July 1989

COMPENDIUM OF CURRENT COAST RANGE RESEARCH

compiled by

Catherine Bacon
Andrew Hansen
Thomas McMahon
Arne Skaugset

FOREST RESEARCH LABORATORY
Oregon State University

COPE

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INTRODUCTION

This compendium contains listings of ongoing and recently completed research and administrative studies conducted in the Oregon Coast Range in the areas of fisheries, forestry, soils/hydrology, and wildlife. To assemble this compendium, requests for information were sent to about 145 individuals from various agencies, companies, and universities. Individuals and agencies contacted were those considered most likely to be conducting suitable studies. Despite our efforts to make this compendium complete, a few key individuals may have been overlooked, or some organizations may have chosen not to respond. Therefore, relevant research may have been missed; absence from the compendium should not imply lack of research on that topic.

There are more than 200 entries in the compendium; they contain information on the location, objective, description, status, contact person, and responsible organization for each study. More detailed information can be obtained by contacting the responsible person directly. The studies are presented by discipline and categorized by subject for easy reference. They are also indexed by contact person, county, and responsible organization.

The compendium will serve as a useful reference for managers and researchers in the Oregon Coast Range and similar areas. It will allow them to determine what work is being done, provide contacts for discussing results, and direct them to new areas of research. The result will be reduced duplication of research effort, increased efficiency in research, and in the long run, better information for managing Coast Range resources.

The Adaptive COPE Team would like to thank the researchers and land managers who took the time to respond to our requests for information.

TABLE OF CONTENTS

FISHERIES

Aquatic Ecology

1 Benthic macroinvertebrates and sediment characteristics of a coastal dune margin lake

RESPONSIBLE ORGANIZATION: Oregon State University Department of General Science

LOCATION: Carter Lake, Oregon Dunes National Recreation Area (Douglas County)

OBJECTIVE: To describe the benthic habitats and macroinvertebrate communities in Carter Lake.

DESCRIPTION: The bathymetry of the lake was mapped, and water samples taken through the summer of 1986 were analyzed for dissolved oxygen and temperature. In May and October 1986, bottom samples were analyzed for sediment characteristics and macroinvertebrates. Habitat distributions were surveyed by snorkeling.

STATUS: The project has been completed and will be reported as a Master's thesis.

CONTACT: Andrew G. Wones
2808 NW Arnold Way
Corvallis, OR 97330
753-0189

2 Leaf-drop simulation at Deer Creek

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis, Oregon State University Department of Fisheries and Wildlife

LOCATION: Deer Creek, Cascade Head Experimental Forest (Tillamook County)

OBJECTIVE: To examine the effects of salmonberry in riparian zones on leaf retention in streams.

DESCRIPTION: The reaches of Deer Creek were cleared of 100% or 50% of salmonberry cover. Plastic leaves were dropped during storms, and the relationship between salmonberry cover and leaf retention was examined.

STATUS: Completed.

CONTACT: Stan Gregory
Department of Fisheries and Wildlife
Oregon State University
Corvallis, OR 97331
754-4531

Coastal Fish Stock Studies

3 Smolt production estimates of anadromous salmonids in Elk River

RESPONSIBLE ORGANIZATION: USDA Forest Service, Oregon Department of Fish and Wildlife

LOCATION: Elk River (Curry County)

OBJECTIVE: To quantify the smolt migration of juvenile anadromous salmonids from Elk River.

DESCRIPTION: Two downstream migrant traps were placed in upper and lower Elk River and finished during the migration season. Seasonal estimates of the number, size, and timing of the downstream migration of juvenile salmonids have been obtained at each trap site.

STATUS: The trap in upper Elk River has been installed since 1985, and that in the lower Elk River since 1986. In 1988, the Humphreys trap in lower Elk River was replaced by a new revolving screw trap, which may be better suited for large smolts.

CONTACT: Jay Nicholas
303 Ballard Extension Hall
Oregon State University
Corvallis, OR 97331
754-4431

4 Research and development of Oregon Coastal chinook salmon

RESPONSIBLE ORGANIZATION: Oregon Department of Fish and Wildlife, National Marine Fisheries Service

LOCATION: Oregon coastal rivers with emphasis on chinook stocking sites in Elk, Sixes, and Chetco Rivers (Curry County)

OBJECTIVE: To collect and analyze a long-term data set from wild and hatchery stocks to: 1) identify physical and biological factors regulating production; 2) provide guidance for a broad range of management programs aimed at protecting and enhancing chinook populations; and 3) to improve the efficiency of hatchery production.

DESCRIPTION: Experiments have been conducted to: 1) evaluate breeding, rearing, and release strategies for coastal chinook populations; 2) assess survival, catch, and escapement of Elk River Hatchery chinook; 3) investigate the feeding ecology of juvenile chinook in estuaries; and 4) evaluate the genetic impacts of hatchery stocks on wild stocks in Elk River. Work is currently underway to develop a Coastal Chinook Plan.

STATUS: Most of the work in the project was scheduled to terminate in October 1988 because of funding shortfalls in the Anadromous Fish Act program.

CONTACT: Jay Nicholas
303 Ballard Extension Hall
Oregon State University
Corvallis, OR 97331
754-4431

5 Coho salmon scale analysis

RESPONSIBLE ORGANIZATION: Oregon Department of Fish and Wildlife, National Marine Fisheries Service

LOCATION: Oregon coastal counties and waters

OBJECTIVE: To estimate the number of hatchery-reared, hatchery-accelerated (private hatcheries), and wild coho salmon caught in the ocean fisheries off Oregon and to identify stray hatchery coho in coastal rivers.

DESCRIPTION: Scale samples were taken from coho salmon landed in commercial troll and sport fisheries at coastal ports. Discriminant analysis was used to estimate the percentages of hatchery, hatchery-accelerated, and wild fish in the catches. Visual analyses were used to separate these groups in coastal spawning streams and in hatchery broodstock collection programs.

STATUS: This project began in 1978 under contract with the National Marine Fisheries Service and was scheduled to terminate in October 1988 because of shortfalls in the Anadromous Fish Act funds.

CONTACT: Lisa Borgerson
303 Ballard Extension Hall
Oregon State University
Corvallis, OR 97331
754-4431

General Fish/Habitat Relationships

6 Watershed and stream habitat classification in relation to life history and persistence of anadromous salmonid stocks

RESPONSIBLE ORGANIZATION: Oregon State University Department of Fisheries and Wildlife, Oregon Department of Fish and Wildlife (ODFW).

LOCATION: Private, federal, and state lands across most of Curry County

OBJECTIVE: To develop a classification system to relate watershed characteristics and land use to stream habitats; to develop means of understanding life histories and productivity of anadromous fish stocks in relation to habitat change and fishery management; and to provide direction and information for ODFW planning of fishery and habitat management for south coastal Oregon.

DESCRIPTION: A hierarchical system of classification (Frissell et al. 1986, Environ. Mgmt. 10:199) serves as a framework for characterizing large watersheds and the land units and stream habitats within them. Geologic, topographic, and climatic map data are used at higher levels of classification (watershed, stream segment); field data on channel and valley form and processes are used at lower levels (reach, pool/riffle, and microhabitat). Historic changes in land use, stream channels, and erosion—as interpreted from aerial photographs—provide a basis for predicting effects of land use patterns in different types of habitats. Field sampling of fish populations and synthesis of available biological data will improve understanding of how anadromous fish use habitat. The importance for chinook salmon productivity of spatial and temporal distribution of habitat types is being investigated by computer modeling of life history/habitat relationships. Finally, several "watershed regions" in coastal Oregon are being described, based on hydrologic, geologic, and biological data, including fish species assemblages and life history patterns of major stocks.

STATUS: Field work and modeling efforts are in progress. Provisional classifications of coastal regions, watersheds, and streams of the south coast have been developed, as have methods for mapping erosion risk units and stream sedimentation risk units. Two annual progress reports and a paper on planning and evaluation of stream "enhancement" projects are available or are in press. Additional publications on evaluation of instream structure projects in western Oregon and effects of watershed management on erosion and stream habitat in southwest Oregon are in preparation.

CONTACT: Chris Frissell
Department of Fisheries and Wildlife
Oregon State University
Corvallis, OR 97331
754-3503, 754-4531

7 Elk River stream habitat and anadromous fish population survey

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis, Oregon Department of Fish and Wildlife (ODFW)—Elk River Research Station

LOCATION: Elk River Basin: Elk River mainstem, South Fork Elk River, and North Fork, Panther Creek, Butler Creek, Red Cedar Creek, and Bald Mountain Creek tributaries

OBJECTIVE: To determine existing habitat conditions for rearing anadromous salmonids. To determine distributions of salmonids, primarily juveniles of anadromous salmonids, within the basin. To provide a continuing data base for the assessment of yearly variations in stream habitat conditions and fish populations. To estimate production of anadromous salmonids in the USFS portion of the basin. To provide background data for assessing and modeling possible changes to anadromous fisheries caused by land-management activities.

DESCRIPTION: Stream habitat surveys and fish population censuses have been performed each summer since 1985. Area, volume, and the number of stream channel units are assessed, as well as other important fish habitat features (substrate, amount of woody debris). Fish numbers are estimated by snorklers. Survey methods are designed to maximize efficiency and accuracy and to allow the survey of entire basins. In addition, ODFW operates a smolt trap just above the Elk River Hatchery which serves to capture and count downstream-migrating and anadromous salmonid juveniles.

STATUS: Surveys have been completed for 1988 and will be continued each year.

CONTACT: Gordon Reeves
Pacific Northwest Research Station
3200 SW Jefferson Way
Corvallis, OR 97331
FTS 420-4382, or 757-4382

8 The long-term effect of forest management on stream systems

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Engineering

LOCATION: West side of Oregon Coast Range from Tillamook to Waldport (Tillamook, Polk, Lincoln, Benton, and Lane Counties)

OBJECTIVE: To determine the effect of forest management practices on woody debris in streams, stream habitat for fish, and long-term development of forest cover in the riparian zone.

DESCRIPTION: Numerous streams in areas that had been clearcut or burned 1 to 135 years previously were examined for canopy cover, woody debris, and other physical features. Similar variables were measured in "old-growth" or older unmanaged stands. Data were collected in 100- to 200-m reaches.

STATUS: Field work complete. Some analysis is finished.
CONTACT: Henry A. Froehlich
Department of Forest Engineering
Oregon State University
Corvallis, OR 97331
754-4005

9 Modeling the effects of forest management practices on salmonid habitat

RESPONSIBLE ORGANIZATION: Siuslaw National Forest
LOCATION: Siuslaw National Forest (Tillamook, Lincoln, Benton, Lane, and Douglas Counties)
OBJECTIVE: To objectively measure the quality and quantity of fish habitat and changes in that habitat resulting from various forest management practices.
DESCRIPTION: The Fish Habitat Index (FHI)—the product of habitat quantity (acres of salmonid habitat) and habitat quality (a numerical indicator of habitat condition)—is a relative rating of the production potential of an area's fish habitat. The index is first computed for managed (present and future) conditions to display the effects of forest management on the fish habitat. The FHI model provides land managers and resource professionals with an efficient and reliable means of assessing relationships between management intensity, salmonid habitat, and watershed condition.
STATUS: On file: Siuslaw National Forest
CONTACT: Robert Young, George Bush
P.O. Box 1148
Corvallis, OR 97339
757-4466, 757-4478

10 The influence of geology on the response of channel morphology and juvenile salmonid populations to logging in streams of the Oregon Coast Range

RESPONSIBLE ORGANIZATION: Oregon State University Department of Fisheries and Wildlife, USDA Forest Service
LOCATION: Private, Bureau of Land Management, and Forest Service lands (Lincoln, Lane, and Douglas Counties)
OBJECTIVE: To investigate the extent to which geology influences the response of stream channel morphology and stream salmonid populations to timber harvest.
DESCRIPTION: Channel morphology variables such as width, depth, substrate characteristics, and amount of large woody debris were measured in 3 km of

stream in four 1500-ha watersheds in sandstone and four 1500-ha watersheds in basalt. A range of timber harvest conditions was represented in each geological substrate. Juvenile salmonid densities were assessed in a subset of the channel units (i.e., pools, glides, and riffles).

STATUS: Channel morphology and fish populations were assessed in summer 1987; the work is to be repeated in summer 1988. Analysis will be completed by June 1989 as part of a doctoral research program.

CONTACT: Brendan Hicks
Department of Fisheries and Wildlife
Oregon State University
Corvallis, OR 97331
757-3087, 754-4531

11 Salmonid habitat project

RESPONSIBLE ORGANIZATION: Oregon Department of Fisheries and Wildlife Research and Development Section

LOCATION: U.S. Forest Service, U.S. Bureau of Land Management, and private lands in the Oregon Coast Range from Astoria to Gold Beach

OBJECTIVE: 1) To evaluate the summer rearing density of salmonids in six streams stocked during the Salmon and Trout Enhancement Project (STEP) hatchbox program, as compared to six unstocked streams in the Siuslaw basin. 2) To evaluate habitat improvement projects aimed at increasing the production of salmonid smolts in the Oregon Coast Range. 3) To determine the habitat requirements and rearing distribution of juvenile salmonids in the Oregon Coast Range and to develop methods of identifying potential limiting factors related to habitat.

