, the value of old growth as part of those landscape patterns, and the effect of the exemption, or salvage, logging operations.

WHY LANDSCAPE PATTERNS ARE IMPORTANT

6. To maintain ecological functions means that one must maintain the characteristics of the ecosystem in such a way that its processes are sustainable. The characteristics one must be concerned about are: (1) composition, (2) structure, (3) function, and (4) Nature's disturbance regimes.

7. The composition or kinds of plants and their age classes within a plant community creates a certain structure that is characteristic of the plant community. It

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is the structure of the plant community that in turn creates and maintains certain functions. In addition, it is the composition, structure, and function of a plant community that determines which animals can live there and how many. If one changes the composition, one changes the structure, one changes the function, one affect the animals. People and Nature are continually changing a community's structure by altering its composition, which in turn affects how it functions.

8. For example, in this case Pacific Lumber wants to change the forest's structure by removing or cutting trees, which in turn will change the plant community's composition, which in turn will change how the community functions, which in turn will change the kinds and numbers of animals that can live there. These are the key elements with which one must be concerned, because an effect on one area can -- and usually does -- affect the entire landscape.

9. Composition, structure, and function go together to create and maintain ecological processes both in time and across space, and it is the health of the processes that in the end creates the forest. The forest is a living organism, not just a collection of trees.

10. Scale is an often forgotten component of healthy forests and landscapes. The treatment of every stand of timber is critically important to the health of the whole landscape, which is a collection of the interrelated stands.

11. Thus, when one deals only with a stand, what can be ignored is the relationship of that particular stand to other stands, to the rest of the drainage, and to the landscape. It's like a jigsaw puzzle where each piece is a stand. The relationship of certain pieces (stands) make a picture (drainage). The relationship of the pictures (drainages) makes a whole puzzle (landscape). Thus, relationships of all the stands within a particular area make a drainage and the relationships of all the drainages within a particular area make the landscape. Each piece (stand) is critically important in its relationship to the completion of the whole puzzle (landscape). Therefore, the

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way each stand is defined and treated by the timber company is critically important to how the landscape, encompassing both the company's land and beyond, looks and functions over time.

12. Nature's disturbance regimes are evidenced by, among other things, wildfire. Old-growth, coniferous forests are frequently considered to be vulnerable to catastrophic fire because of the large amounts of fuel on the ground (particularly since the days of fire suppression) and the sometimes-abundant ladder fuels. Although older forests in the northern Rocky Mountains, particularly those in transition from lodgepole pine to spruce and fir, are indeed the most susceptible to wildfire, the situation appears to be different in forests west of the Cascade Mountains of Oregon, Washington, and southwestern British Columbia. These forests appear to be most susceptible to fire during their first 75 to 100 years.

13. In Northern California old-growth forests are less vulnerable to wildfire, because they frequently have a greater patchiness in the crown layer, which hampers the spread of flames. Although older stands do tend to develop fire ladders in the form of understory trees (particularly since the era of fire suppression began), such an understory, depending on its flammability, may or may not act as a fire ladder.

14. In addition to fire suppression, we are fragmenting landscapes by simplifying their biological structure, composition and function. As we do that we must understand that diversity in habitat and species is related to the landscape patterns we create.

15. When considering diversity, it is important to remember that it is relationship of pattern that confers stability on ecosystems. To understand this, according to soil scientist David A. Perry, it is helpful to think of an ecosystem as somewhat analogous to language. The raw material for languages is words, but its richness is imparted by syntax and context, the way words are arranged into sentences and sentences into phrases. In an ecosystem, stability flows from the

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patterns of relationship that have evolved among the various species. Creating a sustainable, culturally oriented system, even a very diverse one, must attend to these co-evolved relationships or it has about as much chance of succeeding as has a sentence made out of randomly selected words.

16. Consider invertebrates, such as insect populations, as an example. (Evidence has emerged only within the past decade or so to show that many of the so-called pests provide largely unrecognized benefits to the forest, even during apparently destructive epidemics.)

17. Landscape patterns influence populations of insects in three general ways: (1) through the degree of diversity in the distribution of their sources of food, (2) through the quality and quantity of habitat provided for their predators, and (3) through influencing how insects move across a landscape. Not surprisingly, insects multiply and disperse much more effectively when suitable food plants are uniformly distributed. "Suitable" in this sense may mean a given species of plant or a group of species of plants of a certain age or size.

18. Old-growth forests are thus not only more suitable but also support far more predatory invertebrates (mainly spiders) than do younger forests. As a consequence of suitable habitat in old growth forests, the predators exist in sufficient numbers to help control the insects.

19. The predators' effectiveness is reduced however when forests are cut. The success of tree damaging insects increases when the landscape is intersected with roads and the forest is biologically simplified in structure and composition, and therefore in function. This biological simplification of habitat makes it easier for the insects to find suitable host trees by removing the confusion factors inherent in a diverse habitat and thereby reducing the time it takes the insects to locate food.

20. Biological simplification of the forest also reduces the diversity of habitats and the variety of species of prey that are necessary to maintain the populations of

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opportunistic predators, such as spiders and birds. These predators are more important in preventing outbreaks of insects than are host-specific predators, such as parasitic wasps, which are dependent on finding a particular species of prey to exploit.

21. Landscape patterns also influence the habitats provided for birds and mammals that prey on defoliating insects. For example, bird communities in coniferous forests of the west are dominated by species that feed on insects in the foliage. Roughly 80 percent of the food consumed by northwestern birds is animal prey, mostly foliage-feeding insects. It would cost about $1800 per 1.5 square miles per year in insecticides to kill the same number of spruce budworms that are eaten by birds in the forests of northcentral Washington, and this does not even count the predaceous ants that complement the birds. These insect-eating birds and mammals, such as bats, depend on forests in certain older age classes for nesting and roosting, and their numbers are declining where the landscape no longer contains the required habitats.

22. Thus, old-growth forests in the Pacific Northwest with their complex array of species of both trees and predators, large size of stands, and high diversity of age classes, are less vulnerable to epidemics of forest-damaging insects than are the simplified plantations that are being creating over vast areas--through which the landscape pattern is being altered and simplified.

THE VALUE OF OLD GROWTH

23. There are many valid reasons for saving old-growth coniferous forests from extinction. Such forests as those of the Pacific Northwest are beautiful, and unique in the world. They are irreplaceable and finite in number. Old growth forests exist only once in the world because whatever is created in the future will be different -- and centuries away. Large trees can perhaps be grown over two or three centuries, but such trees will not be Nature's trees in Nature's landscape; they will be humanity's trees in society's cultural landscape. These forests, perhaps especially the

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Redwoods, inspire spiritual renewal in many people and are among the rapidly dwindling living monarchs of the world's forests. Old-growth forests are the oldest living beings on earth, and as such they form a tangible link with the past and provide a bond in the present. Consider that trees can and do live for centuries or millennia. Coast redwood, for example, is known to live over 2,000 years and bristlecone pine over 5,000.

24. An important reason for maintaining old-growth forests is that a number of organisms, such as the red-cockaded woodpecker, the spotted owl, the northern flying squirrel, and red tree vole, either find their optimum habitat in them or require the structures provided by the live old trees, the large declining trees, the large standing dead trees, or the large fallen trees. In other words, old-growth forests are tremendous storehouses of biological diversity. As such, they are genetic reservoirs, harboring plants of potential use in medicine, agriculture, and industry.

25. This has already proven to be the case in the forests of southern Mexico and Central American with their exceptionally rich biotic diversity. In 1978, for example, a wild variety of perennial maize (or corn) was discovered in a forest of southern Mexico. Through cross-breeding, this new strain could enable the corn-growing industry to avoid the seasonal costs of plowing and sowing. In addition, the wild germplasm offers resistance to several viruses that attack commercial corn. The economic benefits of this discovery could eventually reach billions of dollars.

26. In North America, the Pacific yew, a shade-tolerant tree in the understory of old-growth forests of the Pacific Northwest, was once considered a weed. It became of medical importance in recent years because it was the sole source of one of the most promising new drugs (Taxol) for the experimental treatment of ovarian cancer, more recently lung and breast cancer, in women.

27. The Pacific yew was once widely distributed from the southern tip of southeastern Alaska throughout the Pacific Coastal regions of British Columbia and the

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Olympic Peninsula in Washington. Although relatively rare in the Coast Range south of the Olympic Peninsula and north of the Umpqua River in Oregon, its frequency was and is greater in the Coast Range in southwestern Oregon and northwestern California. Today, however, the Pacific yew is rapidly disappearing because of clearcutting the old-growth forests and because of uncontrolled, commercial harvesting of its bark for medicine.

28. This recent threat to the Pacific yew prompts questions about what other species of plants are growing in the old-growth forests of the world, the benefits of which will never be known if these remaining habitats are liquidated and the existing ecosystem is compromised.

