

YUROK REDWOOD EXPERIMENTAL FOREST

by

Kenneth N. Boe, Retired

INTRODUCTION

This historical sketch is presented as a Volunteer in National Forest project. It was started in November, 1982 when then Director Robert Callahan asked me if I would be interested in reseaching and writing a history--both factual and anecdotal. It is definitely not definitive but I think it adequately sketches the acquisition period, with names of the principal people involved; the establishment period and building construction; and the timber harvesting with planned research and reporting of results. The latter activity period became possible after Russell K. LeBarron negotiated a 7-year cooperative agreement with Simpson Redwood to log on the Experimental Forest in accordance with Experiment Station plans. I was recruited by LeBarron to head up the work for the Experiment Station and transferred from the Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Montana to the Pacific Southwest Station in November, 1956. When I arrived with my family at the Experimental Forest headquarters building to live temporarily for 7 months until acquiring a home in Crescent City, the weather was beautiful and sunny. Three or four days later a storm moved in with 11 inches of rain in 4 days. This was an eye-opening initiation to a new environment that produced many surprises during the next 18 years I was active in the research affairs.

I soon learned after two or three meetings with Simpson Redwood Company officials that the cooperative agreement was going to be a rugged challenge to administer. I considered working relationships with Simpson Timber remained good throughout the life of the agreement. All of the Company people I worked with continued to be my friends over the years. But contractual clauses were strictly observed throughout the period of the agreement. The Company logging superintendent, John Yingst, and I resolved many problems on the ground in toe to toe discussions on chilly, foggy mornings.

By the time of my retirement in March, 1974, the timber harvesting had diminished to salvage operations. The redwood silviculture research at the Experimental Forest had essentially ended. In another two years a natural area had been set aside on the Forest to preserve a remnant of old-growth redwood for observation and study. After the trade-off of 19,000 acres of Six Rivers National Forest redwood timberland to private industry to create the Redwood National Park in 1968, the natural area provided the only acreage of superb redwood under Forest Service control. On the natural area and the young stands that have started or to be regenerated after additional harvest cuttings on the Redwood Experimental Forest, research people will have a useful field laboratory for the future.

NEEDS AND OPPORTUNITIES

By 1933 considerable discussion was taking place within the California Forest and Range Experiment Station, Berkeley, California regarding the need for acquisition of areas suitable for redwood experimental forests. Mr. Hubert L. Person, Associate Silviculturist, documented this planning by memorandum dated October 17, 1933. He discussed three areas that could be considered suitable. They were: (1) Casper Experimental Forest near Fort Bragg, (2) Van Duzen River, and (3) Weott, both southeast of Eureka. These recommendations were sent to Mr. E. I. Kotok, Branch of Research, Forest Service, in Washington on October 31, 1933.

During 1935, The Regional Office in San Francisco became involved in considering redwood timberland for purchase. There were several reasons for this interest by the Forest Service. The depressed timber market meant many private holdings were becoming tax delinquent and owners wanted to liquidate. The Forest Service was anxious to acquire redwood timberland for management. The price was favorable for acquisition. A report by John R. Berry, Logging Engineer, San Francisco regarding the Northern Redwood Purchase Unit 1, dated December, 13, 1935 evaluates 19,000 acres owned by Hotchkiss Redwood Co. in Wilson, High Prairie, Hoppaw and Turwar Creeks in Del Norte County.

At the same time J. K. Brandeberry prepared a Land Use Plan for the Northern Redwood Purchase Unit. This was approved by Regional Forester S. B. Show. In this plan was included the idea to set aside 2300 acres for scientific or primitive area.

Hubert Person continued proposing the need for a redwood experimental forest in a file report "The need for additional research in the Redwood Region", dated 7-26-1937. First research had been started in 1931 in the general areas of planting, condition of cutover land, redwood logging, and establishment of natural reproduction. The program in 1937 included planting studies, natural reproduction studies on selectively logged areas in Henry Creek, tree measurements for construction of volume tables, logging studies, and slash disposal in cooperation with California Redwood Association. But future research and demonstration was needed on fully controlled lands on an experimental forest. Such additional studies as ecological and soil studies, utilization of logging waste, logging and milling studies, yield studies and slash disposal would be facilitated.

All of the above ideas plus additional planning was incorporated into a "Problem Analysis for Silvicultural Investigations in the Redwood Region" by H. L. Person dated February 10, 1939. He recognized again the need for an experimental forest in each of the northern redwood and southern redwood regions. The environmental and stand differences were evident to most foresters.