DESCRIPTION: Summer and winter rearing density of juvenile salmonids has been measured in over 275 pools in 35 streams in the Oregon Coast Range. Habitat parameters and fish populations (over 30 variables) have been measured in each pool during summer low flow and during winter, as well as in man-made pools including gabions, log sills, rock berms, and several other pool types. Coho salmon smolt production will be assessed for 7 years in three treatment and three control streams in the Alsea, Coos, and Nestucca River systems. This information is being used for planning sampling strategies aimed at the development of models of habitat-related limiting factors for cutthroat and steelhead trout and chinook salmon.

STATUS: The models of habitat-limiting factors for juvenile coho salmon are being tested. The first year of the 7-year coho smolt production assessment has been completed.

CONTACT: Mario Solazzi, Jeff Rodgers
Oregon Department of Fish and Wildlife
303 Extension Hall
Oregon State University
Corvallis, OR 97331
754-4431

12 Influence of streamside vegetation removal and instream habitat enhancement on water temperature, channel structure, and fish populations in Lost Creek

RESPONSIBLE ORGANIZATION: Weyerhaeuser Company, Oregon Department of Fish and Wildlife

LOCATION: Weyerhaeuser Company land, headwaters of the Coos River (Coos County)

OBJECTIVE: To determine the short- and long-term influence of streamside vegetation removal on fish populations, habitat, and water temperature, and to assess the effectiveness of instream habitat enhancement for increasing salmonid populations.

DESCRIPTION: Fish populations and habitat structure have been monitored for 2 years in three sections of Lost Creek. The upstream section is in a heavily buffered area and serves as a reference for the two downstream study sites, which have both been exposed through removal of streamside vegetation. Stream enhancement activities are to be conducted on the lower clear-cut area in summer 1988 and will consist of woody debris placement and holes blasted in the bedrock streambed. Fish populations and habitat in the three sites will be monitored for 2 to 3 years after enhancement. Water temperatures are recorded at 2-hour intervals at the upstream and downstream ends of the exposed section each year from May through September.

STATUS: This project was initiated in 1986 and will be continued through 1990 or 1991.

CONTACT: Robert E. Bilby
Weyerhaeuser Company
Western Forestry Research Center
Centralia, WA 98531
(206) 736-8241

13 The role and management of large woody debris for fish habitat in Oregon Coast Range streams

RESPONSIBLE ORGANIZATION: Oregon State University College of Forestry Adaptive COPE Program

LOCATION: Various Coast Range streams

OBJECTIVE: To synthesize current information on large woody debris: its abundance, distribution, composition, and its relationship to fish populations in various Oregon Coast Range streams; to quantify the relationship between quantity and quality of large woody debris and its suitability as habitat for juvenile salmonids.

DESCRIPTION: This study is aimed at better defining the relationship between fish production and the nature of large woody debris. The synthesis report will compare characteristics of debris (e.g., distribution and abundance) and associated fish populations in various Coast Range streams of differing land use histories. Field studies will examine winter densities of salmonids in stream sections having varying amounts and configurations of woody debris.

STATUS: Synthesis report to be completed in 1989. Field study to commence winter 1989 and end winter 1990.

CONTACT: Tom McMahon
Adaptive COPE
Oregon State University Marine Science Center
Newport, OR 97365
265-3491

14 Large woody debris and channel morphology

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Engineering

LOCATION: Drift Creek drainage, Alsea watershed (Lincoln County)

OBJECTIVE: To evaluate channel morphology characteristics throughout the Drift Creek drainage, and to evaluate the effects of large woody debris and various forest management practices upon channel morphology.

DESCRIPTION: This study is to be initiated summer 1988 by a Master's degree student. Detailed measurements of channel morphology (bankfull width, wetted width, thalweg depth), debris loadings and placement, and channel banks will be undertaken.

STATUS: Field work starts June 1988.

CONTACT: R.L. Beschta
Department of Forest Engineering
Oregon State University
Corvallis, OR 97331
754-4292

Habitat Restoration

See also: Project 12

15 Fish ladder monitoring of Schooner Creek

RESPONSIBLE ORGANIZATION: USDA Forest Service
LOCATION: South Fork Schooner Creek (Lincoln County)
OBJECTIVE: To monitor run size, timing, and origin of all fall/winter/spring anadromous fish ascending the Schooner Creek Fish Ladder.
DESCRIPTION: Until recently, both forks of Schooner Creek had barriers that blocked the upstream migration of fish. The construction of a fish ladder and a series of concrete weirs in 1985 and 1986 opened up 7 miles of stream; fish began moving through the projects as soon as they were completed. This study monitors these fish runs.
STATUS: Completed May 1988. Results and scale analysis now available.
CONTACT: Cal Baker
Hebo Ranger District
P.O. Box 324
Hebo, OR 97122
392-3161

16 Evaluation of Salem District's stream rehabilitation projects (1981-1988)

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Salem District
LOCATION: Alsea and Nestucca River Drainages (Benton, Lane, and Tillamook Counties)
OBJECTIVE: To summarize, tabulate, and evaluate the Salem District Stream Rehabilitation Program.
DESCRIPTION: Fifteen stream rehabilitation projects were analyzed for overall structural stability, habitat produced, salmonid responses, and project benefits. The structures had been constructed on Salem District streams in 1981-88. Most projects are located in the Lobster Creek drainage (Alsea) and upper Nestucca River drainage.
STATUS: Report completed August 1988.
CONTACT: Bob House
1712 Fabry Rd. SE
Salem, OR 97306
399-5608

17 Moore Creek stream habitat improvement project

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management, Oregon Department of Fish and Wildlife (ODFW)—Newport Research Division

LOCATION: Moore Creek (Douglas County)

OBJECTIVE: To evaluate the habitat created by instream structures, and to monitor associated populations of coho salmon, steelhead, and cutthroat trout.

DESCRIPTION: A stream inventory was made in 1980 on Moore Creek. A fish population survey was made in 1981 just prior to the construction of ten instream structures. Post-construction population surveys monitored fish usage in 1981-86. ODFW began doing winter population estimates in 1987-88.

STATUS: Summer surveys should continue, as additional habitat modification will be added to the project. Small woody debris (brush bundles and tree tops) are to be added in 1988 as part of the ODFW winter study.

CONTACT: Bill Hudson
Umpqua Resource Area
333 S. 4th St.
Coos Bay, OR 97420
269-0487

18 The effects of stream habitat modification on fish populations and habitat in Moon Creek

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management, Oregon Department of Fish and Wildlife (ODFW)—Newport Research Division

LOCATION: Moon Creek, North Fork Coquille River (Coos County)

OBJECTIVE: To assess changes in habitat and in the population responses of three salmonid species (Coho salmon, steelhead, and cutthroat trout) as a result of instream modification of a coastal stream.

DESCRIPTION: Prior to construction of 10 log weirs in 1986, 4 years of pre-construction data were collected from two similar stream sections located on a substrate of bedrock. Limited spawning surveys began in 1986, and post-construction surveys began in 1987. ODFW began doing winter population estimates in 1987-88.

STATUS: Summer surveys should continue for 3 more years. The 1988 winter habitat study is to include the addition of small woody debris (brush bundles, tree tops) and possibly some blasting.

CONTACT: John Anderson
USDI Bureau of Land Management
333 South Fourth
Coos Bay, OR 97420
269-5880

Population and Habitat Inventories

19 Upper Lobster Creek habitat and fish use analysis

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Salem District

LOCATION: Bureau of Land Management lands (Benton and Lane Counties)

OBJECTIVE: To assess fish habitat, water quality, and salmonid and non-game fish use in upper Lobster Creek.

DESCRIPTION: The upper Lobster Creek watershed includes 17.7 mi^2 of land, totalling 104 miles of stream (first to sixth order). Assessments were made of the watershed (vegetation, geology, and history), habitat conditions (water quality, macroinvertebrates, and instream and riparian habitat), anadromous fish use, and habitat improvement priorities; completed projects in upper Lobster Creek were then evaluated. The Bisson Microhabitat System was used for a survey of 10.3 miles of stream.

STATUS: Report completed May 1987.

CONTACT: Bob House
1712 Fabry Rd. SE
Salem, OR 97306
399-5608

20 Habitat and fish populations in Elk Creek and Bear Creek (Nestucca River drainage)

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Salem District

LOCATION: Bureau of Land Management and private lands (Tillamook County)

OBJECTIVE: To describe and quantify major habitat components and fish populations of two nearby streams having different land-use patterns.

DESCRIPTION: Habitat characteristics and fish populations were studied along 10,000 ft of two coastal Oregon streams subject to different land-use patterns. Water quality and macroinvertebrates were also sampled.

STATUS: Sampling completed 1980.

CONTACT: Bob House
1712 Fabry Rd. SE
Salem, OR 97306
399-5608

21 South Fork Alsea River habitat analysis

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Salem District

LOCATION: Bureau of Land Management and private lands (Benton County)

OBJECTIVE: To assess fish habitat conditions and determine fish production capabilities of the Alsea River above the South Fork falls, which is currently impassable to anadromous fish.

DESCRIPTION: Conditions on 5.8 miles of stream were inventoried in the watershed above the falls. The watershed drains 15.5 mi^2, with a total stream length of 20.4 miles (third to sixth orders). The Bisson Microhabitat System was used for stream analysis. Each stream reach included such information as channel width, surface area, length, gradient, shade, substrate, habitat types, and amount and size of woody debris.

STATUS: Report completed February 1986.

CONTACT: Bob House
1712 Fabry Rd. SE
Salem, OR 97306
399-5608

22 North Fork Alsea River habitat analysis

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Salem District

LOCATION: Bureau of Land Management and private lands (Benton County).

OBJECTIVE: To assess fish habitat conditions and determine fish production capabilities in the North Fork Alsea River and its tributaries above the North Fork Alsea Hatchery Dam.

DESCRIPTION: Habitat conditions were assessed on 14 miles of inventoried stream. The watershed above the dam drains 32.7 mi^2, with a total stream length of 46.2 miles (third to sixth order). The Bisson Microhabitat System was used for stream analysis. Each stream reach included such information as channel width, surface area, length, gradient, shade, substrate, habitat types, and amount and length of woody debris.

STATUS: Report completed February 1987.

CONTACT: Bob House
1712 Fabry Rd. SE
Salem, OR 97306
399-5608

FORESTRY

Animal Damage

See Also: Projects 111, 139, and 201

23 1-0 vs. 2-0 Douglas-fir field survival, growth, and browse damage in South Coastal Oregon

RESPONSIBLE ORGANIZATION: USDA Forest Service
LOCATION: Gold Beach Ranger District, Siskiyou National Forest (Curry County)
OBJECTIVE: To determine whether 1-0 bareroot planting stock is a viable option in Southwestern Oregon where significant browsing of planted stock can occur.
DESCRIPTION: 1-0 and 2-0 Douglas-fir seedlings were lifted on four different dates from the Humboldt nursery and planted in the appropriate seed zone in spring on the Gold Beach Ranger District. Seedlings of each type were planted in paired rows by lift date in two blocks on each of five sites. Seedlings of one block per site were protected from browse by rigid Vexar* tubing. Seedling height and caliper were measured at installation and at the end of the first and second growing seasons.
STATUS: Second-year data are now being analyzed; the study is to be submitted as a silviculturist recertification paper by September 1988.
CONTACT: Jerry Boughton
Gold Beach Ranger Station
1225 S. Ellensburg
Gold Beach, OR 97444
247-6651

24 Comparison of 2-0 vs. 2-1 stock types and of tree protection methods (bud cap, net, control) on low density 2-0 Douglas-fir

RESPONSIBLE ORGANIZATION: Oregon Department of Forestry—Astoria District
LOCATION: Clatsop County
OBJECTIVE: To study stock type performance and tree protection techniques.
DESCRIPTION: Staked tree transects were installed on five sites. Three sites with different site preparation histories were planted with 2-0 and 2-1 stock types. On the remaining two sites, three tree protection methods (bud caps, netting and none) were compared.

* The mention of trade names does not constitute endorsement or recommendation for use by the authors or their institutions.

STATUS: Started 1985. Will measure for last time after 1988 growing season.