29. Yet another reason to maintain old-growth forests is that each old-growth tree is a "carbon sink," a storehouse of immobilized carbon, the storage of which reduces the potential carbon dioxide in the atmosphere and thereby has a positive influence on the greenhouse effect. In a comparison of total carbon stored in Douglas fir trees, there is 2.2 to 2.3 times as much carbon stored in a stand of Nature's 450-year-old Douglas-fir as there is in a 60-year-old plantation. In fact, landscapes with plantations that are cut on rotations of 50, 75, and 100 years would be able to store at most 38, 44, and 51 percent, respectively, the amount of carbon stored in the old-growth stand. And these values are conservative, because the intense utilization of wood fiber in plantations removes even more of the soil's capacity of store carbon.

30. In addition to carbon storage, such forests are the only living laboratories through which we and future generations may be able to learn how to create sustainable forests, something no one has so far accomplished. As a living laboratory, old-growth forests serve many vital functions, including the following four. First, old-growth forests are native and as such form our link to the past, to the historical forest. The historical view tells us what the present is built on, and together the past and the present tell us on what the future can be projected. The whole forest cannot be seen

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without taking long views both into the future and into the past, to lose the remaining, commercially available old-growth forests is to cast ourselves adrift in a sea of almost total uncertainty with respect to the biological sustainability of the forests and plantations of the future.

31. Second, because we did not design the forest, we do not have a blueprint, parts catalog, or maintenance manual with which to understand and repair it. Nor do we have a service department in which the necessary repairs can be made. Therefore, we cannot afford to liquidate the old growth, which acts as a blueprint, parts catalog, maintenance manual, and service station and is our only hope of understanding the sustainability of the redesigned forests and plantation forest.

32. Third, we are playing "genetic roulette" with forests of the future. What if our genetic engineering, genetic cloning, genetic streamlining, and genetic simplifications run amuck, as they so often have around the world? Native forests, whether old or young, are thus imperative because only they contain the entire genetic code for living, healthy, adaptable forests.

33. Fourth, intact segments of the old-growth forest from which we can learn will allow us to make the necessary adjustments in both our thinking and our subsequent course of management to help assure the sustainability of the redesigned forest. If we choose not to deal with the heart of the old-growth issue, which is the biological sustainability of present and future forests, we will find that reality is more subtle than our understanding of it and that our "good intentions" will likely give bad results.

EXTINCTION OF THE OLD-GROWTH AGE CLASS

34. In Nature's forest, old trees often develop root rot, which so weakens them that they are easily blown over by strong winds. This is how Nature reinvests biological capital into the soil, which in turn nurtures and grows the trees of the forest.

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35. Trees are the only part of the forest to which the timber industry, with [illegible] exception in my experience, assigns value. The rest of the forest is largely disregarded in favor of the potential profit presented by the tree. As a result forest soils are impoverished by the disruption of the myriad organisms and processes at work in the soil.

36. With the elimination of old-growth forests in the Pacific Northwest, for example, there will be no more old trees to die and stand as large snags, and to topple as large fallen trees and lie for centuries decomposing, providing a rich variety of habitats, and performing their myriad functions as they recycle and reinvest their biological capital into the soil from which they grew.

37. And with the old-growth forest shall go species, such as the northern spotted owl and the marbled murrelet, that have evolved in concert with that particular habitat. In fact, the owl and the murrelet have evolved adaptations to particular features of that habitat.

38. The owl nests in tall, broken-topped, old-growth Douglas-fir and Redwood trees. The murrelet -- a seabird -- nests on carefully-selected, large, moss-covered branches at least 100 feet up in old-growth trees with other branches close overhead to protect the nest site. In addition, the nest tree can be located several miles inland from the coast. Being so specialized in the selection of their reproductive habitats, neither is capable of adapting to the rapid changes wrought by the logging of the old-growth forest.

39. It is not only species that will become extinct with the loss of the old-growth forests but also the "grandparent trees." As the old trees are liquidated and replaced by young trees, crop after crop, the ecological functions performed by the old trees become extinct processes, such as creation of the pit-and-mound topography on the floor of the forest with its mixing of mineral soil and organic top soil. Why? Because there are no more grandparent trees to blow over.

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40. Pit refers to the hole left as a tree's roots are pulled from the soil, and mound refers to the soil-laden mass of roots, termed "rootwad," suddenly projected into the air above the floor of the forest. The young trees, with which the grandparent trees are replaced, are much smaller and different in structure than the old trees and can't perform the same functions in the same ways.

41. For example, of all of factors that affect the soil of the forest, the microtopography of the surface, particularly the pit and mound topography, is the most striking. The effects of this topography have a major influence on creating and maintaining species richness of the herbaceous understory and on the success of tree regeneration.

42. Vegetation may be uprooted or buried by soil as an old tree's roots are pulled from the ground. Falling trees also create opportunities for new plants to become established in the bare mineral soil of the root pit and the mound, and with time, the fallen tree itself presents habitats that can be readily colonized by tree seedlings and other plants. In addition, pit and mound topography is a major factor in mixing the soil of the forest floor as the forest evolves.

43. The extinction of the grandparent trees changes the entire complexion of the forest through time, just as the function of a chair is changed when the seat is removed. The "roughness" of the floor of the forest, which was a result of the cumulative addition of pits and mounds and of fallen grandparent trees over the centuries, will become transformed to an unprecedented "smoothness" -- without pits and mounds, without large fallen trees.

44. Now the water moves differently over and through the soil, which is devoid of large, fallen trees to act as reservoirs, storing water throughout the heat of the summer, and which held soil in place on steep slopes. Gone are the huge snags and fallen trees that acted as habitats for many creatures. Gone are the stumps of the

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grandparent trees with their below ground "plumbing systems," which guided rain and melting snow deep into the soil.

45. This plumbing system of decomposing tree stumps and roots is the frequent formation of hollow, interconnected, surface-to-bedrock channels that rapidly drain water from heavy rains and melting snow. The collapse and plugging of these channels as roots rot completely away forces water to drain through the soil matrix, reducing soil cohesion and increasing hydraulic pressure, which, in turn, causes mass soil movement. These plumbing systems cannot be replaced by the young trees of plantations.

SALVAGE LOGGING

46. Salvage logging (=Exemption Logging), is one of the most ecologically dangerous practices in modern forestry because it employs linear economics as an excuse to summarily ignore all current ecological knowledge about the long-term biological sustainability of forests. The sole objective of salvage logging is to convert trees into money, without recognizing the role and ecological value of downed or dying trees within the forest.

47. In traditional linear economic thinking, any merchantable tree that falls to the ground and reinvests its nutrient capital into the soil is considered an economic waste, i.e., it has not been converted into money.

48. However, there is no such thing as biological waste in a forest. But, the economic concept of waste, which excludes nonmonetary social values and all intrinsic ecological values, has spawned the industrial concept of salvage logging,

49. Consider, for example, the coniferous forests of the Pacific Northwest in which Douglas fir and western hemlock are the predominant trees in the old-growth canopy. Herein lives the spotted owl, which preys on the flying squirrel as its stable diet. The flying squirrel, in turn, depends on truffles, the below ground fruiting bodies of mycorrhizal fungi. (The term mycorrhiza, meaning "fungus-root," denotes the

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obligatory symbiotic relationship between certain fungi and plant roots.) Flying squirrels, having eaten truffles, defecate live fungal spores onto the forest floor, which, upon being washed into the soil by rain, inoculate the roots of the forest trees. These fungi depend for survival on the live trees, whose roots they inoculate, to feed them sugars, which the trees produce in their green crowns. In turn, the fungi form extensions of the trees' root systems by collecting minerals, other nutrients, and water that are vital to the trees' survival. Mycorrhizal fungi also depend on large rotting trees lying on and buried in the forest floor for water and the formation of humus in the soil. Further, nitrogen-fixing bacteria occur inside the mycorrhiza, where they convert atmosphere nitrogen into a form that is usable by both the fungus and the tree. Mycorrhizal/small mammal/tree relationships have been documented throughout the coniferous forests of the United States (including Alaska) and Canada. They are also known from Argentina, Europe, and Australia.

50. All this is complicated, but so is a natural forest. To add to the overall complexity, a live old-growth tree eventually becomes injured and/or sickened with disease and dies. How a tree dies determines how it decomposes and reinvests its biological capital (organic material, chemical elements, and functional processes) back into the soil, and eventually into another forest.