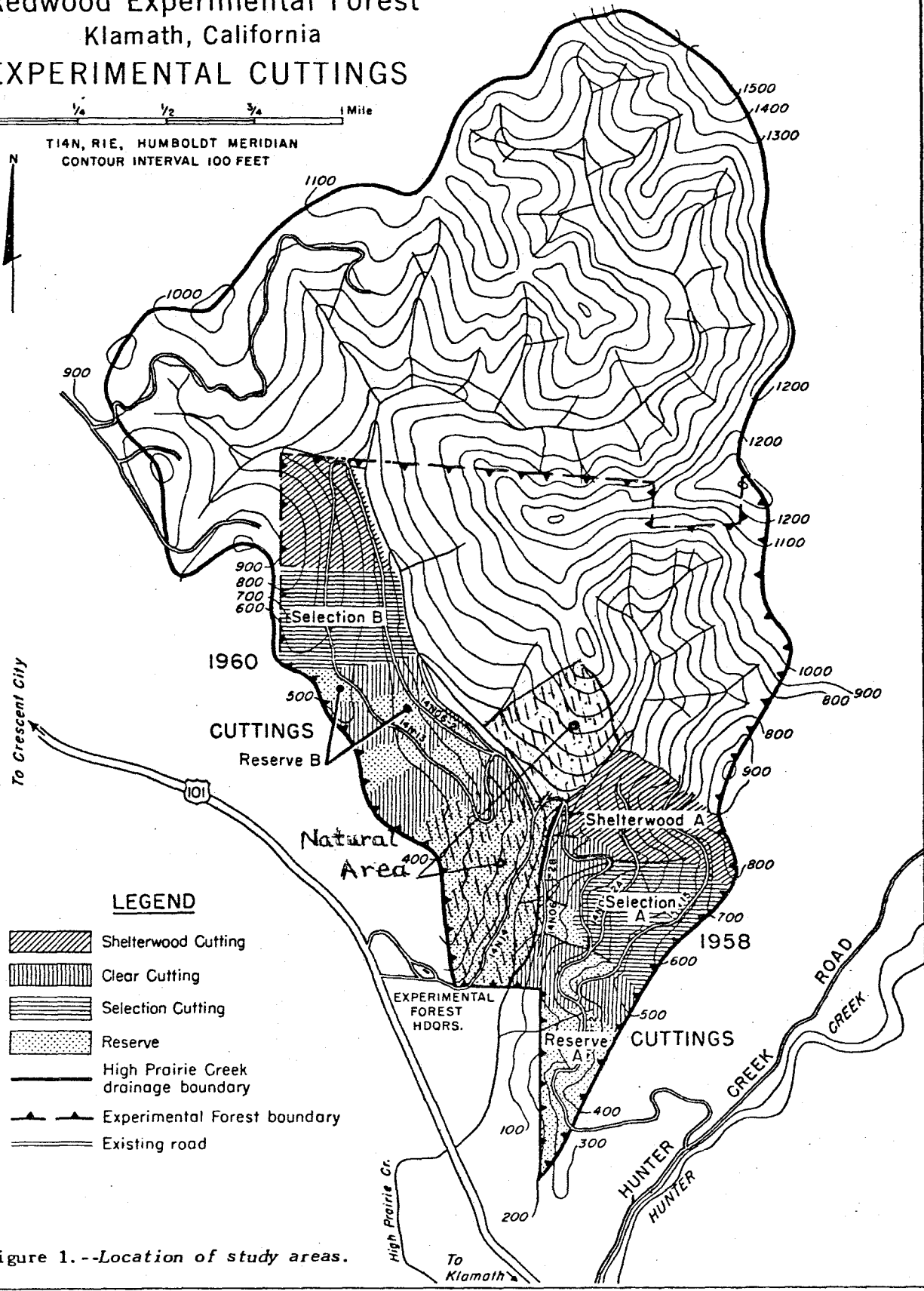
I visited Mr. Person at his home in Danville, CA. on June 6, 1983. I learned from our discussion that Hubert was not personally involved in the purchase of redwood timberlands in the northern zone which included the area of the Redwood Experimental Forest. He transferred to other research duties about 1941 and later entered forestry assignments in the State Department.

Consequently his recall of specific events during the pre-experimental forest period was not possible. His many file reports are his significant contribution.

Redwood Experimental Forest Klamath, California EXPERIMENTAL CUTTINGS

0 1/4 1/2 3/4 1 Mile

T14N, R1E, HUMBOLDT MERIDIAN
CONTOUR INTERVAL 100 FEET



LEGEND




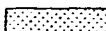



-  Shelterwood Cutting
-  Clear Cutting
-  Selection Cutting
-  Reserve
-  High Prairie Creek drainage boundary
-  Experimental Forest boundary
-  Existing road

Figure 1.--Location of study areas.

REDWOOD TIMBER LAND PURCHASE

Late in 1939 and early 1940 the Forest Service completed the purchase of about 14,500 acres of redwood timberland in the designated Northern Redwood Purchase Unit. This area is mainly north of the lower Klamath River in Del Norte County. The purpose of the purchase was to practice and demonstrate sustained yield forestry, good logging practices, and other uses characteristic of all National Forests, as well as to help stabilize the local economy.