CONTACT: D. Kaspar
Rt. 1, Box 950
Astoria, OR 97103
325-5451

25 Reforestation systems for coastal environments

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis, Siuslaw National Forest

LOCATION: Sites on six stands—Pitchfork, Beaver, Upperten, Randall, Poposchultz, and Bays Wolfe (Lane, Lincoln, and Tillamook Counties)

OBJECTIVE: 1) To make quantitative comparisons, in terms of tree survival and growth, of the various options for main site preparation, planting stock, animal protection, and release that might be combined to reforest sites in the Coast Range; 2) to develop biological and economical guidelines for reforesting clearcuts in the Coast Range; and 3) to determine the coverage, height of vegetation, and successional mix that develops following different methods of site preparation.

DESCRIPTION: This factorial reforestation study compares four site preparation methods, two levels of animal protection, seven types of planting stock, and two release treatments. The replicates, located on six clearcuts in the Siuslaw National Forest, were started in successive years. Three planting blocks containing 14 rows of 20 trees each (seven grown tubed with Vexar®, seven not) constitute the basic module in each site preparation and release combination. Tree and vegetation measurements are being taken periodically for 10 years after planting.

STATUS: Ten-year tree and vegetation measurements have been completed on all but one of the replications. The final measurements will be taken in FY 1989 and full results of the study may become available in the same year. Interim results have not been published in journals, but some are available:

Technical Report. The Coastal Reforestation Systems Study—Five-Year Results (tree survival and growth summed and analyzed factorially).

Poster. The Coastal Reforestation Systems Study—Seven-Year Results (tree survival and growth summed plus cover development of competing vegetation).

CONTACT: William I. Stein
3200 SW Jefferson Way
Corvallis, OR 97331
757-4363

26 Tubing trial

RESPONSIBLE ORGANIZATION: Lone Rock Timber
LOCATION: Three sites near Roseburg (Douglas County)
OBJECTIVE: To determine the effects of Vexar® tubes on newly planted seedlings.
DESCRIPTION: To assess the effectiveness of Vexar® tubes, tubed and untubed seedlings were planted on three sites. Two replications were made, each with 15 seedlings per treatment.
STATUS: Installed spring 1988. Data is to be collected fall 1988 and fall 1989.
CONTACT: Dan Newton
P.O. Box 1127
Roseburg, OR 97470
673-0141

27 Deer browse prevention techniques screening project

RESPONSIBLE ORGANIZATION: Starker Forests, Inc., Oregon State University Department of Forest Science
LOCATION: Three sites in Benton County, one in Lincoln County
OBJECTIVE: 1) To compare efficacy of several physical and chemical barriers for preventing deer browsing of Douglas-fir 2-1's. 2) To determine whether protection techniques affect seedling condition or growth. 3) To determine the impact of weeding on net seedling growth, and its relation to deer browsing and its prevention.
DESCRIPTION: 2-1 transplants were planted at four Coast Range locations in 1981. Half of each site was sprayed with herbicides during Years 1 and 2 to remove weeds. In spring 1981, five physical and two chemical protective treatments, plus one control, were installed on the sprayed and unsprayed plots. Height measurements were taken annually through Year 5. Diameter was measured in Years 3, 4, and 5. Browse and seedling status were also noted.
STATUS: Vegetation was controlled in 1981 and 1982. Next measurement will be taken in 1988 or 1989. Paper for publication is planned.
CONTACT: Marc Vomocil, Mark Gourley
P.O. Box 809
Corvallis, OR 97339
929-2477

28 Forage seeding study

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Coos Bay District

LOCATION: Coos Bay District (Coos County)

OBJECTIVE: 1) To determine whether grass/legume seeding will reduce seedling browse. 2) To determine whether grass/legume seeding will reduce encroaching brush.

DESCRIPTION: Nine operation units are in this administrative study. One-third of each unit was seeded with a grass/legume mix, one-third was seeded and fertilized, and the remaining third served as a control.

STATUS: Second year measurements were made in early 1988.

CONTACT: Jim Batdorff, Dave Fauss
USDI Bureau of Land Management
Coos Bay, OR 97420
269-5880 ext. 281

29 Western redcedar deer browse prevention study

RESPONSIBLE ORGANIZATION: Starker Forests, Inc. (SFI)

LOCATION: SFI land (Benton County)

OBJECTIVE: To determine the efficacy of Ropel®, BGR®, netting, Vexar® tubing and wire cage as protection against deer browse of western redcedar.

DESCRIPTION: Eight treatments were set up on varying slopes and aspects at one location. Newly planted seedlings received two treatments. Five methods of browse prevention and one control were tested on 5-year-old seedlings that had been protected by netting. Half the plots were sprayed with Accord CR® to control vegetation competition.

STATUS: Seedlings in all treatments have been measured and treated. Weekly checks are being made to see if seedlings are being browsed.

CONTACT: Fred Pfund
P.O. Box 809
Corvallis, OR 97339
929-2477

Disease

30 Planting western white pine in selected pockets of *Phellinus* (laminated root rot)

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Salem District

LOCATION: Nestucca drainage (Tillamook County)

OBJECTIVE: To determine the feasibility of reintroducing white pine in *Phellinus weirii* pockets occurring on drier sites.

DESCRIPTION: In this pilot study, about 200 rust-resistant western white pine were planted in rows in known *Phellinus weirii* pockets on drier sites.

STATUS: Seedlings were planted in winter of 1988. Growth and survival will be monitored periodically.

CONTACT: Walt Kastner
6615 Officer's Row
Tillamook, OR 97141
842-7546

31 A test of black walnut as an alternative species in laminated root rot *(Phellinus)* infection centers

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Salem District

LOCATION: Bureau of Land Management land north of Banks (Washington County)

OBJECTIVE: To determine whether black walnut is a viable alternative species in *Phellinus*-infected areas.

DESCRIPTION: The majority of laminated root rot *(Phellinus weirii)* infection centers on a 5-acre area of a clearcut were located. One thousand 2-0 black walnut seedlings were planted at 15 by 15 ft spacings. Sixty seedlings within 50 ft of an infection center were permanently marked for monitoring.

STATUS: Seedlings were planted in spring 1987. Growth and survival will be monitored periodically.

CONTACT: Walt Kastner
6615 Officer's Row
Tillamook, OR 97141
842-7546

32 Red alder and cottonwood as a control for *Phellinus weirii* root rot of Douglas-fir

RESPONSIBLE ORGANIZATION: Oregon State University, USDA Forest Service Pacific Northwest Research Station—Corvallis, International Paper Company

LOCATION: Near Vernonia (Columbia County)

OBJECTIVE: To determine whether 10 or 20 years of red alder or cottonwood on a site will reduce *Phellinus* root rot in subsequent Douglas-fir plantations.

DESCRIPTION: Following harvest of a *Phellinus*-infected stand of Douglas-fir, replicated plots were planted with red alder, cottonwood, and Douglas-fir. After 10 years, half of the alder and cottonwood plots were harvested and planted with Douglas-fir. The remaining alder and cottonwood will be harvested and converted to Douglas-fir after 20 years. Tree growth, Douglas-fir mortality, and site variables will be measured periodically. This project, designed to be a rotation-length study, was installed in 1975.

STATUS: Active. The first 10-year harvest of alder and cottonwood is complete, and conversion to Douglas-fir should be finished in 1990.

CONTACT:

Earl Nelson
3200 Jefferson Way
Corvallis, OR 97331
757-4416

Everett Hansen
Department of Botany
Oregon State University
Corvallis, OR 97331
754-3451

Greg Johnson
International Paper Company
P.O. Box 308
Veneta, OR 97487
935-2215

33 Resistance of Northwestern conifers to laminated root rot *(Phellinus weirii)*

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Siuslaw National Forest, Mapleton Ranger District (Lane and Douglas Counties)

OBJECTIVE: To determine the relative resistance of selected western conifers to *Phellinus weirii.*

DESCRIPTION: Four areas were selected. Seedlings were planted around stumps infested with *Phellinus weirii,* and growth and mortality data were taken periodically.

STATUS: In progress. Preliminary data show grand fir most susceptible, Douglas-fir second most susceptible.

CONTACT:

Earl Nelson
3200 SW Jefferson Way
Corvallis, OR 97331
754-4416

34 Chemical control of *Phellinus weirii* (laminated root rot): application of chloropicrin or methyl isothiocyanate (MITC) to live infected trees

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Private land near Apiary (Columbia County)

OBJECTIVE: 1) To determine whether either healthy or diseased (*P. weirii*-infected) Douglas-fir survive injection of chloropicrin or MITC at dosages approaching those previously shown to eradicate *P. weirii* from stumps. 2) To determine whether injecting these fumigants will eradicate *P. weirii* from the stump and root system.

DESCRIPTION: Three classes of trees (infected, probably infected, and probably healthy) were injected with one of three dosages of either chloropicrin or methyl isothiocyanate in March 1982. Trees were observed each year and those that died were excavated and their roots examined; isolations were made from these roots. This study is described in Northwest Science 61:60-64.

STATUS: Continuing. Of 120 trees treated with fumigants, 88 were still alive in fall 1987. Effectiveness in eradicating the pathogen cannot yet be determined.

CONTACT: Walt Thies
3200 SW Jefferson Way
Corvallis, OR 97331
757-4396

35 Black stain root disease

RESPONSIBLE ORGANIZATION: Weyerhaeuser Company

LOCATION: Coos, Douglas, and Lane Counties

OBJECTIVE: 1) To evaluate time of thinning for control of black stain *(Ceratocystis wagnerii)*; 2) to determine initiation rate of disease centers following precommercial thinning; 3) to determine efficacy of stump fungicide treatments on spread of disease; and 4) to evaluate effects of fertilization on stands infected with black stain.

DESCRIPTION: These programs are being evaluated at numerous locations; all are ongoing. Objectives 1 and 2: Stands precommercial-thinned at various times of year were field surveyed; the number of disease centers and initiation rates were noted. Objective 3): Stumps were treated with Roundup®, diesel, and borax with and without a sweet apple pumice bait. Objective 4): Stands with black stain were divided, and one-half of each was fertilized with urea at 150 lbs N/acre.

STATUS: Data have been collected for most objectives. Preliminary summaries are available for Objectives 1 and 2.

CONTACT: Will Littke
P.O. Box 420
Centralia, WA 98531
(206) 736-8241

Economics

36 Evaluating the socio-economic ramifications of alternative forest resource management options in Coastal Oregon

RESPONSIBLE ORGANIZATION: Oregon State University COPE program, USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Coastal Oregon

OBJECTIVE: To compare the effects of various levels of resource utilization on the community, based on potential changes in employment, income, occupational makeup, demographic characteristics, and county revenues and expenditures.

DESCRIPTION: A comprehensive economic assessment is being made of the Oregon Coast, including the development of an integrated model of the regional economy and case-specific analyses of management options proposed during other COPE research.

STATUS: Three input-output models of the coastal economy are being developed in 1988. Study completion is scheduled for 1991.

CONTACT: Con Shallau
3200 SW Jefferson Way
Corvallis, OR 97331
757-4413

37 Integrating product quality into the evaluation of price relationships for different Douglas-fir growing regimes

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Portland

LOCATION: Portland

OBJECTIVE: To develop data and computer software for estimating the value of trees produced under alternative silvicultural regimes.

DESCRIPTION: Computer software is being developed that will estimate value relationships for trees from stands managed under different silvicultural regimes. Existing software will be used to develop manufacturing cost relationships for trees from managed stands. Volume and grade recovery relationships will be estimated for trees from managed stands in a mill recovery study. Procedures for using these relationships in analyses of silvicultural regimes will be developed.

STATUS: Prototype software and documents developed. Preliminary results from mill recovery study available. Price projections by grade have been published for Douglas-fir lumber.

CONTACT: Roger Fight
Pacific Northwest Research Station
P.O. Box 3890
Portland, OR 97208
231-2086

38 LESA—Land Evaluation and Site Assessment for Clatsop County forest land

RESPONSIBLE ORGANIZATION: Soil Conservation Service—Clatsop District

LOCATION: Clatsop County

OBJECTIVE: To make an assessment of Clatsop County forests that can be used in county planning.

DESCRIPTION: An assessment similar to LCDC's statewide assessment of forest land will be tailored to Clatsop County. Timber product values, cost of production and operation, and soil erosion will be considered, in an attempt to place a more accurate value on forest land, its productivity, and its best uses.

STATUS: The assessment will begin in April 1989; it will take approximately 6 months to complete.