51. A tree may die standing as a snag to crumble and fall piecemeal to the forest floor over decades. Or, it may fall directly to the forest floor as a whole tree. How a tree dies is important to the health of the forest because its manner of death determines the structural dynamics of its body as habitat. Structural dynamics, in turn, determine the biological/chemical diversity hidden within the tree's decomposing body as ecological processes incorporate the old tree into the soil from which the next forest must grow. What goes on inside the decomposing body of a dying or dead tree is the hidden biological and functional diversity that not only is totally ignored by economic valuation but also critical to the viability of growth in the forest. That trees become

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1 injured and diseased and die is therefore critical to the long-term structural and
2 functional health of the forest.

3 52. The forest is thus an interconnected, interactive, organic whole defined
4 not by the pieces of its body but rather by the interdependent functional relationships
5 of those pieces in creating the whole -- the intrinsic value of each piece and its
6 complementary function. These functional relationships are totally ignored in salvage
7 logging.

8 53. Consider that the spotted owl in the Pacific Northwest preys on the flying
9 squirrel, which depends on truffles for its diet. The fungus, of which the truffle is a
10 part, is closely associated with large wood on and in the forest floor. The squirrel, the
11 owl, and the fungus all depend on the same wood!

12 54. This is precisely the interconnected, interactive, interdependent
13 relationship that salvage logging disrupts, particularly in the few remaining unroaded
14 stands, by removing merchantable dying and dead trees.

15 55. Whereas initial logging makes a clear determination of what is and is not
16 to be cut, salvage logging may be open to individual on-site interpretation of what to
17 cut, including such things as live "risk trees" or live "associated trees."

18 I declare under penalty of perjury that the foregoing is true and correct of my
19 own knowledge and if called to do so, I would and could competently testify thereto
20 and that this declaration was executed this 15th day of September, 1995 in Corvallis,
21 Oregon.

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23 By: Chris Maser

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Curriculum Vitae for Chris Maser

Born:
13 October 1938, Bronxville, New York.

Education:
Corvallis Public Schools
1957-1962 Oregon State University, B. S.
1962-1965 Oregon State University, M. S.

Positions held and grants received:

1963-1964	Vertebrate Zoologist, Yale University Prehistoric Expedition to Nubia, Egypt.
1965-1971	Field Associate, Puget Sound Museum of Natural History, University of Puget Sound, Tacoma, Washington.
1966-1967	Mammalogist in Nepal for the U.S. Naval Medical Research Unit #3, Cairo, Egypt.
1968	Sigma Xi, Grant-in-Aid of Research
1970-1972	Principal Investigator, Oregon Coast Ecological Survey, Puget Sound Museum of Natural History, University of Puget Sound, Tacoma, Washington.
1971-1973	Assistant Curator of Mammals, Puget Sound Museum of Natural History, University of Puget Sound, Tacoma, Washington.
1971-1987	Scientific Collaborator with the USDA Forest Service.
1973-1974	Lecturer in Natural History and Ecology, Department of Biology, University of Puget Sound, Tacoma, Washington.
1973-1981	Associate Curator of Mammals, Puget Sound Museum of Natural History, University of Puget Sound, Tacoma, Washington.
1973-1974	Chairman, Committee for Rare and Threatened Species, Federal Research Natural Areas System, Oregon and Washington.
1974	Senior Summer Scientist for the Federal Research Natural Area System, USDA Forest Service.
1975-1977	Research Zoologist, USDI Bureau of Land Management, District Office, Vale, Oregon.
1975-1980	Adjunct Professor, Eastern Oregon State College, LaGrande, Oregon.
1976	USDI Bureau of Land Management--Special Achievement Award for outstanding performance.

1977	USDA Certificate of Merit for "Participating in Developing Wildlife-Timber Management Relationships in the Blue Mountains."
1977-1983	Consultant, International Biosphere Reserves, UNESCO.
1977-1979	National Advisory Committee to H. J. Andrews Experimental Forest, Experimental Ecological Reserve.
1977-1978	Member, Nongame Wildlife Committee, Wildlife Society.
1977-1981	Wildlife Biologist-Research Liaison, USDI Bureau of Land Management, Oregon State Office.
1978-1987	Eastern Oregon Research Committee, USDI Bureau of Land Management, Oregon.
1978-1979	Chairman, National Advisory Committee to H. J. Andrews Experimental Forest, Experimental Ecological Reserve.
1978	Certified Wildlife Biologist, The Wildlife Society.
1978	Technical Reviewer for: Journal of Entomology, Field Museum of Natural History, Northwest Science, USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, Canadian Field-Naturalist.
1978	Supervisor of CETA study on abandoned homesteads in rangelands of southeastern Oregon.
1978	Student supervisor for Eastern Oregon State College Cooperative Education Program.
1978	Member, Task Force: Analysis and revision of USDI Bureau of Land Management's wildlife inventory system.
1979	Technical reviewer for: Murrelet, Auk, Journal of Mammalogy, USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, USDI Fish and Wildlife Service, State of Oregon--Nautral Area Preserves Committee.
1979-1980	Honorary Member of the Environmental Education Association of Oregon.
1980	Technical Reviewer for: Auk.
1980	Bob Smith Award--USDI Bureau of Land Management peer award in recognition of outstanding efforts on behalf of wildlife habitat management.

1981-1992	Assistant Professor of Forestry, Department of Forest Science, Oregon State University, Corvallis, Oregon.
1981	USDI Bureau of Land Management--Special Achievement Award for outstanding performance.
1981-1987	Western Oregon Research Committee, USDI Bureau of Land Management, Oregon.
1981-1987	Research Wildlife Biologist, USDI Bureau of Land Management, Oregon State Office.
1981	Technical Reviewer for: Wildlife Society Bulletin; USDA Forest Service/USDI Bureau of Land Management "West Side Timber/Wildlife Relationships;" USDA Forest Service, Pacific Northwest Forest and Range Experiment Station; Murrelet.
1982	Certificate of appreciation from the Wildlife Society for: the excellent contribution you made to the Symposium (Wildlife Habitats in Managed Rangelands) Sponsored by the Nevada Chapter.
1982	USDI Bureau of Land Management-USDA Forest Service Special Achievement Award for "an outstanding contribution in preparing the technical reference, Natural History of Oregon Coast Mammals, USDA Forest Service General Technical Report PNW-133," as an aid in natural resource planning and management.
1982	Technical reviewer for: Journal of Mammology.
1982-1983	Member, Technical Advisory Committee, USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, "Old-Growth Research and Development Program."
1982-1983	Co-principal Investigator of the USDI Bureau of Land Management--USDA Forest Service Research Project: "Importance of large, rotten logs in unmanaged, old-growth forests and the implications to managed forests."
1983	Inspection team member to evaluate PNW research at Unit in Corvallis.
1983	Elected to full membership in Sigma Xi Research Honorary.

1983-1984	Technical Advisor to Washington Park Zoo for their Cascade Exhibit.
1983	Technical reviewer for: Journal of Mammalogy, Canadian Journal of Zoology, The Auk.
1983-1987	Scientific advisor to the "North American Truffling Society."
1983	North American Truffling Society Certificate of Appreciation for "Research on small mammal mycophagy."
1983-1987	Charter Board Member, Pacific Northwest Natural History Foundation.
1984-1986	Co-principal Investigator of the USDI Bureau of Land Management--USDA Forest Service Research Project: "Importance of large rotten logs in second-growth forests and the implications for management."
1984-1987	Member Advisory Committee for U.S. Forest Service "Forest Inventory and Analysis Group."
1984	Technical reviewer for: The Murrelet; USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, Journal of Mammalogy.
1984-1986	Member Advisory Committee to the Governing Board of the Northwest Center for Holistic Resource Management.
1984-1987	Board of Trustees, Pacific Northwest Natural History Foundation.
1984	Member Wildlife/Agriculture Special Committee, Office of Technology Assessment, Congress of the United States.
1985	One month in Europe studying forestry-acid rain problems in France, Germany, and Switzerland.
1985	Oregon Wildlife Society Award: for dedicated service and outstanding contributions to the management of the wildlife resources of Oregon.
1985	Technical reviewer for: Canadian Ministry of Environment, Victoria, B.C.; USDA Forest Service, Intermountain Research Station.
1986	North American Truffling Society Award for "Many Scientific Contributions."

1986 Technical reviewer for: Western Journal of Applied Forestry, The Auk, Northwest Science, Canadian Journal of Zoology, Journal of Forest Ecology and Management, The Murrelet, Southwestern Naturalist, Journal of Mammalogy.

1986 Selected USDI Bureau of Land Management, (Oregon State) Professional Employee of the Year.

1986 Portland Oregon Federal Executive Board Certificate of Merit "in appreciation of extraordinary service to your Community and Government."

1986 Testified at Weaver's congressional hearings on old-growth.

1986-date Museum Research Associate in Zoology, The Burke Museum, University of Washington, Seattle.

1986 Certificate of Appreciation from the New Mexico Department of Game and Fish. To: "Chris Maser, who, in conjunction with the New Mexico Department of Game and Fish, advanced the awareness of natural resource managers in New Mexico at a sustainable forestry seminar."