This purchase transaction was prolonged and involved. A key document early in negotiations was entitled an "Acquisition Report-Northern Redwood Purchase Unit Tract 1" dated December 13, 1935 by John R. Berry-Logging Engineer, San Francisco. He was negotiating with Hotchkiss Redwood Company, Ed. Fletcher Company and Dean Witter, Bondholder. The area was then considered to be approximately 19,000 acres in the drainages of Wilson, High Prairie, Hoppaw and Turwar Creeks.

The Experiment Station was involved in the transactions throughout negotiations documented in a report dated September 25, 1935, designated R, Branch Stations, Redwood Experimental Forest, and entitled "Tracts Suitable for Experimental Forests". In that report the High Prairie Creek area was given priority in the Northern Redwood Purchase Unit. Actual purchase of timberlands in the Northern Redwood Purchase Unit was authorized early in 1939.

A request was made for approval of the northern redwood experimental forest in "Memorandum for Director", designated R, Branch Stations, Redwood Region, Northern, dated September 30, 1939. The Regional Forester and Director of California Forest and Range Experiment Station, plus other staff met on January 15, 1940 and approved the designation as an experimental forest of that part of High Prairie Creek drainage lying east of the Redwood Highway to the extent that the lands have been or may be acquired by the Forest Service.

In his "Report on Redwood Experimental Forest, Trinity National Forest, Northern Redwood Purchase Unit", by Hubert L. Person and dated March 9, 1940, he listed 643 acres as acquired, or authorized, and in process of title transfer; and 1552 acres as privately owned in the High Prairie Creek drainage. Since the present acreage of the Experimental Forest is recorded as 935, a subsequent purchase was indicated. Mr. William E. Hallin, Winston, Oregon, explained to me when I visited him July 28, 1983, that the additional acreage was purchased in 1940 but that title was not transferred until later. The High Prairie Creek unit is located about 4 miles north of the town of Klamath, Del Norte County. Its southwest corner is near Highway 101. It includes portions of Sections 21, 22, 27, 28, and 33, T14N; R1E., Humboldt Meridian. The upper portion of the High Prairie Creek watershed of approximately 1260 acres was acquired some years later by Simpson Timber Company.

EXPERIMENTAL FOREST SURVEYS AND BUILDING CONSTRUCTION

The details of much of the early work were probably recorded in diaries and office reports that may be filed somewhere but mainly unknown. Bill Hallin remembered a number of key activities. He made a boundary survey in 1939 and later cruised several forties of timber. For this cruising a volume table based on diameter of redwood at 20 feet was used. The diameter at 20 feet was estimated by the use of a monocular with abney level specifically devised for this job.

Plans for buildings got started very quickly. On April 26, 1940 Person wrote to Russell W. Bower, District Ranger, Crescent City, to acknowledge his letter of April 24, in which Bower referred to discussions by these two people about building plans for the research area. Person documented that preliminary plans had been drawn by Williams, Forest Service architect, and that these plans had been tentatively approved by Mr. Kotok, Johnson, Bachman, Bonnet and Irvine. The Experiment Station had promised \$1500.00 towards the project, and that by establishing ERA and WPA projects that it would be possible to construct a two-story building which would normally cost about \$10,000. The location of this headquarters building was to be selected on May 3, 1940. Mr. C. B. Morse, Assistant Regional Forester, informed the Forest Supervisor, Trinity National Forest, Weaverville, that Irvine and Bonnet would be at the site at 10 a.m. on Friday, May 3. He requested Ranger Bowers presence, together with Hubert Person.

Bill Hallin recalled during my interview with him, July 28, 1983, that the headquarters building was started in late summer, 1940. The C.C.C. camp was already functioning before the building was started. We can assume that these crews helped some on site preparation, and I understood that they put in the water line to take water for domestic use from High Prairie Creek about one-half mile upstream. Hallin was involved with the building construction during summer and fall of 1940, and winter of 1940-41. He thought that the building was completed shortly before Pearl Harbor, December 7, 1941. The building plans specified that the principal tree species would be used in the interior paneling. Clear-heart redwood was the predominant wood used. One room was paneled in Port-Orford-cedar, another in Sitka spruce and some Douglas-fir was used.

Hallin had a redwood water tank installed on elevated ground near the headquarters building in 1942. I had this water tank dismantled and shipped to Joe Woolfolks Experimental Range about 1958 or 59 after getting a water hookup to the local water district.

Presumably, The Experiment Station Directors Staff in 1940, envisioned this Headquarters building to be a multipurpose building. There was dormitory space upstairs for field assistants. Downstairs were kitchen, living room, bedroom, and office space for a Superintendent. Throughout the building were 6 fireplaces for heating. Someone must have thought that C.C.C. crews, would be around for a long time to cut firewood.