CONTACT: Jerry Prout
249 W. Main Street
Hillsboro, OR 97123
640-1332

Growth and Yield

39 Development of a west-central Willamette Valley version of ORGANON

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Resources Management
LOCATION: College of Forestry's McDonald and Dunn Forests (Benton County)
OBJECTIVE: To develop a west-central Willamette Valley version of ORGANON, a single-tree/distance-independent growth and yield model.
DESCRIPTION: Growth and yield information was collected on 136 stands. This data will be used to develop equations for bark thickness, height/diameter, height/crown base, height growth, diameter growth, and mortality for single trees growing in stands. The southwest Oregon version of ORGANON will then be modified to accept these equations.
STATUS: Final equations have been developed for bark thickness, height/diameter, height/crown base, and height growth. Preliminary equations for diameter growth and mortality have been completed. Software development is in limbo.
CONTACT: David W. Hann
Department of Forest Resources Management
Oregon State University
Corvallis, OR 97331
754-4951

40 Douglas-fir growth and yield

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis
LOCATION: Cascade Head Experimental Forest (Tillamook County)
OBJECTIVE: To follow the growth and yield of three stands of Douglas-fir with Sitka spruce and western hemlock.
DESCRIPTION: Three 1-acre plots were established during 1936-37, in stands that originated after an 1840's fire. Measurements of dbh, height, and mortality data are being collected.
STATUS: Semi-active. Last remeasurement in 1983. Easily locatable.
CONTACT: Sarah Greene
3200 SW Jefferson Way
Corvallis, OR 97331
757-4429

41 Test beds for further silvicultural studies

RESPONSIBLE ORGANIZATION: Weyerhaeuser Company
LOCATION: Three sites in Coos County and two in Douglas County
OBJECTIVE: To establish a set of plantations for future—as yet undetermined—silvicultural tests.

DESCRIPTION: Plantations were established from 1985 to the present. Each site is blocked into four or five units, each with a minimum size of 2 acres. Blocks were planted at different densities ranging from 100 to 900 trees per acre.

STATUS: All are reserved for future silvicultural studies.

CONTACT:

William Scott
Weyerhaeuser Company
WTC-2H5
Tacoma, WA 98477
(206) 924-6321

Ron Heninger
Weyerhaeuser Company
P.O. Box 275
Springfield, OR 97477
(503) 746-2511

42 Douglas-fir plantation forecasting

RESPONSIBLE ORGANIZATION: Weyerhaeuser Company

LOCATION: Weyerhaeuser land: three sites in Douglas County and three in Coos County

OBJECTIVE: To develop a high-quality data base for forecasting yield of Douglas-fir plantations.

DESCRIPTION: These six sites are part of a larger data set covering the Douglas-fir region. Treatments to be studied include four levels of density and fertilization. Four sites have eight to ten permanently marked 0.125-ha plots; two sites have only two plots.

STATUS: All are active with two to three measurements taken.

CONTACT:

William Scott
Weyerhaeuser Company
WTC-2H5
Tacoma, WA 98477
(206) 924-6321

Ron Heninger
Weyerhaeuser Company
P.O. Box 275
Springfield, OR 97477
746-2511

43 Long-rotation response of Douglas-fir to selective cutting and mid-rotation clearing operations

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Near Corvallis (Benton County)

OBJECTIVE: To determine whether "old-growth-like" stands can be created by silvicultural manipulation. To suggest management strategies that might create old-growth-like conditions.

DESCRIPTION: Two 2-acre stands with a history of harvest and experimentation were inventoried, and 16-inch increment cores were taken from 25 trees per plot to determine response to mid-rotation clearing operations.

STATUS: Dormant—expansion and continuation of project likely. Publication: Michael Newton and Elizabeth Cole, 1987. A sustained-yield scheme for old-growth Douglas-fir. W.J. of Appl. For. 2:22-25.

CONTACT:

Mike Newton, Liz Cole
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

44 Growth potential of released understory conifers

RESPONSIBLE ORGANIZATION: Oregon State University FIR program
LOCATION: Forest Service land in Josephine County and Del Norte (California)
OBJECTIVE: To develop guidelines for estimating the height growth potential of understory Douglas-fir and white fir after final overwood removal.
DESCRIPTION: Eleven height measurements will be recorded for each sample tree, starting with its height 5 years before overstory removal and ending with its height 5 years after overstory removal. Stepwise regression analysis procedures will be used to develop two prediction equations. The first will describe variation in height growth 5 years before release; the second, average annual height growth during the 5-year period following release.
STATUS: Active.
CONTACT: Steve Tesch
FIR Program
1301 Maple Grove
Medford, OR 97501
776-7116

45 Biomass estimates and nutrient content of young-growth Douglas-fir and red alder in coastal Oregon

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science, USDA Forest Service
LOCATION: Waldport District of the Siuslaw National Forest (Lincoln County)
OBJECTIVE: 1) To develop equations for estimating biomass of above-ground components of young Douglas-fir and red alder in a coastal plantation. 2) To obtain nutrient contents for these two tree species.
DESCRIPTION: Douglas-fir and red alder were randomly sampled from 18 research plots on a clearcut site in the Coast Range 10 km east of Waldport. Biomass equations were developed from these trees and nutrient content was obtained for N, P, and S for above-ground tree components including foliage, branches, and boles.
STATUS: The study is essentially complete, with one publication forthcoming in the Canadian Journal of Forest Research and another planned for 1989.
CONTACT: Kermit Cromack, Jr.
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

46 Growth and yield in Sitka spruce/western hemlock (SSWH) stands

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Cascade Head Experimental Forest (Tillamook County)

OBJECTIVE: To follow growth yield and mortality of mature SSWH stands; demography of seedlings is also being followed.

DESCRIPTION: Thirteen 1-acre plots were established in 1935 on stands that resulted from fire in the 1840's. Of the original plots, nine still exist. Heights, dbh, volume, and biomass data were taken in 1935, 1940, 1945, 1950, 1955, 1968, 1978, 1983, and 1988. Annual mortality data since 1980 is also available.

STATUS: Last remeasured March 1988.

CONTACT: Sarah Greene
3200 SW Jefferson Way
Corvallis, OR 97331
757-4429

47 Growth and yield of Sitka spruce/western hemlock stands immediately adjacent to the coast

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Neskowin Crest Research Natural Area, Cascade Head Experimental Forest (Tillamook County)

OBJECTIVE: To look at growth, yield, mortality, and spatial patterning in stands adjacent to the coast and subject to environmental extremes such as wind and salt spray.

DESCRIPTION: Forty-four 1000-m^2 plots were established along four transects in 1979, with 200 m between plots. The plots were remeasured in 1983 for dbh, dendrometer data on subsample of trees, heights on subsample, and mortality rates and causes.

STATUS: Active. Nine years' annual mortality data is available (1979-1988). Ten-year remeasurements will be taken spring 1989.

CONTACT: Sarah Greene
3200 SW Jefferson Way
Corvallis, OR 97331
757-4429

48 Alder/conifer study

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis
LOCATION: Cascade Head Experimental Forest (Tillamook County)
OBJECTIVE: To follow effects of alder in pure and mixed stands.
DESCRIPTION: Three types of stand were established in 1936 on an abandoned homestead—pure alder, pure conifer, and alder/conifer mix (no treatment). Height, growth, and dbh have been followed since the establishment of this unreplicated study.
STATUS: Still maintained. Last measurements were taken in 1985. Data in Forest Science Data Bank, Oregon State University, Corvallis, OR.
CONTACT: Sarah Greene
3200 SW Jefferson Way
Corvallis, OR 97331
757-4429

49 Sugar pine provenance study

RESPONSIBLE ORGANIZATION: Institute of Forest Genetics
LOCATION: Gold Beach Ranger District and Galice Ranger District (Curry and Josephine Counties)
OBJECTIVE: To evaluate the performance of sugar pine seedlings from throughout the species' range.
DESCRIPTION: A typical provenance study design has been set up on sites representing the entire natural range of sugar pine.
STATUS: Ongoing.
CONTACT: James L. Jenkinson
Institute of Forest Genetics
Placerville, CA 95667
FTS 449-3730

50 Pacific Southwest Research Station red fir study

RESPONSIBLE ORGANIZATION: Pacific Southwest Research Station—Redding
LOCATION: Forest Service land (Josephine County)
OBJECTIVE: To develop growth and yield prediction models for young-growth stands of red fir in California and southern Oregon.
DESCRIPTION: This study uses a five-plot cluster arrangement with variable-radius prism plots. Prism trees are increment-bored for collection of age and radial growth information. Trees will be felled and sectioned for stem analysis

to obtain the height information needed for the models.

STATUS: Statistical analysis underway. Results should be out in 1989.

CONTACT: K. Leroy Dolph
2400 Washington Ave.
Redding, CA 96001
(916) 246-5462

51 True fir common garden study

RESPONSIBLE ORGANIZATION: USDA Forest Service

LOCATION: Siskiyou National Forest lands (Josephine County)

OBJECTIVE: To select parent trees and collect cones for two southwestern Oregon species. To use the seedlots in genetic architecture studies which will enable provisional seed-transfer rules to be developed.

DESCRIPTION: Teams at each forest are selecting and mapping parent trees, collecting cones, and sending them to Dorena Tree Improvement Center for processing. White fir was sown in 1987-88, and Shasta red fir in 1988.

STATUS: Active as of July, 1988. Results from the study are to be analyzed and summarized in 1991-92.

CONTACT: Robert Campbell, Nick Vagle
Umpqua National Forest
P.O. Box 1008
Roseburg, OR 97470
476-3830, 479-5301

52 Seed transfer study

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Siskiyou National Forest lands (Coos, Curry, and Josephine Counties)

OBJECTIVE: To collect cones of minor species for use in genetic tests aimed at improving management and species utilization.

DESCRIPTION: From each seed source of ponderosa pine and white fir, 500 seeds were collected for genetic testing. Each collection site was described and mapped. For about 50% of the sources, paired trees were selected within 50 to 100 feet of each other on the same aspect.

STATUS: Active. Seedlings are currently being evaluated.

CONTACT: Robert Campbell
3200 SW Jefferson Way
Corvallis, OR 97331
757-4342

Harvest Methods

53 Urban forest fringe harvesting

RESPONSIBLE ORGANIZATION: Oregon State University Research Forests
LOCATION: Oak Creek Area, west of Corvallis on Oregon State University Forest land (Benton County)
OBJECTIVE: To test several harvesting and silviculture strategies in an area close to existing homes. To find systems compatible with urban use.
DESCRIPTION: A variety of silvicultural systems will be tested—partial cuts, small patch clearcuts, and all-aged management. The area will be cleaned up after harvest and reforested; costs will be gathered and public reaction evaluated.
STATUS: Planning stage in 1988. First harvesting in 1989.
CONTACT: Bill Atkinson
Department of Forest Engineering
Oregon State University
Corvallis, OR 97331
754-4952

54 Mechanized harvesting of small timber

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Engineering
LOCATION: Various locations in Coast and Cascade mountain ranges
OBJECTIVE: To evaluate the environmental effects and cost effectiveness of mechanized harvesting systems for second growth forests.
DESCRIPTION: Field production/cost studies will be conducted on mechanized harvesting systems with emphasis on new systems and concepts appropriate to northwestern environmental and operational constraints. Equipment modifications and new harvesting methods will be proposed. Field study data will be used to validate the simulation model and conduct a simulation analysis, allowing more complete evaluation of whole system interactions and efficiency.
STATUS: Short-term operational studies are being conducted on different sites. The 1988-89 emphasis is on mechanized delimbers on small cable landings in western Oregon and on soil compaction from feller-bunchers in eastern Oregon.
CONTACT: Loren Kellogg
Department of Forest Engineering
Oregon State University
Corvallis, OR 97331
754-4952

55 Precommercial thinning selection

RESPONSIBLE ORGANIZATION: Weyerhaeuser Company
LOCATION: Roseburg (Douglas County)
OBJECTIVE: To evaluate the growth and yield of Douglas-fir planted at three densities and precommercial-thinned at age 10 years.
DESCRIPTION: Douglas-fir was planted in 1973 at three densities, with spacing of 5 by 5 ft, 7.5 by 7.5 ft, and 10 by 10 ft. In 1983, the two higher-density tests were precommercial-thinned to the surviving density of the 10 by 10 ft spaced plot—that is, 450 trees per acre. Thirty-two 0.1-acre permanent plots were installed.
STATUS: Plots remeasured in 1984 and 1987. Analysis not yet complete.
CONTACT:

William Scott
Weyerhaeuser Company
WTC 2H5
Tacoma, WA 98477
(206) 924-6321

Ron Heninger
Weyerhaeuser Company
P.O. Box 275
Springfield, OR 97477
(503) 746-2511

56 Site and stand factors influencing plantation response to precommercial thinning

RESPONSIBLE ORGANIZATION: Oregon State University, USDA Forest Service—Mapleton Ranger District
LOCATION: Various locations in the Mapleton Ranger District (Douglas and Lane Counties)
OBJECTIVE: To test a model that predicts individual crop tree response to precommercial thinning.
DESCRIPTION: An earlier study produced a model that predicts tree response to precommercial thinning as a function of stand density and various topographic factors. To test this model, paired plots of thinned and unthinned Douglas-fir were installed in 1984 at various locations on the Mapleton Ranger District.
STATUS: Plots are to be measured in summer 1990.
CONTACT:

Dave Perry
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

57 Comstock juvenile stand spacing trial

RESPONSIBLE ORGANIZATION: Weyerhaeuser Company
LOCATION: Curtin (Douglas County)
OBJECTIVE: To determine the relationship between growth rates and initial growing space per tree in a stand where space was regulated by early thinning.