1986 Superior Service Honor Award of the U.S. Department of the Interior.

1987 Technical reviewer for: Journal of Wildlife Management, Natural Areas Journal, Journal of Mammalogy, Canadian Journal of Zoology.

1987-1990 Private consultant in Sustainable Forestry.

1987-date Author and lecturer.

1987-1989 Board of Directors for the Institute of Domestic Tranquility.

1988 H.J. Andrews Experimental Forest Award (USDA Forest Service): "For outstanding contributions to research/management working relationships."

1989 USDA Forest Service Certificate of Appreciation: "In appreciation for your leadership, cooperation, and dedication that led to the successful accomplishment of the Oregon Range Evaluation Project."

1989 Forest Primeval, the Natural History of an Ancient Forest is selected as the "One of two outstanding scientific and technical publications of 1989" by the School Library Journal.

1990-1992 Council for the Institute of Domestic Tranquility.

1990-1991 Landscape Ecologist with the Environmental Monitoring and Assessment Program of the Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Las Vegas, NV.

1990 Submitted invited testimony to the U. S. Congress on sustainable forestry and spotted owls.

1990 Technical reviewer for: The Auk, Canadian Journal of Forest Research; USDA Forest Service, Pacific Northwest Research Station.

1991-date Private consultant in Sustainable Forestry.

1991 Technical reviewer for: The American Midland Naturalist.

1991 United States Department of Agriculture Certificate of Appreciation "For your outstanding presentation entitled 'Humanism and Ecology' presented to the Forest Service's Staff and Senior Community Service Employment Program Coordinators on January 11, 1991. You made a Difference!" Irving W. Thomas, Director of Human Resources Programs.

1991 Gave invited testimony at the government tribunal held in Toronto, Canada, on forestry practices in the province of Ontario.

1991-date Member Scientific Advisory Board for The Ecoforestry Institutes, U.S. and Canada.

1992-date Member Scientific Advisory Board for Colorado's Ocean Journey Aquatic Life Park, Denver, CO.

1992 Guest in eastern Slovakia, Czechoslovakia, to study and to recommend alternatives to the management-created damage in the forest of Cergov.

1992 Guest in Japan to help organize a 1994 world conference on the Earth's environment and sustainable forestry, to examine old-growth forests, and to help establish a thousand-year-old forest to ensure the future rebuilding the Shinto Shrines.

1992-date Member Environmental Issues Advisory Committee for Benton County in the State of Oregon.

1993 Guest of Fort Liard Indian Band in McKenzie District of Northwest Territories, Canada, to help the Band create a vision for a sustainable forest, including historic cultural values, over 800 square kilometers of the Fort Liard Valley. Worked with members of three tribal councils and two Canadian governments.

1993-date Member Scientific and Technical Advisory Board of the Silva Forest Foundation, Slocan Park, B.C., Canada.

1993-date Member International Advisory Committee, Seven Sisters Ventures, Inc., White Rock, B.C., Canada.

1993 Guest in Japan to teach the forest ecology portion of the outdoor school at Taneyama ga Hara.

1993-date Co-founder and Chief Facilitator, Center for Resolution, Vision, and Change, Inc., Corvallis, OR, a nonprofit organization.

1994 Testified before the Canadian House of Commons, Ottawa, Ontario, Canada, on forestry practices and clearcutting.

1994 Invited member of Grey Towers conference, hosted by the Pinchot Institute for Conservation, to help guide the direction the US Forest Service is to take into the next century.

1994-1996 Appointed to the Federal Livestock Grazing Fee Incentive Program Advisory Committee of the US Department of the Interior and the US Department of Agriculture, where my explicit task is to keep committee members both ecologically and socially honest.

1995-to date Member Scientific and Technical Advisory Board VLK Forest Protection Foundation, Tulcik, Solvakia.

1995 Meritorious Service Award, Society for Northwestern Vertebrate Biology. "This award is presented by the Society for Northwestern Vertebrate Biology in recognition of your long-term contributions to the Society and to the field of vertebrate biology in the Pacific Northwest."

1995 Guest in Malaysia to help scientists of the Forestry Research Institute Malaysia (in Kuala Lumpur) integrate their theoretical and applied research efforts into a view of forest systems.

Member of:

Current:
American Society of Mammalogists
American Society of Ichthyologists and Herpetologists
Northwest Natural History Society
Society of Range Management
Sigma Xi

Past:
North American Truffling Society
Northwest Scientific Association
Oregon Entomological Society
Society of American Foresters
The Wildlife Society

Listed in:

Who's Who in the West
American Men and Women of Science
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Attorneys for Plaintiffs

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

MARBLED MURRELET (*Brachyramphus marmoratus*); NORTHERN SPOTTED OWL (*Strix occidentalis caurina*); ENVIRONMENTAL PROTECTION INFORMATION CENTER, INC. Plaintiffs, v. BRUCE BABBITT, Secretary, Department of the Interior; MOLLIE BEATTIE, Director, United States Fish and Wildlife Service; MICHAEL SPEAR, Region 1 Director, United States Fish & Wildlife Service; U.S. FISH & WILDLIFE SERVICE; THE PACIFIC LUMBER COMPANY, a Delaware Corporation; SCOTIA PACIFIC HOLDING COMPANY, a Delaware Corporation; SALMON CREEK CORPORATION; a Delaware Corporation, Defendants.	Civil No. DECLARATION OF S. KIM NELSON IN SUPPORT OF MOTION FOR TEMPORARY RESTRAINING ORDER

I, S. Kim Nelson, declare under penalty of perjury that:

1. I make this declaration in response to questions posed by David Henkin, of the Law Offices of Joseph J. Brecher, in a letter dated April 4, 1995, which were presented to me again in a letter from Sharon Duggan dated September 13, 1995. A true and correct copy of the letter from Sharon Duggan is attached hereto as Exhibit "A" and incorporated herein by this reference. I make this declaration as a resubmission of the Declaration I submitted on behalf of the Sierra Club and the Environmental Protection Information Center in April, 1995.

2. I am a Research Wildlife Biologist with the Oregon Cooperative Wildlife Research Unit (OCWRU) at Oregon State University. I have conducted surveys of avian and mammalian species in old-growth and mature forests of the Oregon Coast and Cascade Ranges since 1982. I participated in research on juvenile dispersal of the Northern Spotted Owl and conducted my thesis project on densities and nest-site characteristics of nine cavity-nesting species. In relation to the Marbled Murrelet, I have been conducting research on this species since 1988, including, but not limited to, survey techniques, nest-site characteristics, breeding biology, and habitat associations. I lead the Marbled Murrelet research program for the OCWRU in the State of Oregon. A true and correct copy of my curriculum vitae is attached hereto as Exhibit "B" and is incorporated herein by this reference.

3. I am co-author and compiler of the Pacific Seabird Group's (PSG) survey protocols, entitled "Methods of Surveying for Marbled Murrelets at Inland Forested Sites" (Ralph and Nelson 1992; Ralph et al. 1993, 1994, 1995) and was Chair of PSG's Marbled Murrelet Technical Committee from 1990 to 1993. The PSG Protocol is the generally accepted methodology employed to determine where marbled murrelets are located and what type of use they are making of particular inland forested sites. The Protocol has been adopted for use by the U. S. Forest Service, the U. S. Bureau of Land Management, and the state fish and wildlife agencies of Washington, Oregon and California. In addition, I am author of six papers that appear in the U. S. Forest

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Service Marbled Murrelet Conservation Assessment (April, 1995) and co-editor of PSG's second symposium proceedings on the Marbled Murrelet.

4. The Marbled Murrelet is a small and uncommon member of the diving seabird family Alcidae. Adults weigh approximately 220 g. They forage in bays, inlets, fiords, and the open ocean primarily within 1-2 km of shore (occasionally on freshwater lakes), and feed on a variety of small schooling fish (e.g., sandlance) and invertebrates (e.g., euphausiids). This species is found along the Pacific Coast from south central Alaska to central California.

5. In the southern portion of their range (southeast Alaska, British Columbia, Washington, Oregon and California), the murrelet's nesting habits are unique from those of other alcids; instead of nesting on the ground or in large colonies, Marbled Murrelets nest in large trees, individually or in loose colonies. In these areas, they range up to 108 Km (67 mi) inland. The nesting habits of this species had long remained a mystery; the first confirmed tree nest was not located until 1974. The secretive behavior of this alcid, which flies at high speeds during low light levels, combined with the difficulty of capture and their ephemeral nature at sea, have made this species difficult to study.