CARETAKER USE BY SIX RIVERS NATIONAL FOREST

When the purchase negotiations were in progress to acquire redwood timberlands on the Northern Redwood Purchase unit, the area was part of the Trinity National Forest headquartered in Weaverville. The Coast Ranger District was located in Crescent City, and as I mentioned earlier, Russell Bower was District Ranger. In April, 1944, Vern Hallin became Ranger. He is a personal friend of mine and presently lives in Eureka. From some notes he made for me I have summarized brief remarks about the period from World War II to 1956.

Hallin stated that 14,492 acres were acquired and the purchase price was \$0.50 per M. bd. ft. for redwood for a total cost of less than half million dollars. Later the total volume was estimated at one billion board feet. He continued negotiations with Ward interests for additional purchase but nothing developed of this work

In 1947 the Six Rivers National Forest was established from units of the Siskiyou (Gasquet District), Klamath (Orleans District) and Trinity (Lower Trinity, Mad River, and Northern Redwood Purchase Unit). Headquarters are in Eureka.

Hallin said that the new Experiment Station building remained unoccupied during his Ranger tenure except for occasional visits and group meetings by Experiment Station and Forest people. After Six Rivers National Forest was established, Ranger meetings were held more often at the Headquarters building. Just prior to our arrival in 1956, a Forest permanent employee, Charley Brown, was living temporarily in the building with his family.

A CCC camp had been at the site of the experiment Station building for several years. There were two barracks, a mess hall and a recreation hall. One barracks was dismantled in 1945 and transported to Weaverville for reuse. Assistant Ranger Jim James lived in the other barracks building in 1945 and 1946. The State Division of Forestry used the mess hall and recreation hall for several seasons as a fire station. Early in 1957, then Gasquet District Ranger, Jim James, came with a small crew and burned all the remaining CCC buildings. I was very pleased with this cleanup as the buildings were fire traps and dingy.

RESEARCH PROGRAM AT EXPERIMENTAL FOREST
Cooperative Agreement with Simpson Timber Company

The basis for beginning a research program at the Yurok Redwood Experimental Forest was The Cooperative Agreement for Forest Research between Simpson Redwood Company, Arcata, California and the California Forest and Range Experiment Station, Berkeley, California. This agreement was entered into August 21, 1956.

Russell K. LeBarron, Chief, Division of Forest Management Research was the principal drafter of this agreement. Henry K. Trobitz was the principal counterpart for the company although John Miles and John Yingst participated in many discussions.

Two parcels of land, essentially all of High Prairie Creek, comprised the land and timber for this agreement (see map). The Forest Service Experimental Forest occupied the lower watershed and totalled about 935 acres. The Company lands were in the upper watershed totalling about 1200 acres.

The agreement specified a period of seven years cooperation with provision for extension. The Experiment Station agreed to make available at least 25 million board feet of merchantable timber during the 7-year period. The Company pledged land and timber for the agreement period and in accordance with approved study plans. Over the seven year period the Company agreed to contribute a total of \$62,000 to be paid into a special cooperative work fund.

An approved study and working plan was the key document to getting the program started. As stated in clause 6 of the cooperative agreement "The Company shall cut, log, and remove timber from Parcel 1 (Experiment Station) and Parcel 2 (Company) and perform such parts of the related research work as are specified for performance by the Company in the plans that are described in clause 4(b), (Study Plans)."

All of the merchantable timber to be harvested in Parcel 1 in accordance with the approved plans would be paid for at the appraised stumpage value. This stumpage would be determined by standard Forest Service appraisal methods with usual allowances for roads, slash disposal, etc., plus any special requirements detailed in the study plan.

The program on the Experimental Forest was scheduled as follow:

- (a) During the first year, get organized, make plans, start roads, and perform other necessary preparatory work.
- (b) During second through sixth years, install experiments, cut timber, and conduct related research work.
- (c) During the seventh year, complete the records and terminate studies that are not of a continuing nature.

Preliminaries To Getting Research Program Started

At the invitation of Russell K. Le Barron, Chief, Division of Forest Management Research, CF & RES, I travelled from my research job at the Northern Rocky Mountain Forest and Range Experiment Station, Missoula, Montana to Berkeley in August, 1956. Together with Douglass F. Roy, Project Leader, we drove to the redwood country, visited the Yurok Redwood Experimental Forest and discussed general plans for getting a research program started.

I accepted a transfer and in late November, 1956 arrived with my family at the Headquarters building on the Experimental Forest. We had been given permission to live in the building temporarily until we found a suitable place to rent or buy either in Klamath or Crescent City. Personnel of Six Rivers National Forest had been using the building so it was livable. Our furniture arrived the next day. The weather was sunny and warm. It was a pleasant beginning. About 3 days later a typical winter storm blew in. We had 11 inches of rain in 4 days. From then on the real-life situation began with a rush: adjusting to a new climate; getting 2 children started in school; looking for a house; familiarizing myself with a timber type in which some branches on giant redwoods were as large as lodgepole pine trees in Montana; and writing an acceptable study plan that was needed before experimental cuttings, cruises, appraisals, and road plans could be started.