DESCRIPTION: An old cleared field, with a ground cover of ferns and grasses, was machine-planted in March 1958 with 2-0 bareroot Douglas-fir at 600 trees per acre. Seven permanent growth plots were installed in 1972 and precommercially thinned (PCT) to three densities plus an unthinned control—200, 340, 470, and 1300 trees per acre. The plots were operationally fertilized in 1971, 1977, and 1982. Measurements of diameter and cubic volume were taken in 1972, 1976, 1979, 1981, 1983 and 1988.

STATUS: Active. Plot statistics available, no special analysis.

CONTACT:

William Scott
Weyerhaeuser Company
WTC-2H5
Tacoma, WA
(206) 924-6321

Ron Heninger
Weyerhaeuser Company
P.O. Box 275
Springfield, OR 97477
(503) 746-2511

58 Thinning studies

RESPONSIBLE ORGANIZATION: Cavenham Forest Industries

LOCATION: Cavenham lands (Clatsop County)

OBJECTIVE: To evaluate various thinning regimes in coastal forests.

DESCRIPTION: Project CT-1: Plots of trees planted in 1936 were thinned at ages 42, 44, and 48 years, with repeated entries into each plot. The plots, including controls, were measured regularly until 1980. Project CT-7: Plots of trees planted in 1947 were thinned at age 17 to 680 trees per acre (tpa), at age 22 to 500 tpa, and at age 27 to 200 tpa. Project CT-10: 26-year-old trees were thinned to various densities in 1976, with only one thinning per plot.

STATUS: Company rethinking what to do with project. May remeasure and analyze soon.

CONTACT:

Rob Mangold
1500 SW 1st Ave., Suite 500
Portland, OR 97201
221-7127

59 Commercial thinning in 30-year-old Sitka spruce/ western hemlock stands

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis, Oregon State University Department of Forest Science

LOCATION: Cascade Head Experimental Forest (Tillamook County)

OBJECTIVE: To determine the effects of three different spacings on growth and sapwood area.

DESCRIPTION: Stands of 30-year-old Sitka spruce/western hemlock were commercially thinned (CT) in 1983. Four replications of each thinning pattern were used—control (no thinning), narrow (18 by 18 ft), wide (24 by 24 ft), and herringbone. Prior to thinning, information was collected on dbh, heights, crown ratios, sapwood area, and increment growth. The same measurements were taken in 1988, 5 years after CT.

STATUS: Active study. Thinned 1983. Ten-year measurements to be taken in 1993.

CONTACT: Sarah Greene, Bill Emmingham
3200 SW Jefferson Way
Corvallis, OR 97331
757-4429

Intermediate Treatments

See Also: Projects 42 and 161

60 Silviculture systems for alder

RESPONSIBLE ORGANIZATION: Oregon State University Extension Service
LOCATION: Private land near Olney, south of Astoria (Clatsop County)
OBJECTIVE: To obtain data on 1) the response of a 14-year-old red alder stand to chemical and mechanical thinning (14 ft by 20 ft spacing); 2) underplanted wildling western hemlock in thinned and unthinned areas; 3) underplanted plug and wildling western hemlock, Sitka spruce, western redcedar, and 2-0 and plug-1 Douglas-fir; 4) the response of alder to various chemical and mechanical killing methods; and 5) the efficacy of replacing alder from below with underplanted conifer.
DESCRIPTION: This study was installed in 1981 to explore silvicultural options in managing and converting red alder stands. The treatments are replicated three times in a 20-acre alder stand that was 14 years old at the time of thinning. Since the stand is in near-riparian zone conditions, it illustrated techniques useful for management in the riparian zone.
STATUS: The study area has developed into a very useful demonstration area for small woodland owners and professional foresters. Three publications based on 4 or 5 years' data are in various stages of publication.
CONTACT: Bill Emmingham, Mike Bondi, Dave Hibbs
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

61 Alder thinning

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science
LOCATION: Siletz tribal land on Pioneer Mountain (Lincoln County)
OBJECTIVE: To investigate the effects of density management on growth of alder. To test new alder stocking guide.
DESCRIPTION: Two levels of thinning and a control were tested on replicated plots of alder.
STATUS: Thinned in winter of 1985-86; annual measurements being taken.
CONTACT: David Hibbs
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

62 Oregon ash thinning study

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science
LOCATION: Dunn Forest (Benton County)
OBJECTIVE: To gain information on the response of ash to thinning.
DESCRIPTION: Two levels of thinning and a control treatment are being studied; there are three replications.
STATUS: Project is in fifth growing season; ash stands will be remeasured shortly.
CONTACT: Dave Hibbs, Bill Emmingham, Rick Fletcher
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

63 Marsh Creek thinning and fertilization study

RESPONSIBLE ORGANIZATION: International Paper Company
LOCATION: Several sites on Hinman Tree Farm (Douglas County)
OBJECTIVE: To evaluate the influence of stand density and fertilization interactions on growth and development of Douglas-fir stands.
DESCRIPTION: Douglas-fir was studied in a randomized block design with three blocks; each block contained a factorial arrangement of spacings (8 x 8, 11 x 11, and 14 x 14 ft) and fertilizer (0 lbs N and 200 lbs N). One extra 14 x 14 ft spacing with fertilizer treatment was included in each block. Plots are 0.075 ha with 10-m buffers. The study was established in February 1982 and will be studied through commercial thinning and final harvest.
STATUS: Measurements were taken in 1983, 1984, 1985, and 1987. Next measurement scheduled for 1989.
CONTACT: Greg Johnson
International Paper Company
P.O. Box 308
Veneta, OR 97487
935-2215

64 Comparative effects of thinning, urea fertilizer, and red alder in a Site II coastal Douglas-fir plantation

RESPONSIBLE ORGANIZATION: USDA Forest Service
LOCATION: Risley Creek, Waldport Ranger District (Lincoln County)
OBJECTIVE: To determine the effects of precommercial thinning, fertilization with nitrogen, and several densities of red alder on tree size and stand growth.
DESCRIPTION: Three replications of six treatments were installed in a 9-year-old plantation. Thinning reduced Douglas-fir density to 300 trees per acre. Alder was retained at densities of 0, 20, 30, or 40 stems per acre; 200 lbs N/acre was applied to half of the alder-free plots.

STATUS: Trees measured after 1979, 1982, and 1985 growing seasons. Data summarized but not yet published.

CONTACT: Dick Miller
Forestry Sciences Laboratory
3625 93rd Ave. SW
Olympia, WA 98502
(206) 753-9470

65 Fertilizing seedlings to achieve plantation release

RESPONSIBLE ORGANIZATION: USDA Forest Service

LOCATION: Siskiyou National Forest land (Coos, Curry, and Josephine Counties)

OBJECTIVE: To assess the efficacy of in-ground and foliar fertilizers for speeding Douglas-fir seedling growth and reducing the need for mechanical or chemical release.

DESCRIPTION: Field trials will be installed in new plantations expected to need release. In-ground trials will assess both quick-release and slow-release fertilizers. Both will be laid out in each of five separate plantations. In each plantation, the trial will consist of four replications of a randomized complete block of five treatment plots. Foliar nutrient applications will be tested in a single plantation.

STATUS: Active.

CONTACT: Mel Greenup
P.O. Box 440
Grants Pass, OR 97526
479-5301 ext. 302

66 Mapleton seedling fertilization study

RESPONSIBLE ORGANIZATION: Champion International Corp.

LOCATION: Lane County

OBJECTIVE: To determine whether seedling fertilizer pellets can reduce the need for a spray release treatment in a Douglas-fir plantation.

DESCRIPTION: On a study site established in December 1987, Douglas-fir plug + 1's were fertilized with "Agriform" or "Forest Starter" pellets. A control area was established as well.

STATUS: Ongoing. Study currently being monitored.

CONTACT: Jeff Madsen
P.O. Box 37
Mapleton, OR 97439
268-4412

67 Douglas-fir dosage and frequency fertilization trial

RESPONSIBLE ORGANIZATION: Weyerhaeuser Company
LOCATION: Reston Rim, Roseburg (Douglas County)
OBJECTIVE: To evaluate various rates and frequencies of applying urea fertilization.
DESCRIPTION: Fifty-six permanent 0.16-ha plots were installed in 1981. Each fertilization plot received an initial application of 225 kg of nitrogen per ha in 1981. Rate treatments followed at various frequencies: annual applications at 20, 45, 65, and 120 kg N/ha; applications every third year at 60, 135, and 360 kg N/ha; every fifth year at 100, 225, and 600 kg N/ha.
STATUS: Fertilizer application was continued through 1986 (two cycles). Plots were remeasured annually through the 1987 growing season. Data have not yet been analyzed.
CONTACT:

William Scott
Weyerhaeuser Company
WTC-2H5
Tacoma, WA 98477
(206) 924-6321

Ron Heninger
Weyerhaeuser Company
P.O. Box 275
Springfield, OR 97477
746-2511

68 Effects of urea and biuret fertilizer on growth of 35-year-old stands of Douglas-fir in coastal Oregon

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Olympia
LOCATION: Hebo, Waldport, and Mapleton Ranger Districts (Tillamook, Lincoln, and Lane Counties)
OBJECTIVE: 1) To determine growth response to two nitrogen fertilizers. 2) To provide the Siuslaw National Forest with reliable data about tree and stand growth and about tree size and numbers.
DESCRIPTION: Two existing plots at each of five locations were remeasured; one was fertilized with urea at 200 lb N/acre. Individual trees outside these plots were randomly selected as extra untreated controls, or they were fertilized with biuret, a slow-release source of nitrogen, at 200 lb N/acre.
STATUS: Remeasurement and treatment occurred after the 1987 growing season. Trees will be measured again after the 1990 or 1991 growing seasons.
CONTACT:

Dick Miller
Forestry Sciences Laboratory
3625 93rd Ave. SW
Olympia, WA 98502
(206) 753-9470

69 Effects of intermediate operations on young to mid-rotation aged Douglas-fir plantations

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: McDonald Forest (Benton County)

OBJECTIVE: To determine the results of intermediate operations on Douglas-fir plantation growth.

DESCRIPTION: In 1959, seedlings from four seed sources were planted in McDonald Forest. To avoid animal damage, large 2-0 Douglas-fir stock were used. The various treatments were in randomized blocks, and included pruned and unpruned, weed control, fertilized, and nonfertilized.

STATUS: Dormant. The two plots still standing are used for demonstration purposes.

CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

Long Term Site Productivity

70 Microbial ecology of ectomycorrhizal mats in a Douglas-fir ecosystem

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Alsea Ranger District of the Siuslaw National Forest near Mary's Peak (Benton County)

OBJECTIVE: To study the role of Douglas-fir ectomycorrhizal mineralization of soil nitrogen and phosphorus.

DESCRIPTION: This study examines soil microbial biomass and the soil enzyme activity associated with recycling of soil nitrogen and phosphorus. Enzymes and processes being studied include: phosphates for phosphorus; organic nitrogen recycling; carbon degrading enzymes; and the role of mycorrhizae as decomposers.

STATUS: The project began in February 1988 and will continue until February 1991.

CONTACT: Kermit Cromack, Jr.
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

71 Rapid root tip and mycorrhizal formation and increased survival of Douglas-fir seedlings after soil transfer

RESPONSIBLE ORGANIZATION: Oregon State University

LOCATION: Cedar Camp clearcut, Illinois Valley Ranger District, Siskiyou National Forest (Josephine County)

OBJECTIVE: To determine the effect of added mycorrhizae-bearing soil on root tip initiation and mycorrhizae formation in an old, unrevegetated clearcut.

DESCRIPTION: Small amounts of soil from an established Douglas-fir plantation were added to some of the Douglas-fir planting holes in an old, unrevegetated clearcut. Seedlings were lifted throughout the growing season to assess the soil's effect on root tip initiation and mycorrhizae formation.

STATUS: Completed.