6. The current estimated size of Marbled Murrelet populations range from 100,000 to 300,000 individuals. In California, current estimates range from 5,000 to 6,450 individuals. The current distribution of murrelets throughout their range is disjunct; birds are not observed in areas where they historically occurred in large numbers during the early 1900's. Gaps in their distribution correspond to areas where nesting habitat is limited or non-existent. For example, in Oregon, birds are not observed in areas on the north coast and central coast, where they were abundant in the 1930's, because their primary habitat (old-growth forests) has been logged and burned.

7. The estimated population sizes listed in paragraph 6 are probably lower than historically, and the populations are probably still in decline. Reasons for their

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decline primarily include loss of nesting habitat from logging, development and fires. The Marbled Murrelet was federally listed as a threatened species because of the extensive loss of habitat in Washington, Oregon and California.

8. Marbled murrelets initiate nesting as early as March in some years. They are most active at nest sites from April through August (breeding season), but also visit inland forests year-round. Murrelets use nest sites for nesting, selecting nest sites, and perhaps roosting and selecting mates. Females lay a single egg which both adults incubate for 30 days on 24-hour shifts. The chick is brooded for 1-2 days and then is left alone in the nest site for 30-40 days; adults return only to feed the chick between 1 and 8 times daily. The chick fledges alone at dusk and flies directly from the nest to the ocean.

9. Within the contiguous United States, Marbled Murrelets nest only in old-growth and mature forests (forests with old-growth components), up to 108 km inland. Mature forests have characteristics of old-growth forests including large, old-growth trees (>80 cm dbh), multi-layered canopies, snags, and woody debris. Murrelets need large platforms upon which to lay their single egg, because they do not build a nest. They lay their single egg on the moss or duff on a large tree limb (generally >10 cm in diameter) of a large conifer tree (>80 cm in diameter [dbh]). Nests are usually in the middle of the live crown, often more than 45 m (150 ft) above the forest floor. The structures of these older forests, including, most importantly, the presence of large conifer trees and the availability of next platforms with high vertical cover (concealment cover), are necessary for Marbled Murrelet nesting.

10. Predators of Marbled Murrelet chicks and eggs include Common Ravens (*Corvus corax*), Steller's Jays (*Cyanocitta stelleri*), and Sharp-Shinned Hawks (*Accipiter striatus*). Great-Horned Owls (*Bubo virginianus*), American Crows (*Corvus brachyrynchos*) and Grey Jays (*Perisoreus candadensis*) are suspected predators of chicks and eggs. Adults have been killed at nests or in nesting stands by Sharp-Shinned Hawks, Common Ravens and Peregrine Falcons (*Falco peregrinus*).

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11. The only protection Marbled Murrelets have at nest sites is their ability to remain hidden. Therefore, murrelets are very secretive at their nest sites to protect themselves and their young from predators. Visits to the nest are brief and birds are primarily silent while at or near their nest. They are primarily crepuscular; they fly in darkness or very low light levels, at dawn and dusk. They also fly very rapidly to and from their nest sites, at speeds up to 97 kmp (60 mph). Both adult murrelets and their chicks have cryptic plumage that provides them camouflage at the nest site. The murrelet also nests on limbs with thick vertical and horizontal cover (concealment cover).

12. The removal of dead and dying trees from old-growth habitats impact the availability of nest sites, foraging sites, and overall structure of the habitat for species that are dependent on: (1) dead and dying trees, (2) forests with limited disturbance, and (3) forests with relatively closed canopies. For example, cavity-nesting birds depend on the availability of dead and dying trees for making their nesting and roosting cavities. They also depend on these trees for foraging. Assuming that the planned exemption logging in and around the Headwaters Forest will include the building of tractor roads and/or the harvest of or disturbance to trees used by a variety of avian, mammalian and insect species for nesting, roosting and feeding, the logging would have negative impacts on their nest success, breeding, and/or food resources.

13. As defined by Section 895.1 of the Forest Practice Rules, dying and diseased trees could include old-growth trees used by murrelets for nesting. In addition, the accidental limbing of trees, by one tree colliding with another during falling, could destroy murrelet nest platforms. If these were to occur, then logging dead and dying trees will directly impact murrelet nesting habitat.

14. Additionally, creating tractor roads, felling of individual trees or groups of trees, and felling one tree into another, will open up the canopy and create gaps in the forest that probably will have negative impacts on murrelet nesting success, by eliminating necessary hiding cover and allowing predators easier access to nest sites.

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As stated above, Marbled Murrelets have no protection at the nest site other than the ability to remain hidden from predators. Hiding cover and the availability of nest sites away from edges and disturbed areas are important for nesting success.

15. Harvesting of murrelet habitat (clearcuts, selective harvest) would probably also adversely affect the familiarity of individual birds with their nesting area. Changes in the physical features of nesting habitat of many bird species is known to cause delays (sometimes of several years) in nesting attempts and sometimes abandonment of nest sites.

16. Creating openings in the forest can also increase blowdown and cause other long-term cumulative impacts. For example, an increase in sunlight and wind effects would probably affect the microclimate of the forest, and over time, limit the availability of epiphytres. Murrelet nests are often located on accumulations of moss or lichens.

17. Because Marbled Murrelets are found in inland forests year-round, the exemption logging in forest stands would probably disrupt murrelets at all times of the year. During the winter, Marbled Murrelets fly into forests to select nest sites and probably monitor historic nest sites and individual territories. Marbled Murrelets are known to have high site fidelity; in other words, birds are known to return to the same forest stands year after year, and birds are known to use the same nest tree or nest platform in successive years. Returning to a modified habitat in winter or early spring would probably adversely affect the ability of individual birds to secure nest sites or find their historic nest site. In addition, the future nesting success of these birds would probably be compromised if the canopy has been opened up and, as a result, predators are more successful at locating murrelet nests.

18. The amount of habitat available to the murrelet in California is limited. In addition, many of the coastal forests near the exemption areas that are suitable for murrelets are located in parks that are heavily used for recreation. Corvids (ravens and jays) are very abundant in these areas because of human food and garbage.

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Nesting success is probably low in these areas as a result. For example, most (67%; of 6) nests in Big Basin State Park in California have been unsuccessful. The abundance of Common Ravens and Steller's Jays is believed to be the cause for this nest failure. Successful nesting is critical to the survival of the species, because of their life history characteristics (e.g., they only lay one egg). Maintaining quality habitat (limited disturbance; forest structural characteristics that allow for successful nesting) in the Headwaters Forest and other nearby forests that are occupied by murrelets will be important for maintaining murrelet populations in northern California. Because the Marbled Murrelet is state listed as endangered in California, any harvesting in these forests that will open up the canopy and disturb nesting habitat will minimize the murrelets chances for recovery in California.

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I, S. Kim Nelson, declare under penalty of perjury that the foregoing is true and correct and that this declaration was executed in Corvallis Oregon on September 13, 1995.

S. KIM NELSON

LAW OFFICES OF SHARON E. DUGGAN

1032 Irving Street Suite 218
San Francisco, CA 94122
(415) 566-5321

Facsimile: By Request
Connect ID: SEDUGGAN

September 13, 1995

S. Kim Nelson
Oregon State University
Department of Fisheries & Wildlife
Nash Hall, Room 104
Corvallis, Oregon 97731

RE: Exemption logging in Headwaters Forest

Dear Kim:

Thank you for agreeing to assist us by providing a declaration in a soon to be filed federal court case. As I explained to you, EPIC is interested in knowing the likely impacts on marbled murrelets associated with logging operations on Pacific Lumber lands in and around the Headwater Forest under the exemptions recently granted by the California Department of Forestry.

As we discussed, here are some questions that I hope you can answer relating to the effects of exemption logging on the remaining old-growth stands in the exemption area and on the marbled murrelet in particular. Please make your responses as detailed as possible. If you do not feel qualified to answer any of these questions, please let me know. Obviously, I would like you to respond only to those questions that lie within your area of expertise and experience.

1. Please describe your professional experience related to the study of old-growth species and habitat in general and of the marbled murrelet in particular.

2. Please provide general background information about the marbled murrelet, including historic populations and current status (including locations of current populations.)

3. What are the marbled murrelet's nesting and breeding habitat"? Does it nest only in old-growth forests, and if so, why? What is the normal breeding season?

4. What animals prey on the murrelet? What strategies does the murrelet use to avoid predators?

5. Want are the principle causes of the marbled murrelet's decline?

6. What impact would the removal of dead and dying trees from exemption logging areas have on the old-growth ecosystem in general?

EXHIBIT A

7. What impact would the removal of dead and dying trees from the exemption logging areas have on the marbled murrelet in particular?

8. Would activities under the exemptions disrupt the marbled murrelet only during the breeding season or at all times of year? Please explain.

9. Is it important for the murrelet's continued survival to preserve old-growth habitat on private lands in south-central Humboldt County in addition to existing parkland preserves? Why?