Simpson Redwood Company didn't hesitate about applying pressure to get moving on the project in accordance with the terms of The Cooperative Agreement. On December 11, 1956, Le Barron replied to Land and Timber Manager Henry Trobitz's letter of December 1, that his proposal for a meeting was appropriate, but that I probably yet hadn't had time for enough orientation (an understatement since I had been on the job less than two weeks). Nevertheless, I managed some progress in about two months.

In early March, 1957, The Experiment Station received permission from The Regional Fiscal agent to request Simpson Redwood Company to begin an engineering survey.

The costs of this work would be recovered through a reduction in the appraised value of the timber. Accordingly on March 14, 1957 I formally requested this work with instructions and a map showing the road sections that were needed. The work was to have been completed by June 15. The invoice statement from Simpson documented that the work was begun on April 16 and finished July 10, 1957, at a cost of \$2171. But these first road surveys had to be put on hold for a couple of years because of complicating circumstances.

Our initial plans called for the main haul road to enter from Highway 101 at the Experimental Forest headquarters building site. Supervisor W. W. Spinney, Six Rivers National Forest, subsequently opposed this plan, and instead said the entrance road had to be from the Hunter Creek, or southeast side. This necessitated a half mile right-of-way timber sale and road construction by the National Forest before we could begin the activities on the Experimental Forest. As a consequence of this change, only the right-of-way timber was available to the company for logging in 1957.

It is possible this forced change speeded up the plans for the national Forest to survey and plan the bridge crossing of High Prairie Creek within the Experimental Forest. Bridge construction was started in November 1957 and completed in early 1958.

A minor event related to the bridge construction illustrated one aspect of the redwood forests worth recording. I had requested the company to fell trees and clear the area for the bridge -- of course as a recoverable cost item in stumpage appraisals. One huge redwood windfall tree lay parallel to High Prairie Creek in a very moist environment. On the surface of the butt-section of the redwood grew a western hemlock, which I determined to be 143 years old by ring count after it had been felled. The windfall redwood was then bucked and hauled to the mill and at least the 143-year old logs in the lower tree were essentially sound. The damp environment presumably kept the wood saturated so that fungi could not grow.

The Study Plan

My first draft copy of the study plan was completed in July 1957. I determined the problem to be that forest managers who intend to grow wood for continuous yield lack information to effectively convert unmanaged old-growth redwood forests to younger managed stands. Although cutting had been in progress in redwood for over 100 years, and much had been written about redwood, there was still considerable uncertainty about getting the most quality and quantity wood production from the land.

All of the experimental cuttings were aimed at converting old growth redwood to younger managed forests. The three reproduction methods tested were selection, shelterwood and clear cutting in patches or blocks. The

selection method was intended to produce an all-aged forest, but to change the age structure from very old to young mature trees. The shelterwood method would remove the old-growth timber in two cuts on half the area for shelterwood testing and three cuts on remainder. Thus young stands would be started and effects on the reproduction of returning to the areas for removing remaining overstories would be evaluated. The small clear cuttings of 10 to 20 acre sizes would be alternated with equal reserved areas. Thus when the latter blocks would be cut in 10 years or more there would develop different age classes in small segments of the watershed.

Additionally, regarding the selection cuttings, I anticipated a cutting cycle of 10 years on an approximate 100 year rotation. Therefore trees on about 10 percent of each 40-50 acre tract were marked for the first cut. Since those were biggest, oldest trees the volume removed in the first cutting was 40-50 percent.

In conjunction with the reproduction cuttings a logging cost study was completed. The company furnished information on record sheets provided to them for two main categories--road construction and logging. The cost records for logging were kept separately by (1) cutting method, (2) stage (trees under 6 feet d.b.h. logged first; over 6 ft. d.b.h. second), and (3) landing within each unit and for

- a. Felling and bucking
- b. Peeling of redwoods if done in woods
- c. Skidding
- d. Loading

Supplemental work but not for evaluation included slash disposal, disposal of cull trees, and erosion control.

The general experimental design required that the three reproduction methods would be replicated four times in a large scale randomized block design including Company lands in the upper watershed. Only two blocks (replications) were completed by the end of activities.

For study purposes square plots were used:
(1) 0.4 acre (2 X 2 chains) for redwood 1" and over; (2) 0.1 acre (1 X 1 chains) for conifer species 1 "andover" d.b.h.

Within the study plots seed dispersal and reproduction establishment were studied by seed traps and reproduction transects.

The first block was designated Yurok-1958. It comprised 62 acres of shelterwood cutting, 52 acres of selection and 60 acres of clear cutting in 3 units. This block was located in the southeast side of the Experimental Forest.

Marking and Appraisal Yurok 1958 Cuttings

The layout of blocks, marking of timber, and first appraisal report were completed in April 1958. The Six Rivers National Forest people besides Supervisor W. W. Spinney who cooperated in getting the appraisal completed were Engineer George E. Blodgett, District Ranger M. R. James, assistants John VAn Akkeren, T. F. Hatzimanolis, plus Forest Timber Staff Corson Williams and Vern Hallin.