CONTACT: Mike Amaranthus
P.O. Box 1131
Grants Pass, OR 97526
476-3830

72 Clearcutting and prescribed burning: effects on native mycorrhizae and Douglas-fir seedling growth

RESPONSIBLE ORGANIZATION: Oregon State University
LOCATION: A clearcut in Galice Ranger District (Josephine County)
OBJECTIVE: To compare mycorrhizae formation and subsequent seedling growth in Douglas-fir seedlings grown in soil from burned clearcuts and from undisturbed sites.
DESCRIPTION: Seedlings were germinated and grown in a greenhouse in soil from a burned clearcut site, and other seedlings were grown in soil from an adjacent undisturbed stand. Mycorrhizae formation was measured and the seedlings were outplanted. Mycorrhizae formation and seedling survival and growth were measured at the end of one growing season.
STATUS: Completed.
CONTACT: Mike Amaranthus
P.O. Box 1131
Grants Pass, OR 97526
476-3830

73 Effect of soil transfer on ectomycorrhizae formation and growth of conifer seedlings

RESPONSIBLE ORGANIZATION: Oregon State University
LOCATION: Cedar Camp, Crazy Peak, Wood Creek, and Galice Ranger District (Josephine County)
OBJECTIVE: To evaluate the effects of soil transfer on ectomycorrhizae formation and growth of conifer seedlings.
DESCRIPTION: Replicate blocks on old unreforested clearcuts were cleared of vegetation, then planted with nonmycorrhizal conifer seedlings. Each seedling hole received an addition of freshly collected soil from one of four sources, or no soil addition for the controls. The sources included a burned clearcut, an unburned clearcut, mature forest pasteurized, and unpasteurized mature forest. Seedling survival, diameter growth, height growth, and mycorrhizal formation were monitored over time.
STATUS: Completed.
CONTACT: Mike Amaranthus
P.O. Box 1131
Grants Pass, OR 97526
476-3830

74 Decaying logs as moisture reservoirs following drought and wildfire

RESPONSIBLE ORGANIZATION: Siskiyou National Forest
LOCATION: Galice Fire area (Josephine County)
OBJECTIVE: To investigate moisture contents of downed logs and soil following extended drought and wildfire.
DESCRIPTION: Cross-sections from eight randomly selected Douglas-fir logs were sampled for moisture content. Two soil samples taken near each log were also sampled for moisture content.
STATUS: Completed.
CONTACT: Mike Amaranthus
P.O. Box 1131
Grants Pass, OR 97526
476-3830

75 Oregon transect

RESPONSIBLE ORGANIZATION: NASA, Oregon State University
LOCATION: Sitka spruce/hemlock, alder, and Douglas-fir stands near Cascade Head or Newport (Tillamook or Lincoln County)
OBJECTIVE: To collect "ground truth" data for forest canopy characteristics and meteorology. To compare these results with those from model predictions and remote sensing techniques.
DESCRIPTION: The Sitka spruce/hemlock, alder, and Douglas-fir stands to be studied in this project form part of a seven-station forest transect extending to Bend in central Oregon. The emphasis will be on forest canopy characteristics (leaf-area index, photosynthetic capacity, stomatal conductance, net primary production, lignin and nitrogen concentration) which will be measured seasonally, and on meteorology (net radiation, humidity, temperature, litter and soil water content); measurements in meteorology will be continuous. Remote sensing will take place daily, weekly, or seasonally, depending on objectives.
STATUS: Preliminary studies are complete. Study site is to be selected summer 1988. The study is to run for 3 years.
CONTACT: R.H. Waring, Dave Myrold
College of Forestry and Soils Department
Oregon State University
Corvallis, OR 97331
754-2244

76 Genetic variability within individual old-growth Sitka spruce trees

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: USDA Forest Service lands, Waldport Ranger District (Lincoln County)

OBJECTIVE: To examine whether genetic variability develops during the lifetime of long-lived trees.

DESCRIPTION: DNA was extracted from foliage on two widely-separated branches from each of 10 trees. The trees ranged from 86 to 232 cm dbh. The DNA samples will be compared by means of molecular genetic methods to see if gene characteristics differ between branches of the same tree.

STATUS: Statistical analyses are under way. Results available August 1988.

CONTACT: Steve Strauss
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

Planting Strategies

See Also: Projects 23, 24, 25, and 112

77 Stand management cooperative

RESPONSIBLE ORGANIZATION: University of Washington College of Forest Resources; five other institutions and 16 companies and agencies

LOCATION: Private, Bureau of Land Management, and Forest Service lands (Lane, Benton, and Columbia Counties)

OBJECTIVE: To establish and maintain an integrated regional program that will provide high-quality data on effects of management practices for stands that have been under stocking control from an early age and that include a wide range of initial spacings.

DESCRIPTION: Several types of stand are included in this study. Type I installations are juvenile stands with several initial density levels, with and without later thinnings and supplementary treatments (pruning, leave tree selection, fertilization). Type II installations are existing plantations approaching commercial thinning age, representing the most dense Type I's and receiving a subset of thinning treatments. Type III areas are operationally planted at a range of initial spacings.

STATUS: Establishment period 1986-1990. Type I: 32 proposed, 15 established; Type II: 12 proposed, 5 established; Type III: 15 proposed, 10 established.

CONTACT: H.N. Chappell, Doug Maguire
College of Forest Resources, AR-10
University of Washington
Seattle, WA 98195
(206) 543-9527 or (206) 543-2395

78 Effects of two seedling planting densities on growth of Douglas-fir seedlings

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: McDonald Forest (Benton county)

OBJECTIVE: To compare two spacing regimes.

DESCRIPTION: Douglas-fir seedlings were planted in 1979 on 8 by 8 ft spacings or in clusters of six seedlings with the clusters on 25 by 25 ft spacings. After a 7-year delay, red alder seedlings were planted between the cluster-planted Douglas-fir. The plots were grazed by sheep for several years to test the effectiveness of this treatment for vegetation management. The Douglas-fir seedlings on the 8-ft spacings were thinned to 300 trees per acre at age 11 years.

STATUS: During the spring of 1987, mortality was assessed and dead trees replaced. Thinning was completed in 1988. The plots will be evaluated periodically.

CONTACT: Bill Emmingham
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

79 Oldy burn species/spacing study

RESPONSIBLE ORGANIZATION: Cavenham Forest Industries

LOCATION: Clatsop County

OBJECTIVE: To evaluate pure and mixed stands of Douglas-fir and western hemlock at several spacings.

DESCRIPTION: Douglas-fir and western hemlock were each planted in pure stands at three different spacings. Mixed stands were also planted. The stands are 10 years old, and were measured in 1983.

STATUS: Company rethinking what to do with project. May remeasure and analyze soon.

CONTACT: Rob Mangold
1500 SW 1st Avenue, Suite 500
Portland, OR 97201
221-7127

80 Alder planting density

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Five Rivers (Lincoln County)

OBJECTIVE: To study the effects of planting density on growth, biomass partitioning, and mortality. To study the effects of P fertilization on growth processes.

DESCRIPTION: Three Nelder type 1a plots were established, with alder densities ranging from 30 cm to 6 m. Half of each circular plot was fertilized with phosphorus, and growth and biomass partitioning were assessed.

STATUS: Planted in 1984. Measured through 1986. Needs examination. Mortality by freezing was high.

CONTACT: David Hibbs
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

81 Mapleton stock type studies

RESPONSIBLE ORGANIZATION: Champion International Corp.

LOCATION: Five areas on Champion lands (Lane County)

OBJECTIVE: To compare growth and survival rates among types of seedling stock.

DESCRIPTION: Five sites were established in 1982 and 1983 on a well-burned clearcut. Each has three to five different types of stock and at least one plug type per site.

STATUS: Seedlings starting to compete with each other because of original tight spacing (4-5 ft).

CONTACT: Jeff Madsen
P.O. Box 37
Mapleton, OR 97453
268-4412

82 Effect of stock-type on plantation success

RESPONSIBLE ORGANIZATION: International Paper Company

LOCATION: Eight reforestation units in the Oregon Coast Range (Lane and Douglas Counties)

OBJECTIVE: To determine the effect of four stock types on the success of plantation establishment.

DESCRIPTION: Four Douglas-fir stock-types (plug, plug+1, 2+0, and 2+1) were established in replicated plots on each of eight reforestation units during the winter of 1977-78. Seedling heights and condition were evaluated after each of the first three growing seasons.

STATUS: Original study finished after 3 years. Plots were recently relocated for potential 10-year remeasurements.

CONTACT: Jay Faulconer
International Paper Company
34937 Tennessee Rd.
Lebanon, OR 97355
935-2215

Greg Johnson
International Paper Company
P.O. Box 308
Veneta, OR 97487
935-2215

83 Mini-plug stock comparison field trial

RESPONSIBLE ORGANIZATION: Weyerhaeuser Company

LOCATION: Nine test sites (Coos and Douglas Counties)

OBJECTIVE: To determine the survival, vigor, and growth of mini-plug Douglas-fir planting stock compared to other stock types.

DESCRIPTION: As part of a larger study covering the company's major ownerships in the Pacific Northwest, five test sites were planted in 1986 and four in 1987. Mini-plug stock was compared to 1+1, 2-0, and 2+1 Douglas-fir. Evaluations of survival, vigor, and growth were measured in 1986 and 1987.

STATUS: Data have been summarized and analyzed. Report in progress.

CONTACT: Yasu Tanaka
P.O. Box 420
Centralia, WA 98531
(206) 736-8241

84 Evaluation of mini-plug+1 field performance

RESPONSIBLE ORGANIZATION: International Paper Company

LOCATION: Various reforestation units in the Oregon Coast Range (Lane and

Douglas Counties)

OBJECTIVE: To evaluate the field performance of the mini-plug+1 stock-type.

DESCRIPTION: Informal plots of operationally planted mini-plug+1 Douglas-fir seedlings have been established in each of the past three years.

STATUS: Active.

CONTACT: Jay Faulconer
International Paper Company
34937 Tennessee Rd.
Lebanon, OR 97355
259-2651

85 Cluster plot project, Beaver Creek

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science, Bureau of Land Management, International Paper Company

LOCATION: North Fork of Beaver Creek, Siuslaw National Forest, Waldport District (Lincoln County)

OBJECTIVE: 1) To compare selected stock types grown on favorable coastal sites. 2) To assess the effect of salmonberry on performance of various stock types.

DESCRIPTION: Cluster plots of stock types were planted on sites burned 0, 2, or 4 years before planting. Eleven different stock types ranging from 1-0 plugs to 3-ft wildlings were tested.

STATUS: Started in 1975. Twelfth-year data collected, awaiting analysis.

CONTACT: Mike Newton, Liz Cole
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

86 Reforestation on harsh sites

RESPONSIBLE ORGANIZATION: International Paper Company

LOCATION: Two reforestation units near Elkton (Douglas County)

OBJECTIVE: To identify optimum methods of reforesting harsh sites, as characterized by southern aspects, skeletal soils, and severe summer drought.

DESCRIPTION: Four Douglas-fir stock-types (1+0, plug, mini-plug+1, and 1+1) were established in plots during the winter of 1988-89. Each stock-type treatment is duplicated with and without peat shade collars.

STATUS: Active, newly established.

CONTACT: Jay Faulconer
International Paper Company
34937 Tennessee Rd.
Lebanon, OR 97355
259-2651

87 Trials of operationally planted 1-0 Douglas-fir seedlings

RESPONSIBLE ORGANIZATION: International Paper Company
LOCATION: Eight reforestation units ranging from near Vaughn to near Reedsport (Lane and Douglas Counties)
OBJECTIVE: To evaluate performance potential of 1-0 Douglas-fir seedlings for reforestation in the Oregon Coast Range.
DESCRIPTION: 1-0 seedlings were operationally planted on portions of eight reforestation units during the winter of 1986-87. Performance is being compared to operationally prescribed stock-types (2-0 or 2-1) planted on the remainder of each unit.
STATUS: Active. Measurements taken each year since establishment.
CONTACT: Jay Faulconer
International Paper Company
34937 Tennessee Rd.
Lebanon, OR 97355
259-2651

88 Effects of different nursery techniques on survival and growth of various conifers in the eastern Coast Range

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science
LOCATION: Nashville, McDonald Forest (Benton County)
OBJECTIVE: To determine growth rates of Douglas-fir, grand fir, noble fir, Sitka spruce, and ponderosa pine from different size nursery stock.
DESCRIPTION: Trees were grown in the nursery at seedling spacings ranging from 50 per ft^2 to 10 per ft^2, on the assumption that spacing would affect seedling size and therefore subsequent forest growth; seedlings were outplanted and monitored.
STATUS: Dormant, not publishable but utilized for demonstration purposes.
CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

89 The efficiency of various coniferous stock types planted on brushy sites in the Oregon Coast Range

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science, International Paper Company
LOCATION: Near Eddyville (Lincoln County) and the International Paper

Company's Hinman Tree Farm between Gardiner and Vaughn (Douglas and Lane Counties)

OBJECTIVE: To determine the survival and growth patterns of several coniferous stock types in typical Oregon Coast Range brush habitats.

DESCRIPTION: Clusters of nine types of seedlings were established on 40 plots at each of two sites. Clusters contained large and small 2-1 Douglas-fir transplants, three sizes of hemlock wildlings, large Douglas-fir wildlings, and plugs of Sitka spruce, 2-1 Douglas-fir, and hemlock. Vegetative competition, height growth, and survival were monitored.

STATUS: Dormant, but still locatable. Last observation in 1979. 5th-year data were used in M.S. theses by Rich Iverson and Catherine Roberts.

CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

90 Long-term consequences of choosing different stock sizes in different vegetation patches

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science, International Paper Company

LOCATION: International Paper Company's Hinman Tree Farm between Lakeside and Vaughn (Coos, Douglas, and Lane Counties), and many plots in the nearby Oxbow burn area

OBJECTIVE: To determine long-term growth of Douglas-fir of differing stock types.

DESCRIPTION: Plots were installed in 17 study sites between 1970 and 1974. Each plot contained 25 trees of each of three to six types of Douglas-fir stock; there were six replications. Stock types include: 2-0 bareroot seedlings, 1-0 plugs, 1-0 bullets, and 1-2 transplants.

STATUS: Fourteenth-year data recently collected, analyzed and in preparation for publication. Seventh-year update: M.S. thesis by Kary Howards.

CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

91 Seed spotting

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management and Oregon State University Forest Research Laboratory

LOCATION: Eugene District of Bureau of Land Management (Lane County)

OBJECTIVE: To determine the operational feasibility and effectiveness of seed spotting Douglas-fir in western Oregon.

DESCRIPTION: The study involved two parts: 1) testing the reliability and efficiency of the Cerbel Funnel Seed System; and 2) installation of plots to

determine the system's ability to establish seedlings over a range of sites. Bureau of Land Management crews were used to operationally seed spot two plantations. The establishment plots involved sites in the Cascade foothills and the Coast Range on site classes III and IV. The survival and growth of the seed spotted seedlings were compared with that of bareroot 2-0 and 2-1 stock from the same seed source.

STATUS: All field trials are complete and final report has been prepared.

CONTACT: Norman B. Gartley
Bureau of Land Management
P.O. Box 10226
Eugene, OR 97440
683-6494

92 Direct seeding/1-0 planting study

RESPONSIBLE ORGANIZATION: International Paper Company

LOCATION: Near Esmond Creek (Lane County)

OBJECTIVE: To evaluate 1-0 planting and two direct-seeding techniques as low-cost reforestation methods.

DESCRIPTION: Douglas-fir plots with the following treatments were established during the spring of 1986: direct seeding with plastic protective cones for the seed, direct seeding of unprotected seed, and planting of 1-0 seedlings.

STATUS: Active. Measurements taken each year since establishment.

CONTACT: Jay Faulconer
International Paper Company
34937 Tennessee Rd.
Lebanon, OR 97355
259-2651

93 Environment and the natural regeneration of conifers

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Tillamook, Yamhill, Polk, Lincoln, Benton, Lane, Douglas, Coos, Curry, and Josephine Counties

OBJECTIVE: 1) To relate environment to natural regeneration. 2) To measure and describe seed-source and regeneration relationships. 3) To define and describe riparian environments where regeneration is occurring.

DESCRIPTION: Clearcut units throughout the Coast Range will be sampled to relate environment to natural regeneration. Vegetation and regeneration will be studied at riparian sites.

STATUS: Clearcut units are now being sampled. Progress Reports are on file.

CONTACT: Don Minore
3200 SW Jefferson Way
Corvallis, OR 97331
757-4364

94 Comparison of Douglas-fir and western hemlock on wet brush sites on the Hinman Tree Farm

RESPONSIBLE ORGANIZATION: International Paper Company
LOCATION: Hinman Tree Farm (Lane and Douglas Counties)
OBJECTIVE: To evaluate western hemlock reforestation by comparing its early survival, growth, and yield with that of Douglas-fir.
DESCRIPTION: Western hemlock and Douglas-fir were planted in pure stands and in a 50/50 mix on three site types (including wet areas and clearcut north slopes). Each treatment consisted of 121 trees planted in a square at 10-ft spacing. Treatments were repeated in two different seed zones (062 and 252).
STATUS: Measurements taken in 1984, 1985, and 1986. Remeasurements due at 5-year intervals.
CONTACT: Greg Johnson
P.O. Box 308
Veneta, OR 97487
935-2215

95 Hardwood species trials

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science
LOCATION: Near Warren in the northern Coast Range (Columbia County); other sites near Corvallis, Lebanon, and Clatskanie (Benton, Linn, and Columbia Counties)
OBJECTIVE: To grow native and non-native hardwood species on a variety of sites that are not generally used for conifer production. To select species for more intensive investigation.
DESCRIPTION: This study involves replicated plots of 25 trees at 8-ft spacings. Species choice and mix depends on location, but five to ten hardwood species are planted at each site.
STATUS: Warren site was planted in 1986. Annual measurements are being taken.
CONTACT: David Hibbs
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

96 Aire King seedling blowdown

RESPONSIBLE ORGANIZATION: Starker Forests, Inc.
LOCATION: Lincoln County
OBJECTIVE: To observe the effect of substantial, significant twizzling on

seedling survival and height growth.

DESCRIPTION: The operational reforestation unit was planted with Douglas-fir plug-1's in December 1982, but it experienced a very high rate of twizzling, causing seedling roots to be exposed. Ninety-one seedlings were straightened or replanted; 82 were left twizzled, leaning to varying degrees off of vertical.

STATUS: Measured fall 1983, fall 1985, and fall 1986.

CONTACT: Mark Gourley, Fred Pfund, Paul Mortenson
P.O. Box 809
Corvallis, OR 97339
929-2477

97 Meyers-Marks root study

RESPONSIBLE ORGANIZATION: Starker Forests, Inc.

LOCATION: Benton County

OBJECTIVE: To determine the effect of J-root planting of Douglas-fir 2-1 transplants on seedling survival and growth.

DESCRIPTION: Fifty Douglas-fir 2-1's were intentionally J-root planted in March 1980 alongside 50 that were planted with straight roots.

STATUS: Height and diameter are being measured annually.

CONTACT: Mark Gourley
P.O. Box 809
Corvallis, OR 97339
929-2477

98 Effect of root form on survival and seedling height growth

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Coos Bay

LOCATION: Coos Bay District (Coos County)

OBJECTIVE: To compare growth and survival of purposely planted J- and L-rooted trees with that of correctly planted seedlings.

DESCRIPTION: Four blocks of completely randomized seedlings (normal, J-, and L-rooted) were planted in 1981 on a single operational reforestation unit.

STATUS: Fifth-year measurements indicated no significant difference in survival and height growth.

CONTACT: Jim Batdorff
Bureau of Land Management
333 South 4th St.
Coos Bay, OR 97420
269-9729

99 McIntyre root study

RESPONSIBLE ORGANIZATION: Starker Forests, Inc.
LOCATION: Lincoln County
OBJECTIVE: To compare seedling survival and growth of Douglas-fir 2-1's and plug-1's planted by auger, by shovel wing 3-D technique, slit technique, and J-root technique.
DESCRIPTION: Plots were initially established at two locations, but one was destroyed by fire. Fifteen tree rows were established in January 1983, with 30 trees for each seedling type/planting method combination.
STATUS: Last measurement, winter 1986-87.
CONTACT: Mark Gourley
P.O. Box 809
Corvallis, OR 97339
929-2477

Riparian Zone Management

See Also: Project 93

100 Ecology and management of riparian zone vegetation

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Resources Management, USDA Forest Service

LOCATION: South coast drainage—Elk River Basin (Curry County); central coast drainage—Drift Creek Basin (Lincoln County); north coast basin not yet selected

OBJECTIVE: To conduct an extensive inventory of vegetation cover within (and possibly beyond) the riparian zones of representative areas in the Coast Range, using photographic and other remote sensing techniques.

DESCRIPTION: A carto Ap190 analytical stereoplotter is being used for the acquisition of mapped and tabular river basin data (Cope Newsletter #1). Mapping is at two levels: extensive mapping of the entire basin and intensive vegetation mapping of specific sites as requested. Polygon units are classified according to specific physical attributes such as hydrological, geological, or biological features. The present classifications include: 1) water—both major and minor tributaries; 2) gravel bars; 3) roads; 4) snags; 5) brush; 6) conifer stands; 7) hardwood stands; 8) conifer/hardwood mix. In addition, other information may include area, height classes and stocking densities of vegetation, stream gradient, slope aspect, and other types of three-dimensional ground data.

STATUS: In progress.

CONTACT: David Paine
Department of Forest Resources Management
Oregon State University
Corvallis, OR 97331
754-4451

101 Establishment of shade-tolerant conifers under existing riparian vegetation

RESPONSIBLE ORGANIZATION: Adaptive COPE

LOCATION: At least six riparian leave areas representing the entire Coast Range

OBJECTIVE: To determine whether shade-tolerant conifers can become established under existing riparian vegetation and to determine the best reforestation practices for growth of these underplanted seedlings.

DESCRIPTION: At each site, this study will include four species and six treatments. Proposed species are hemlock, grand fir, Douglas-fir, and western redcedar. Treatments will include various combinations of overstory thinning and understory clearing.

STATUS: Study plan being developed, implementation expected in 1990. Completion scheduled for 1996.

CONTACT: Cathie Bacon
Oregon State University Marine Science Center
Newport, OR 97365
867-4011

Seedling Quality

102 Seedling root volume grading evaluation trial

RESPONSIBLE ORGANIZATION: Oregon Department of Forestry, USDI Bureau of Land Management

LOCATION: Phipps Nursery, Elkton (Douglas County)

OBJECTIVE: To evaluate a method of seedling grading based on root volume. Evaluation includes ability of sorters to employ the system and outplanting performance of seedlings of different root volume classes.

DESCRIPTION: Volunteer sorters were given instructions for the technique and then asked to sort about 100 seedlings. Seedlings of several root volume groups in four stem-caliper categories were outplanted and will be evaluated for survival and growth.

STATUS: Sorting occurred in January and February 1988. Seedlings were outplanted in late March to early April. Seedlings will be evaluated in mid-October 1988 and 1989.

CONTACT: Paul Morgan
Phipps Forest Nursery
2424 Wells Road
Elkton, OR 97436
584-2214

103 Evaluating physiological vigor of Douglas-fir nursery planting stock

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Peavy Arboretum, Corvallis (Benton County)

OBJECTIVE: To evaluate various methods of measuring vigor of planting stock.

DESCRIPTION: Seedlings are first treated to reduce their vigor. Various techniques for evaluating vigor are then used and the results are compared with field outplanting tests. Evaluation tests include: root regenerating capacity, survival in a growth room, osmotic concentration of xylem sap, starch content of roots, and biochemical markers.

STATUS: The project is almost complete. Final results are being prepared for publication.

CONTACT: J.B. Zaerr
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

104 Vigor test outplant study

RESPONSIBLE ORGANIZATION: International Paper Company
LOCATION: Bureau of Land Management land near Creswell (Lane County)
OBJECTIVE: To correlate field performance of Douglas-fir seedlings with results of seedling tests (e.g. root-growth potential, frost-hardiness, morphology).
DESCRIPTION: Six different lots of Douglas-fir were subjected to a battery of quality tests conducted by International Paper's testing service. The seedlings were then planted into field plots to assess the reliability of field performance predictions based on the tests.
STATUS: Established winter of 1984-85. Measurements taken through two seasons after planting.
CONTACT: Jay Faulconer
International Paper Company
34937 Tennessee Rd.
Lebanon, OR 97355
259-2651

105 Effect of nursery bed density on subsequent survival and growth of 2-0 Douglas-fir

RESPONSIBLE ORGANIZATION: International Paper Company
LOCATION: Soleratus Creek Watershed (Lane County)
OBJECTIVE: To determine the effect of nursery density on morphology and field performance of 2-0 Douglas-fir.
DESCRIPTION: Douglas-fir seedlings were grown in the nursery at five densities (10, 18, 25, 25, and 45/ft^2). The effect of density on morphology and yield was determined for the nursery phase of the study. Seedlings from each density were then established in field plots to determine the effect of nursery density on subsequent field performance.
STATUS: Plots established winter of 1982-83. Measurements completed through 1987 growing season.
CONTACT: Jay Faulconer
International Paper Company
34937 Tennessee Rd.
Lebanon, OR 97355
259-2651

Greg Johnson
International Paper Company
P.O. Box 308
Veneta, OR 97487
935-2215

106 Noti family block competition study

RESPONSIBLE ORGANIZATION: International Paper Company
LOCATION: Three sites on International Paper land (Lane County)
OBJECTIVE: To examine yield, productivity, and intergenotypic competitive effects in half-sib Douglas-fir families.
DESCRIPTION: Ten randomized treatments were replicated on three different sites in January 1983. Each treatment contained 121 trees planted at 11 x

11 ft spacing. Forty-nine trees in the innermost square of the treatment were used as study trees. Treatments included: Unimproved Bulk (2 plots)—Woodsrun seed; Seed Mix—equal mix of families as seed; Tree Mix—equal mix of families as trees; and six families of wind-pollinated half-sibs from parent trees.

STATUS: Plots awaiting measurement.