I have attached for your review a copy of the Forest Practice Rules for exemption logging (14 Cal. Code of Regulations, §1038) and of the definition for "dying" and "diseased" trees under the rules (14 Cal. Code of Regulations §895.1) If you need further information please let me know.

Thank you very much for your help.

Sincerely,

SHARON E. DUGGAN

sed.fw

S. KIM NELSON
Oregon Cooperative Wildlife Research Unit
Oregon State University
Department of Fisheries and Wildlife
Nash Hall 104
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RESEARCH AND PROFESSIONAL EXPERIENCE

Research Wildlife Biologist/Senior Faculty Research Assistant. Oregon Cooperative Wildlife Research Unit, Oregon State University, Corvallis, OR. 4/89-Present. Conducting research on the distribution, behavior, and habitat associations of Marbled Murrelets in the Oregon Coast Ranges.

Wildlife Biologist. Oregon Department of Fish and Wildlife Nongame Program, Portland, OR. 5/88-4/89. Developed and tested inventory techniques for Marbled Murrelets in the Oregon Coast Ranges.

Graduate Research Assistant. Oregon Cooperative Wildlife Research Unit, Oregon State University, Corvallis, OR. 1/85-3/89. Thesis entitled "Habitat use and densities of cavity-nesting birds in the Oregon Coast Ranges".

Faculty Research Assistant. Oregon Cooperative Wildlife Research Unit, Oregon State University, Corvallis, OR. 7/83-1/85. Assisted on a study of juvenile dispersal of the Northern Spotted Owl.

Biological Technician. Oregon Cooperative Wildlife Research Unit, Oregon State University, Corvallis, OR. 6/83-7/83 and 1/84-2/84. Variable circular-plot censuses of forest birds and arboreal mammals were conducted in the Oregon Cascade Mountains.

Biologist/Education Specialist. Oregon Museum of Science and Industry, Portland, OR. 9/80-12/81. Involved developing and implementing field and laboratory research projects with birds and marine invertebrates; teaching natural history and physical science to adults and children; public relations; development of science education materials.

EDUCATION

M.S. Wildlife Science, Oregon State University, Corvallis. June 1989.

Classes in Wildlife Science, Oregon State University, Corvallis. September 1982-June 1983.

B.A. Art History and Business Administration, Lewis and Clark College, Portland, Oregon. August 1980.

EXHIBIT B

PUBLICATIONS

De Santo, T.L. and S.K. Nelson. 1995. Comparative reproductive ecology of the Auks (Family Alcidae) with emphasis on the Marbled Murrelet. *In*: Ralph, C.J., G.L. Hunt, Jr., J.F. Piatt, and M.G. Raphael, eds. Ecology and conservation of the Marbled Murrelet: An Interagency Scientific Evaluation. U.S. Department of Agriculture, Forest Service General Technical Report PSW-GTR-152.

Hamer, T.E. and S.K. Nelson. 1995. Characteristics of Marbled Murrelet nest trees and nesting stands. *In*: Ralph, C.J., G.L. Hunt, Jr., J.F. Piatt, and M.G. Raphael, eds. Ecology and conservation of the Marbled Murrelet: An Interagency Scientific Evaluation. U.S. Department of Agriculture, Forest Service General Technical Report PSW-GTR-152.

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Nelson, S.K. and T.E. Hamer. 1995. Biology and behavior of the Marbled Murrelet. *In*: Ralph, C.J., G.L. Hunt, Jr., J.F. Piatt, and M.G. Raphael, eds. Ecology and conservation of the Marbled Murrelet: An Interagency Scientific Evaluation. U.S. Department of Agriculture, Forest Service General Technical Report PSW-GTR-152.

Nelson, S.K. and T.E. Hamer. 1995. Nest success and the effects of predation on Marbled Murrelets. *In*: Ralph, C.J., G.L. Hunt, Jr., J.F. Piatt, and M.G. Raphael, eds. Ecology and conservation of the Marbled Murrelet: An Interagency Scientific Evaluation. U.S. Department of Agriculture, Forest Service General Technical Report PSW-GTR-152.

Nelson, S.K. and R.W. Peck. 1994. Behavior of the Marbled Murrelet at nine nest sites in Oregon. *In*: Nelson, S.K. and S.G. Sealy, eds. Biology of the Marbled Murrelet: Inland and At-Sea. Northwestern Naturalist 75(3).

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Nelson, S.K., M.L.C. McAllister, M.A. Stern, D.H. Varoujean, and J.M Scott. 1992. The Marbled Murrelet in Oregon, 1899-1987. Pages 61-91 IN Carter, H.R. and M. Morrison, eds. Status and Conservation of the Marbled Murrelet in North America. Proceedings of the Western Foundation of Vertebrate Zoology 5(1).

Carey, A.B., V.E. Castellano, C. Chappell, R. Kuntz, R.W. Lundquist, B.G. Marcot, S.K. Nelson, and P. Sullivan. 1990. Training guide for bird identification in Pacific Northwest Douglas-fir forests. U.S. Department of Agriculture, Forest Service, General Technical Report PNW-GTR-260.

Paton, P.W.C., C.J. Ralph, H.R. Carter, and S.K. Nelson. 1990. Surveying Marbled Murrelets at inland forested sites: a guide. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, General Technical Report PSW-120.

Anthony, R.G., E.D. Forsman, G.A. Green, G. Witmer, and S.K. Nelson. 1987. Small-mammal populations in riparian zones of different-aged coniferous forests. Murrelet 68:94-102.

Miller, G.S., S.K. Nelson, and W.C. Wright. 1985. Two-year old female Spotted Owl breeds successfully. Western Birds 16:93-94.

MANUSCRIPTS IN PRESS

Nelson, S.K. In press. Marbled Murrelet (*Brachyramphus marmoratus*). *In*: Poole, A. and F. Gill, eds. Birds of North America. The Academy of Natural Sciences, Philadelphia; The American Ornithologists Union, Washington, D.C.

PRESENTATIONS AND SEMINARS

Marbled Murrelet habitat associations and vocal repertoire. June 1993. Seminar, Cornell Laboratory of Ornithology, Sierra Nevada Research Station, Sattley, California.

The Endangered Species Act: a case study on the Marbled Murrelet. May 1993. Seminar, Oregon State University, Department of Forest Science, Corvallis, Oregon.

Inland habitat use and status of the Marbled Murrelet. March 1993. The Wildlife Society, Oregon Chapter, Annual Meeting, Newport, Oregon.

Marbled Murrelets and habitat diversity. March 1993. Seminar, Biodiversity Panel. Environmental Law Conference, University of Oregon, Eugene, Oregon.

Shore-based surveys of the Marbled Murrelet along the Oregon Coast, 1988-1992. February 1993. Pacific Seabird Group Annual Meeting, Seattle, Washington.

Biology and management of the Marbled Murrelet. November 1992. Seminar, Cornell University, Laboratory of Ornithology, Ithaca, New York, and Lewis and Clark College, Portland, Oregon.

The Marbled Murrelet: an enigma of the Pacific Northwest. October 1992. Society of American Foresters National Convention, Richmond, Virginia.

Testimony to the U.S. Senate Environment Committee on the biology and management of the Marbled Murrelet. August 1992. U.S. Senate, Washington, D.C.

Marbled Murrelets and oceanography. March 1992. Seminar, Department of Oceanography, Oregon State University, Corvallis, Oregon.

The Marbled Murrelet and the endangered species act. February 1992. Seminar, Department of Fisheries and Wildlife, Oregon State University, Corvallis, Oregon.

Nest-site characteristics of the Marbled Murrelet in the Pacific Northwest. January 1992. Pacific Seabird Group Annual Meeting, Charleston, Oregon.

A preliminary analysis of the vocal repertoire of Marbled Murrelets. January 1992. Pacific Seabird Group Annual Meeting, Charleston, Oregon.

Nesting biology of Marbled Murrelets. November 1991. Society of American Foresters, Annual Meeting, Tillamook, Oregon.

Marbled Murrelet biology and evolution. April 1991. Seminar, Evolutionary Biology Seminar Series, University of Oregon, Eugene, Oregon.

Discovery of two tree nests of the Marbled Murrelet in western Oregon. February 1991 and January 1991. The Wildlife Society, Oregon Chapter, Annual Meeting, Newport, Oregon, and Pacific Seabird Group Annual Meeting, Monterey, California.

Preferred snag characteristics of cavity-nesting birds in western Oregon. March 1990. The Wildlife Society, Oregon Chapter, Annual Meeting, Welches, Oregon.

Distribution and behavior of the Marbled Murrelet. March 1990 and February 1990. The Wildlife Society, Oregon Chapter, Annual Meeting, Welches, Oregon, and Pacific Seabird Group Annual Meeting, Victoria, B.C.

Nesting biology of Marbled Murrelets. March 1990. Seminar, Central Oregon Community College, Bend, Oregon.