The appraised value of redwood on this first cutting block was \$14.26 per M.bd.ft., Douglas-fir was \$27.51, Port Orford Cedar \$19.30 and other species a nominal amount. These stumpage prices were somewhat lower than prevailed at that time because The Experiment Station required special records and extra work, that would not ordinarily be done on commercial timber sales.

Of particular interest and irritation in this Cooperative Agreement was that redwood was to be scaled by the Humboldt log rule. This log scale had an arbitrary 30 percent reduction for defect. It had been used throughout the redwood region for many years on private industry timber sales. This defect deduction applied to all logs scaled. But the critical factor was "who determines what logs are to be scaled and on what basis". The Forest Service did not accept and would not handle Humboldt scale. I had a problem. I was not prepared to hire and train a scaler. My solution, which was accepted and handled by Six Rivers National Forest was to have the Forest Service regular scaler at Simpsons mill scale all logs by Scribner Dec. c. rule. The scale books were then turned over to us at The Experimental Forest. For those redwood logs that were merchantable by definition (50% of gross volume) we entered Humboldt Log Scale. Cutting reports were then prepared and sent to Six Rivers National Forest for billing and collection.

Marking and Appraisal Yurok 1960 Cuttings

The second block of the large-scale randomized design was located along the northwest side of High Prairie Creek (see map). The net acreage involved, less main roads, was as follows: (1) Shelterwood 49 acres, (2) Selection 57, (3) Five clear cut units of 10, 8, 13, 9, and 16 acres totalling 56, and (4) Four reserve units totalling 43 acres. For an estimated 22,700 M b.m. Humboldt scale the redwood stumpage was appraised at \$21,88; Douglas-fir was \$21.90 per M b.m. Scribner Dec. C.

For all of the marking, surveys, plot layouts, and compilation work on the Yurok-1958 cuttings and most of the Yurok-1960 project, Arthur Magill was my assistant. Much of the field work was done in the winter under adverse weather conditions. Neither of us had ever experienced under story conditions as are found in old-growth redwoods. For example in running lines sometimes huge windfalls block the path. When the lead man would scramble to the other side he would have to hold his hard hat on the Jacob-Staff above his head to indicate his position. Vegetation was generally dense--in places sword fern 4 to 6 feet tall, and salal so stiff and thick to almost prevent forward motion.

After Magill transferred to Berkeley, Robert Dobbs became my assistant. He stayed two years or more to help finish the 1960 cuttings and started plot examination on the 1958 cuttings. After Dobbs departure, Robert Neal came on the job and remained for several years. I moved to Arcata in 1963 to set up the project office on the Humboldt State University campus. Neal had charge of all activities on The Experimental Forest including completion of the 1960 cuttings, plot remeasurements and subsequent salvage sales. He was assisted by Danny Heavilin during later years.

In many respects this research project was too heavily involved in timber sale activities. From my previous experience in the NRM station where I had responsibility for silvicultural cuttings on the 7000-acre Coran Experimental Forest I was prepared somewhat for this job. But in Montana the District people handled much of the administrative work. At Yurok, by reason of the Cooperative Agreement, we were saddled with a major portion of the work. Nevertheless, after about three years, research information began to accumulate.

To further illustrate the size of the timber sale activities involved in harvesting the cuttings on the two randomized blocks, I have summarized the following: (Note that volumes reserved are cruise estimates and volumes cut are both scaled and cruise estimates but within reasonable limits.)

<u>Cutting</u>	<u>Acres(Including)</u> <u>Reserve Units</u>	<u>Volume Cut</u>		<u>Volume Reserved</u>
		(M b.m. Scr.Dec.C.)		(M b.m.Scr.Dec.C.)
		<u>Redwood</u>	<u>Whitewoods</u>	<u>All Species</u>
Yurok-1958	209	18,450	4,101	10,031
Yurok-1960	214	28,554	1,443	19,103
Total	413	47,004	5,544	29,134

The cooperative agreement with Simpson Timber Company was terminated May, 1965.

SUBSEQUENT TIMBER SALES

Mainly because of heavy windfall in the Yurok-1958 block we concluded that salvage and second cuttings were necessary although 10 years had not elapsed since the first cuttings. The cooperative agreement with Simpson Timber Company had terminated. Therefore in July, 1964 we entered into a cooperative agreement with Twin Parks Lumber Company, Arcata to conduct additional cutting studies. By a supplement to this agreement dated May 14, 1965, and signed by John R. McGuire, Director PSW Expt. Sta., the details of this project were recorded. The broad scope consisted of:

1. Make the final cut on half of the Shelterwood and the second cut on the other half in accordance with the 1957 study plan.