PROFESSIONAL SOCIETIES

Pacific Seabird Group; Chair, Marbled Murrelet Technical Committee, 1990-1993.
The Wildlife Society - National, Western Region and Oregon member; Executive Board Member, Oregon Chapter, 1990-1993; Executive Board, Student Chapter, 1984-1986.
Society for Conservation Biology
Society of Northwestern Vertebrate Biology
Cooper Ornithological Society
Wilson Ornithological Society
Association of Field Ornithologists
American Ornithologists Union
Society of American Foresters

PERSONAL Born 31 December 1957 in Richmond, Virginia

REFERENCES

Dr. Robert Anthony, Leader, Oregon Cooperative Wildlife Research Unit, Oregon State University, Nash Hall 104, Corvallis, OR 97331 (503)737-4531.

Richard Holthausen, Regional Wildlife Ecologist, USDA Forest Service, Oregon State University, Department of Fisheries and Wildlife, Nash Hall 104, Corvallis, OR 97331 (503)737-4531.

Martin Nugent, Nongame Wildlife Coordinator, Oregon Department of Fish and Wildlife, P.O. Box 59, Portland, OR 97207 (503)229-5454.

Robin F. Brown, Nongame Wildlife Biologist, Oregon Department of Fish and Wildlife, Marine Region, Marine Science Drive, Building #3, Newport, OR 97365 (503)867-4741.

I. HEADWATERS FOREST COMPLEX

HEADWATERS FOREST COMPLEX

II. HEADWATERS MAP

HEADWATERS MAP

III. MAP OF OLD GROWTH REDWOOD EXTENT ORIGINAL TO 1992

EXTENT ORIGINAL TO 1992

IV. COLOR PHOTOS OF VIRGIN AND RESIDUAL OLD-GROWTH GROVES

COLOR PHOTOS

V. WATERSHED RESTORATION PLAN

WATERSHED RESTORATION PLAN

VI. PAT HIGGINS REPORT ON YAGER CREEK FISHERIES

FISHERIES

VII. DECLARATION OF CHRIS MASER ON ECOLOGICAL VALUES IN OLD GROWTH

OLD GROWTH ECOLOGY

VIII. DECLARATION OF KIM NELSON ON MARBLED MURRELET

MARBLED MURRELET

Congress of the United States
Washington, DC 20515

November 9, 1995

The Honorable Albert Gore
Vice President
The White House
1600 Pennsylvania Ave.
Washington, DC 20500

Dear Vice President Gore:

As Californians, we are writing to urge your immediate assistance and leadership in acquiring the Headwaters Forest in Northern California. Pacific Lumber Company, the owner of the Headwaters Forest, has secured regulatory approval to remove trees from the virgin old growth redwood forest for the first time ever. In mid September more than two thousand protesters demonstrated against harvesting of the old growth trees. Although the Federal Court has recently issued a preliminary injunction, Pacific Lumber has indicated its intention to appeal. Therefore, there is an imminent threat that the delicate balance and fabric of this ancient forest will be irreversibly disturbed and the public resource value compromised.

We are convinced that your Administration's leadership of a coordinated inter-agency effort is necessary to achieve permanent protection of the Headwaters Forest. Success will require the ability to marshall a broad range of cash equivalents.

Building on the strong support indicated by the House of Representatives' passage of the Headwaters Forest Act in the 103rd Congress, the Department of Interior has initiated efforts to identify available resources. Preliminary discussions with the Federal Deposit Insurance Corporation (FDIC) indicate receptivity to consideration of a "debt for nature" exchange as a means of maximizing recovery in the FDIC's recently filed action against Mr. Charles Hurwitz, President of Pacific Lumber. This action was filed in early August to recover a portion of the $1.6 billion loss associated with the failure of United Savings Association of Texas while under Mr. Hurwitz' control.

We urge you to indicate your support for pursuing the possibility of a "debt-for-nature" exchange coordinated with identification of other federal resources that may be necessary to negotiate federal acquisition and permanent protection of the Headwaters Forest. An indication of the Administration's commitment is a key step to forestall logging. The owner continues to indicate a willingness to transfer the Forest to public ownership in exchange for fair market value. Your leadership at this critical juncture will

Vice President Gore
page two

Lucille Roybal-Allard
Member of Congress

Nancy Pelosi
Member of Congress

Howard L. Berman
Member of Congress

Bob Filner
Member of Congress

George Miller
Member of Congress

Walter Tucker
Member of Congress

Henry Waxman
Member of Congress

Anna Eshoo
Member of Congress

Xavier Becerra
Member of Congress

Tom Lantos
Member of Congress

Barbara Boxer
U.S. Senator

Dianne Feinstein
U.S. Senator

Jane Harman
Member of Congress

Vice President Gore
page two

demonstrate to the property owner and the public a commitment to pursuit of creative alternatives to resolve this longstanding controversy.

Thank you for your immediate attention to this critical issue.

Sincerely,

Fortney Pete Stark
Member of Congress

George E. Brown, Jr.
Member of Congress

Vic Fazio
Member of Congress

Ronald V. Dellums
Member of Congress

Anthony C. Beilenson
Member of Congress

Lynn Woolsey
Member of Congress

Zoe Lofgren
Member of Congress

Sam Farr
Member of Congress

Matthew G. Martinez
Member of Congress

Robert T. Matsui
Member of Congress

Julian C. Dixon
Member of Congress

Esteban Edward Torres
Member of Congress

DIANNE FEINSTEIN
CALIFORNIA

United States Senate
WASHINGTON, DC 20510-0504

September 28, 1995

Honorable Albert Gore
Vice President
The White House
Washington, D.C. 20500

Dear Mr. Vice President:

I am writing to urge your immediate assistance and leadership in protecting the Headwaters Forest in northern California. The Headwaters Forest is the last superb area of primeval redwoods in private ownership, as well as essential nesting habitat for the marbled murrelet, a federally listed threatened species.

On September 15, 2,000 people rallied in Humboldt County to protest the plans of Pacific Lumber Company to log Headwaters Grove, located on the company's property in the Headwaters Forest. Pacific Lumber has obtained a salvage exemption from the California Department of Forestry allowing the company to helicopter log dead and dying trees in the forest. For the moment, there is a temporary injunction issued by the U.S. District Court to prevent the logging.

As you know, efforts to protect the Headwaters have been considerable to date. Both the Department of Interior and the California Resources Agency have been exploring various means to protect the Headwaters, including a debt-for-nature-swap. The Federal Deposit Insurance Corporation, which in August filed a lawsuit against Charles Hurwitz for his role in connection with the failure of United Savings Association of Texas, has indicated the agency is open to any appropriate settlement of this litigation, including a debt-for-nature-swap.

I support protection of the Headwaters Forest, and again encourage the Administration to explore all options, including a debt-for-nature-swap, to acquire the property and protect this valuable and highly threatened California resource. I believe such a swap should include sufficient acreage that will offer long-term protection to the magnificent ancient forest grove that is the jewel of this crown.

Thank you for your immediate attention to this critical issue.

Sincerely,

Dianne Feinstein

Dianne Feinstein
United States Senator

San Francisco Examiner

Sunday, September 24, 1995

Save these redwoods

Federal authorities could agree to accept Headwaters Forest in lieu of claims against corporate raider Charles Hurwitz

COAST REDWOODS, said German architect Eric Mendelsohn, are "God's own flagpoles." And in 1908, pleased that a virgin woods near Mill Valley had been preserved in his name as a national monument, John Muir wrote, "Saving these woods from the axe and saw . . . is in many ways the most notable service to God and man I have heard of since my forest wanderings began."

In Muir's lifetime, passenger pigeons darkened the sky. Herds of bison blanketed the prairie. And forests of *sequoia sempervirens* covered about 2 million foggy acres of California's coastal valleys. Today, of course, the passenger pigeon is extinct. A few bison survive — as curiosities. And all that remains of our redwoods, including 35-story skyscrapers that sprouted when Cleopatra was a girl, are found in about 80,000 acres in state and federal parks.

Private holdings include the Headwaters Forest, about 3,000 acres of virgin redwoods controlled by a Texas junk bond mogul. It's a good thing for Charles E. Hurwitz that we don't have a debtor's prisons, because the taxpayers paid out $1.6 billion after the failure of his United Savings Association of Texas.

In a year when most Republican lawmakers (and a few Democrats) are clamoring for deregulation, let's recall how removal of federal oversight led to the junk bond boom of the Reagan years, the subsequent crash of dozens of financial institutions and the resulting bailouts that robbed the taxpayers of nearly $6 billion.

Hurwitz's Maxxam Corp. had used junk bonds for leverage in 1986 in a hostile takeover of the Pacific Lumber Co., which had been locally owned with a good record of conservation practices on its 196,000 acres in the north coast region.