2. Salvage windfalls, damaged, and dead trees on other designated areas on the Experimental Forest. On the Yurok-1958 selection area the salvage will comprise the second cut. Since Reserve Unit 5 was heavily damaged by windfall, after the salvage cutting, it will become part of the Selection area for future planning. On the Yurok-1960 cuttings all salvage was included.

We specified many details of how the logging was to be conducted to minimize damage to reserved trees and to the reproduction that had become established since the first cutting in 1958. But the principal study in this project was that of skidding production to consider variables, (1) gross volume per log, (2) skidroad gradient, and (3) skidding distance.

RESEARCH PUBLICATIONS-REDWOOD EXPERIMENTAL FOREST

One objective of the experimental cuttings on the Redwood Experimental Forest was to effectively convert old-growth into younger stands for management. During this conversion process there was opportunity to study and report on many problems associated with harvesting and reproducing new stands. Following is a list of published reports:

Boe, Kenneth N.

(n.d.) Research at the Redwood Experimental Forest. U.S. Forest Serv., 12p., illus. Pacific Southwest Forest and Range Exp. Stn., Berkeley, CA.

1961. Redwood seed dispersion in old-growth cutovers. U.S. Forest Serv. Res. Note 177, 7p., illus. Pacific Southwest Forest and Range Exp. Stn., Berkeley, CA.

1963. Tractor-logging costs and production in old-growth redwood forests. U.S. Forest Serv. Res. Paper P SW-8, 16p., illus. Pacific Southwest Forest and Range Exp. Stn., Berkeley, CA.

1965. Natural regeneration in old-growth redwood cuttings. U.S. Forest Serv. Res. Note PSW-94, 5p. Pacific Southwest Forest and Range Exp. Stn., Berkeley, CA.

1965. Windfall after experimental cuttings in old-growth redwood. Proc. Soc. American Foresters, pp 59-63, illus. Detroit, Mich.

1967. Sound wood residue left after experimental cuttings in old-growth redwood. U.S. Forest Serv. Res. Note PSW-136, 4p., illus. Pacific Southwest Forest and Range Exp. Stn. Berkeley, CA.

1968 Cone production, seed dispersal, ~germination in old-growth redwood cut and uncut stands. U.S. Forest Serv. Res. Note PSW-184, 7p., illus. Pacific Southwest Forest and Range Exp. Stn., Berkeley, CA.

1970. Temperature, humidity, and precipitation at the Redwood Experimental Forest. U.S. Forest Serv. Res. Note PSW-222, 11p., illus. Pacific Southwest Forest and Range Exp. Stn. Berkeley, CA.

1971. Damage to Knobcone x Monterey pine hybrids and parents... by red band needle blight in California redwood sites. U.S. Forest Serv. Res. Note PSW-233, 6p., illus. Pacific Southwest Forest and Range Exp. Stn. Berkeley, CA.

1973. Redwood. U.S. Forest Serv. Agriculture Handbook No. 445, pp23-26. Washington, D.C.

1974. Growth and mortality after regeneration cuttings in old-growth redwood. U.S. Forest Serv. Res. Paper PSW-104, 13p., illus. Pacific Southwest Forest and Range Exp. Stn. Berkeley, CA.

1975. Natural seedlings and sprouts after regeneration cuttings in old-growth redwood. U.S. Forest Serv. Res. Paper PSW-111, 17p., illus. Pacific Southwest Forest and Range Exp. Stn. Berkeley, CA.

1974. Eucalyptus species response to the environment of north coastal California. Progress Report. 5p. U.S. Forest Service. Pacific Southwest Forest and Range Exp. Stn. Berkeley, CA.

Neal, Robert L. Jr.

1967. Sprouting of old-growth redwood stumps first year after logging. U.S. Forest Serv. Res. Note PSW-137, 7p. illus. Pacific Southwest Forest and Range Exp. Stn. Berkeley, CA.

VISITOR INFORMATION

Throughout the years there was continued interest by researchers, foresters, lumbermen, conservationists, students and tourists to visit The Experimental Forest. Some wanted to see logging of the giant redwoods. Others wanted to look at the research work and accumulated information. Groups, such as the Sierra Club, came to critique the entire project. For many years I kept a guest register but finally discontinued it.

I especially liked having the silviculture and logging classes come from Humboldt State University for field trips. Many pertinent discussions were generated but mainly by a small percentage of each class.

On one occasion, Louise Parker, then of the PSW Experiment Station, brought a Greyhound bus load of Sierra Club members for an all day conducted tour. By that time the regeneration had already started on some of the earliest cuttings so most believed what we were trying to do.

Undoubtedly, the visit by about thirty-five men and women from Great Britian will forever be remembered by me. I met the visitors at a motel in Crescent City on the morning of October 12, 1962. The weather appeared threatening but since the weather forecast seemed somewhat favorable the people were eager to get started on their short tour to The Redwood Experimental Forest as part of their conducted travels of the coastal redwoods.

By Greyhound bus we traveled to the Forest and to different areas that the bus could negotiate and that I thought would be interesting to the group. Since the group had luncheon reservations at the Trees of Mystery, I tried to adhere to a time schedule that would get us back just before 1:00 p.m. On our way out the southeast haul road, several people wanted to stop once more to gather redwood cones and take some more photos. All morning many had complained about the muggy air. As we left the bus to walk along the road, the first blast of wind of what we later learned was the Columbus Day hurricane, hit us. When I saw many branches snapping off the big redwoods, I hurried the people in the bus, told the driver to move it as fast as he could for Highway 101, and prayed a little. By the-time we reached the highway, trees were falling and the wind was howling. At the resturant we learned that the highway both north and south was blocked. Luckily the road to Eureka was opened by mid afternoon so the foreign visitors got safely to their destination that evening. Later in the evening I got home to Crescent City.

COOPERATIVE STUDIES

At the start of the silviculture research, other divisions in the Experiment Station were mildly interested in getting some studies started. Only watershed management followed up with plans and field work. Clark Gleason spent several days in winter of 1956-57 evaluating some characteristics of High Prairie Creek. Subsequently, Art Magill and I collected many water samples during different stream stages after winter rains and sent these to Berkeley. We also measured stream flow at marked sample points to coincide with the water samples.

The Wildlife Management Unit at Humboldt State University sponsored one graduate student to study mice populations in virgin stands and in clearcuttings. Professor Charles Yocum, HSU, made some surveys to supplement his other data for some of his teaching research.

CURRENT STATUS

In the 1960's a ranger district was established to manage the 19,200 acres of the Northern Purchase Unit. Previously this acreage was part of the Gasquet Ranger District. The District people (Ranger Ted Hatzimanolis)) shared office space in the Experiment Station building at the Redwood Experimental Forest. Six Rivers National Forest constructed residences and workshops on the administrative site. In 1968 the entire purchase unit was traded to timber companies as partial payment for land acquired for the Redwood National Park. Subsequently the Forest Service turned the headquarters buildings over to the National Park Service. The Experiment Station retained working space in the buildings through a cooperative agreement with The National Park Service.

Yurok Research Natural Area

The U.S. Forest Service control of high quality redwoods in the northern area is limited to The Redwood Experimental Forest. There are no other opportunities to locate an old-growth redwood natural area -on national forest land within the main body of this type. Therefore the establishment of this 150-acre natural area in 1976 fills an important need in representing the redwood type and to insure continued use for scientific and educational purposes.

The Research Natural Area is in portions of the south half of Section 21 and the north half of Section 28, T. 14 N., R. 1 E., Humboldt Meridian.

On the 120 acres of superlative old-growth redwood, volumes are well over 300,000 board feet per acre of which 80 percent is redwood, and the remainder is Douglas-fir, Western Hemlock, Port-Orford cedar, and Sitka spruce. Overstory redwood trees range in age from 400 to 1200 years. The photo on the following page illustrates the timber stand.

An additional 30 acres of the Natural Area is on alluvial flat land where big leaf maple and red alder predominate.

The area will be administered by the scientists at The Redwood Sciences Laboratory, Arcata.

Future Harvest Cuttings

When the redwood silviculture research project moved towards termination after mid-1970, some thought was given to what to do with the remaining old-growth outside the natural area on the experimental forest. In D. F. Olson's proposal dated February 15, 1979 the acreage breakdown was indicated to be:

436 acres loggable old-growth
150 acres natural area
119 acres shelterwood cutting
120 acres selection cutting
110 acres clearcutting
935 acres total

Olson suggested two basic policies to be followed that seem acceptable, namely:

1. Insuring the establishment of desired species on cutover land immediately after logging and slash disposal.
2. Continuing ongoing research and formulating new studies as need requires.

The idea of developing a range of ages from 1 to 24 years in 2-year age classes and area control units seems unrealistic and unneeded. The experimental forest should be utilized for silvicultural, ecological, and hydrological studies and not constrained by continuous yield or unit area controls.

Young-growth stands are needed for study purposes to be useful to timber land owners managing for wood fiber production. In *Silvicultural Systems for the Major Forest Types*, U.S. Forest Service Agri. Handbook No. 445, I stated my views on culture of young growth on page 25. I would hope that the coppice selection method would be tested after young stands reach thinning age, size, and density.

I was pleased to learn that the Experiment Station is assuming control again of the harvesting activities on The Experimental Forest as stated in Ben Spada's decision notice of 1-17-1984. Also C. J. Ralph's plan to study old-growth forest wildlife habitat should provide some basic information and maybe some surprises. One of my biggest surprises, in company with Art Magill about 1959, was to have a mountain lion jump across the road in front of our pick up while going to upper High Prairie Creek one winter morning.



Yukon Research Natural Area, Ariz. May, 11 standing on windfall. Photo by Ken Boes - 1957.