The new owners doubled logging operations, but it hasn't been an easy time for Hurwitz and his investors. The Federal Deposit Insurance Corp. sued him last month in federal court, asking for $250 million on grounds that the corporate raider deceived shareholders and government agencies. A lawsuit filed in San Francisco by attorney Kirk Boyd asks $1.6 billion in restitution to federal taxpayers. Logging has been delayed for years in the Headwaters by suits alleging violations of the Endangered Species Act and National Environmental Policy Act. And a series of demonstrations culminated Sept. 15 in 246 arrests at Pacific's main yard in Fortuna.

Hurwitz set an exorbitant price of $500 million for the Headwaters, a sum that's a lot more than federal or state treasuries can afford these days. The Garberville-based Environmental Protection Information Center, the Sierra Club, Audubon Society, Wilderness Society and other groups are urging a "debt for nature" swap.

It's a win-win solution that would allow Hurwitz to pay some of his debt to society by offering the government title to the Headwaters Forest and its magnificent, priceless, irreplaceable galleries of God's own flagpoles.

E X E C U T I V E O F F I C E O F T H E P R E S I D E N T

26-Apr-1996 02:27pm

TO: Elena Kagan
TO: Dawn Chirwa

FROM: Elisabeth Blaug
Council on Environmental Quality

CC: Kathleen A. McGinty

SUBJECT: headwaters

Now that the litigation letter has been signed, sealed and delivered, John Martin, from Hurwitz's firm Patton Boggs, wants to meet with us on Wednesday at 10:00 to start talking about available properties (recall that they already have that dated GSA list which provides little information). Allen McReynolds met with GSA on Monday (Tony Costa, Chief of Staff to the Commissioner) to convey the message that we want to work with a senior level appointee on this to get an updated list of properties, and go through that list carefully, and ASAP. In addition, FDIC is putting together a more extensive list of available properties, and would like to meet with us prior to the Wednesday meeting to provide us with the new list, give us any info they can provide on a preliminary settlement figure they and OTS think would be sufficient in the event Hurwitz requests settlement discussions with FDIC/OTS, and follow up on other issues.

I would like to have the Wednesday meeting in the CEQ conference room. I haven't connected with Jack Smith, but I will suggest Tuesday at 10:00, same place. Hope one or both of you can attend both meetings. Let me know if timing is a problem. Thanks!

MAXXAM

CHARLES E. HURWITZ
CHAIRMAN

April 16, 1996

Honorable John Garamendi
Deputy Secretary
Department of the Interior
1849 C St., N.W.
Washington, D.C. 20240

Dear Deputy Secretary:

This letter addresses the manner in which the Department of the Interior, MAXXAM Inc., MAXXAM Group Inc., The Pacific Lumber Company, Scotia Pacific Holding Company, and Salmon Creek Corporation will characterize their discussions regarding a possible land exchange with the United States involving certain timberlands in Humboldt County, California owned by The Pacific Lumber Company through its subsidiaries Scotia Pacific Holding Company and Salmon Creek Corporation ("subsidiaries").

During a recent meeting with our attorneys to discuss a possible land exchange with the United States, you expressed on behalf of the Department of the Interior a concern; namely, that statements made during the course of any discussions might be thereafter used in subsequent litigation in a manner that is adverse to the interests of the United States. As I said on prior occasions, it was not and is not my intent that statements made during any land exchange discussions by the parties, including their employees, agents, officers, representatives, experts, consultants, assigns or subsidiaries, would be used in any subsequent litigation between the United States, MAXXAM Inc., MAXXAM Group Inc., The Pacific Lumber Company, Scotia Pacific Holding Company, and Salmon Creek Corporation ("parties").

Accordingly, and in consideration of the mutual benefits to all parties of frank and open discussions regarding the possible land exchange, this letter represents our agreement that any statements made during the discussions of the possible land exchange are inadmissible in any future judicial proceeding involving the United States of America.

I view this letter of agreement and attached principles when countersigned below by an authorized representative of the United States, as binding upon the parties and fully enforceable against any of the parties. My signature below constitutes a representation that I have been duly

bkl

5847 San Felipe, Suite 2600 • Houston, Texas 77057 • Telephone 713-975-7600

authorized to execute the letter. I also represent that this agreement by me is binding on behalf of all the corporations identified in this letter, and that this agreement is authorized, or will be authorized, by appropriate corporate bylaws and resolutions of MAXXAM Inc., MAXXAM Group Inc., and The Pacific Lumber Company and its subsidiaries.

The attached principles set forth in greater detail the agreement between the parties on how oral and written information would be characterized in our discussions.

Let me also take this occasion to assure you of our good faith interest in pursuing our discussions with the Department of the Interior. We are prepared to engage in meaningful discussions over both the value of any property that may be acquired through an exchange by Pacific Lumber and the type and mix of compensation to be received by Pacific Lumber.

With every good wish, I am

Sincerely yours,

MAXXAM Inc.
MAXXAM Group Inc. as parents of
The Pacific Lumber Company and its
subsidiaries

Charles E. Hurwitz
Chairman of the Board &
Chief Executive Officer

Agreed to by the United States
acting through the Department
of Justice, by:

William M. Cohen

Date: 4/19/96

Attachment

bkl

PRINCIPLES GOVERNING DISCUSSIONS

For the purposes of this agreement:

The term "Property" generally denotes an area of timberland in Humboldt County, California owned by Pacific Lumber Company through its subsidiaries Scotia Pacific Holding Company and Salmon Creek Corporation.

The term "discussion" refers collectively to communications, meetings, expert reports, appraisals, telephone communications, correspondence, memoranda, and any and all documents regarding the contemplated land exchange involving the Property, whether written or oral between the parties. Discussion includes but is not limited to any commercial or financial information that is confidential or privileged. All such discussions between the parties as of July 1, 1995 are considered discussions encompassed by this agreement.

The terms "party" or "parties" includes the departments, agencies and offices of the United States government, MAXXAM Inc., MAXXAM Group, Inc., Pacific Lumber Company, Scotia Pacific Holding Company or Salmon Creek Corporation and all their respective employees, agents, officers, representatives, attorneys, experts, consultants, assigns and subsidiaries.

The promises to abide by the principles contained herein are made in consideration of the benefit to the parties of frank and open discussions.

Any party may terminate the land exchange discussions without consequence and for any reason. Participation in these discussions shall not constitute a waiver of any legal positions, rights or claims of the parties, nor shall either participation in these discussions or the discussions themselves constitute the basis for any legal position, rights or claims of any the parties.

The parties agree that all discussions which occur shall be considered "compromise negotiations" pursuant to Rule 408 of Federal Rules of Evidence and shall be inadmissible in any future judicial proceeding between the parties, including all agencies of the United States, and that no party will seek to introduce these discussions in any civil discovery requests or motions, nor reference such discussions in any legal proceedings; provided that the parties may agree prior thereto in writing to allow admission of certain otherwise inadmissible discussions. In addition the parties agree that all discussions shall not be discoverable or admissible as evidence of admission against interests, prior inconsistent statements, impeachment, or for other purposes that is "otherwise discoverable" under Rule 408 of the Federal Rules of Evidence.

It is also agreed that (a) the parties will keep confidential between themselves all discussions, to the extent permitted by law, and (b) unless otherwise mutually decided in writing prior thereto, no party will disclose the substance of these discussions to third parties, except as otherwise required by law. However, parties may respond to requests from duly authorized committees of the Congress and may, with mutual prior written agreement, issue generalized informational

statements to third parties, including the public, pertaining to the status of the discussions under the foregoing principles, provided that they do not disclose or characterize the parties' respective positions.

Should a request be made of the federal party under the Freedom of Information Act for information related to discussions (as defined in these Principles), the federal party will contact the other parties before responding in order to determine whether any of the information requested is commercial or financial information which is confidential or privileged subject to 5 U.S.C. §552 (b) (4).

To the extent that any other documents, communications, or correspondence between the parties are inconsistent with the rights of the parties as set forth in the principles contained herein, the principles contained herein shall govern.

United States Department of the Interior

OFFICE OF THE SOLICITOR
Washington, D.C. 20240

TAKE PRIDE IN AMERICA

April 19, 1996

William M. Cohen
Chief, General Litigation Section
Environment and Natural Resources Division
Department of Justice
601 Pennsylvania Ave,
Washington, D.C. 20004

Dear Bill:

This relates to our conversation of April 18, regarding the potential land exchange negotiations between this Department and MAXXAM, Inc. and its various subsidiaries. This Department agrees with the terms and conditions of the letter, including the enclosure, signed by Mr. Hurwitz, which I hand delivered to you yesterday. We recommend that you sign the second page of the letter on behalf of the Department of Justice. Again, we appreciate you and your office taking the time to help us craft the terms of the letter and agreement.

Sincerely,

David A. Watts