CONTACT: Greg Johnson
P.O. Box 308
Veneta, OR 97487
935-2215

107 The effect of root volume on survival, growth, and nutrient uptake for ponderosa pine and Douglas-fir seedlings

RESPONSIBLE ORGANIZATION: Oregon State University Nursery Technology Cooperative, USDI Bureau of Land Management

LOCATION: Bureau of Land Management lands (Columbia County) and Forest Service lands (Wasco County)

OBJECTIVE: To determine the differences in survival and growth and the differences in nutrient uptake among different root-volume treatments.

DESCRIPTION: Douglas-fir and ponderosa pine were planted on separate sites. Three different seed sources were used at each site. Each seed source was separated into three root-volume categories. Before planting, seedlings were measured for height, caliper, root volume, and total fresh weight. Seedlings will be measured for height and survival at the end of each growing season for 4 years. A subsample of seedlings is being harvested periodically for nutrient analysis, root carbohydrate analysis, and dry weight analysis.

STATUS: Seedlings lifted, measured, planted spring 1987. Three seedling subsamples have been harvested. First-year height and survival data collected and analyzed in fall 1987; nursery data analyzed.

CONTACT: Robin Rose
Department of Forest Science
Oregon State University
Corvallis 97331
754-2244

108 Phenology and "transplant-shock"

RESPONSIBLE ORGANIZATION: Nursery Technology Cooperative

LOCATION: Not yet determined

OBJECTIVE: To determine the effect of phenology on "transplant-shock," as measured by various physiological and morphological parameters.

DESCRIPTION: Different phenological cycles will be created by applying different nursery treatments to seedlings. Phenology will be measured via

budset, mitotic index, frost hardiness, and carbohydrates, as well as nutrient status, height, caliper, etc. Seedlings will be outplanted and evaluated for field performance.

STATUS: In planning.

CONTACT: Robin Rose
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

109 Effect of lift date and storage duration on survival and growth of 1-1 Douglas-fir

RESPONSIBLE ORGANIZATION: International Paper Company

LOCATION: Near Elkton (Douglas County)

OBJECTIVE: To determine the effect of lift date and storage duration on survival and growth of 1-1 Douglas-fir.

DESCRIPTION: This factorial experiment, established in field plots during the winter of 1986-87, includes four lift dates and four storage durations.

STATUS: Active. Measurements taken each year since establishment.

CONTACT: Jay Faulconer
International Paper Company
34937 Tennessee Rd.
Lebanon, OR 97355
259-2651

110 Lifting window study

RESPONSIBLE ORGANIZATION: USDA Forest Service, J.H. Stone Nursery

LOCATION: Siskiyou National Forest lands (Curry County)

OBJECTIVE: To establish calendar dates within which key Douglas-fir seed lots grown at J.H. Stone Nursery may be safely lifted for optimum survival and growth in outplanting. To develop threshold values of root growth potential for each seed lot.

DESCRIPTION: One hundred sixty acceptable seedlings were lifted each month, for 5 months. Sixty seedlings from each month were tested for root growth potential. The remaining 100 seedlings were bundled into groups of 10, labeled with the lifting date, and sent to the district for outplanting. The planting design consists of 10 replications of the five lifting dates.

STATUS: Information was collected and analyzed for FY 87. FY 88 seedlings have been lifted and planted, with data to be collected and analyzed in the summer of 1988.

CONTACT: John Scholtes, JHS Nursery Manager
2606 Old Stage Rd.
Central Point, OR 97502
776-4281

Site Preparation

See Also: Projects 25, 72, 195

111 Comparison of site preparation methods in the Coast Range

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis, Siuslaw National Forest

LOCATION: Formader, LBJ, Camp 76, and Farmer (Benton, Lane, Lincoln, and Tillamook Counties)

OBJECTIVE: 1) To determine the influence of site preparation method on survival of large 2-0 Douglas-fir stock and on height and diameter growth of Douglas-fir stock. 2) To determine whether tubing improves the survival, height, or diameter growth of Douglas-fir stock, and whether the effects vary on differently prepared sites. 3) To assess differences in percent cover, height, and composition of competing vegetation following different methods of site preparation.

DESCRIPTION: Each study location (block) contains six site preparation treatments, each 5 acres in size. Within each treatment, four to six systematically spaced rows containing a total of 120 planting spots were marked for repeated measurement of seedling and vegetation development. Alternate trees were tubed to protect them from animals. Site preparation treatments, applied on an operational scale, included: aerial application of Tordon* 101 as a preburn spray; broadcast burning without spraying, after spraying, or after manual slashing; aerial application of Roundup®; manual slashing only; and a control. Douglas-fir seedlings and development of adjacent vegetation have been measured periodically.

STATUS: Seventh-year tree and vegetation measurements have been completed recently, and data summaries are scheduled for FY 1989. Research progress reports have been prepared; the 1986 report covers five-year results.

CONTACT: William I. Stein
3200 SW Jefferson Way
Corvallis, Oregon 97331
757-4363

* Trademark of Dow

112 Haemer Lake studies

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science, USDI Bureau of Land Management, McIntyre-Stennis

LOCATION: Near Haemer Lake NW of Corvallis (Benton County)

OBJECTIVE: To evaluate the effects of various site preparation techniques 12 years after conversion of red alder to conifer plantations.

DESCRIPTION: Four site preparation techniques were investigated on a total of 240 acres: 1) tractor scarification; 2) herbicides followed by tractor crushing; 3) herbicides followed by burning; and 4) herbicides alone. Ten-acre plots were established in 1969 to test several different treatments. The four best treatments were established in 1976. Vegetation development and conifer survival were recorded before and after treatment. There were 16 permanent sampling points per plot, each containing cluster plots planted with conifers of different species and stock type.

STATUS: Dormant, high priority to remeasure. M.S. thesis by Bruce Kelpsas (1978): "Comparative effects of chemical, time, and machine site preparation in an Oregon coastal brushfield."

CONTACT: Mike Newton, Bruce Kelpsas
Department of Forest Science
Oregon State University
Corvallis, Oregon 97331
754-2244

113 Bare soil exposure following logging and prescribed burning in Southwestern Oregon

RESPONSIBLE ORGANIZATION: Oregon State University, Siskiyou National Forest

LOCATION: Waters Creek drainage, Galice Ranger District (Josephine County)

OBJECTIVE: To study the interrelationship of pre-existing duff depth to bare soil exposure after broadcast burning.

DESCRIPTION: The percent of bare soil exposure was measured prior to harvest, after skyline harvest, and after broadcast burning on four clearcut harvest units.

STATUS: Complete and published.

CONTACT: Mike Amaranthus
P.O. Box 1131
Grants Pass, OR 97526
476-3830

114 Validation of fuel consumption models during early spring prescribed burns

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Seattle

LOCATION: Siuslaw National Forest and State Department of Forestry lands in coastal Oregon

OBJECTIVE: 1) To measure woody fuel and duff consumption on prescribed burns that occur during early spring-like conditions. 2) To modify and extend the range of current fuel consumption modeling capabilities to include burning under wet, small-fuel conditions.

DESCRIPTION: Nine to twelve early, spring-like burns will be monitored for consumption of woody fuel and duff. Fuel loading, fuel moisture, fuel management, slope, aspect, lighting technique, and meteorological data will be used to develop new or modify existing fuel consumption equations for early spring burning. This will enable forest managers to better plan prescribed burns to meet site objectives while reducing impact on air quality.

STATUS: Study plan is being written. Units were inventoried in the summer and fall of 1988 for burning in the early spring of 1989.

CONTACT: Roger Ottmar
Pacific Northwest Research Station
4043 Roosevelt Way NE
Seattle, WA 98105
(206) 442-7815

115 Characterization of the thermal environment: developing guidelines for management of shrubs and hardwoods in coastal forests

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Seattle

LOCATION: Siuslaw National Forest and State Department of Forestry lands in coastal Oregon

OBJECTIVE: 1) To characterize the thermal environment of the humus and soil layer for broadcast burning. 2) To develop or adapt an existing thermodynamic heat transfer model for broadcast burning.

DESCRIPTION: Over 20 logged units will be burned and the humus and soil layers will be monitored for heat penetration. The data will be used to

develop or modify an existing heat transfer model for use by forest managers. This will allow preharvest and prescribed fire planning to best control vegetation while mitigating the effects of fire on air, soil, and water resources.

STATUS: Analysis of 1987 data is complete. Two to four burns are scheduled for 1988. A heat-transfer model is on USDA Forest Service Data General computer for modification and testing with field data.

CONTACT: Roger Ottmar
Pacific Northwest Research Station
4043 Roosevelt Way NE
Seattle, WA 98105
(206) 442-7815

116 Characterization of emissions from the broadcast burning of hardwood logging residues

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Seattle

LOCATION: Siuslaw National Forest

OBJECTIVE: 1) To measure emission components from hardwood prescribed burns. 2) To characterize trace constituents. 3) To develop rate-of-fuel consumption profiles.

DESCRIPTION: The study collected information on emission characteristics, chemical fingerprints, and emission production rates for eight hardwood prescribed burns. The information extended the knowledge of emission characterization from prescribed burning to hardwood slash and will provide additional accuracy to the compilation of emission inventory.

STATUS: Field effort is complete. Data has been analyzed and published. A final report is to be completed summer 1988.

CONTACT: Colin Hardy
Pacific Northwest Research Station
4043 Roosevelt Way NE
Seattle, WA 98105
(206) 442-7815

117 Helitorch mass ignition: reduction in air pollutant emissions and fuel consumption

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Seattle

LOCATION: Siuslaw National Forest and State Department of Forestry lands in coastal Oregon

OBJECTIVE: To test the hypothesis that mass ignition of prescribed fire by helitorch reduces the consumption of large, woody fuels and duff by 20 to 50%.

DESCRIPTION: Twelve to fifteen prescribed burns were ignited by a helicopter and reached a mass fire situation. Monitoring these burns produced data that will be used to evaluate the benefits of helitorch ignition over hand-lighting for reducing consumption of large logs and duff and for reducing emissions.

STATUS: Field effort is complete. Data has been analyzed. Report is to be completed in the summer of 1988.

CONTACT: Roger Ottmar
Pacific Northwest Research Station
4043 Roosevelt Way NE
Seattle, WA 98105
(206) 442-7815

118 Prescribed fire and fuel consumption in uncured slash

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Seattle

LOCATION: Siuslaw National Forest and State Department of Forestry lands in coastal Oregon

OBJECTIVE: To modify and extend the range of current fuel consumption modeling capabilities to include the burning of uncured slash.

DESCRIPTION: Without adding additional costs, new burning techniques may increase timber productivity, improve protection of soil, water, and wildlife habitats, and improve air quality. One such technique is to burn shortly after harvest when the woody fuels are uncured. Information from 15 uncured units that have been burned and monitored for fuel consumption will be used to develop a fuel consumption model for burning uncured slash. A fuel moisture study was initiated in 1987 to develop a mathematical curing rate model for uncured slash.

STATUS: Three additional burns will be monitored for fuel consumption in 1988. Final consumption and fuel moisture curing rate model will be completed in 1989.

CONTACT: Roger Ottmar
Pacific Northwest Research Station
4043 Roosevelt Way NE
Seattle, WA 98105
(206) 442-7815

119 Effect of slash burning on planting spot availability and planting efficiency

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: USDI Bureau of Land Management—Eugene District, Hebo and Alsea Ranger Districts (Benton, Lane, and Lincoln Counties)

OBJECTIVE: To determine the effects of slashburning on planting spot availability and planting efficiency.

DESCRIPTION: Planting spot availability and planting efficiency were determined before and after burning on nine sites in the Coast Range. Fuel loading was determined before and after burning and will be used as the independent variable in statistical analysis.

STATUS: Field work completed. Data analysis starting. Report planned for 1989.

CONTACT: John Zasada
3200 SW Jefferson Way
Corvallis, Oregon 97331
757-4377

120 Western Oregon debris and plantability prediction system

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management

LOCATION: Eugene, Salem, Roseburg, and Coos Bay Bureau of Land Management District Offices

OBJECTIVE: To construct a model to predict downed woody debris and planting spots per acre, based on timber cruise data and measured environmental variables. To rank harvest units by need for treatments.

DESCRIPTION: Cruise and stand data are used to predict the amount and arrangement of woody debris after harvest and logging operations. Validation of predictions will be made by comparing fuel inventory with plantability data from 120 harvest units. Woody debris data are correlated with plantability; hence cruise data may be used to predict planting spots. Units can then be prioritized by need for prescribed fire or alternative treatment(s).

STATUS: Data collection is in progress and will be completed by summer 1988. Debris prediction models are being refined. Validation of prediction models will be completed by fall 1988. Project report due September 1988.

CONTACT: Peter Teensma, Program Analyst
USDI Bureau of Land Management
P.O. Box 10226
Eugene, OR 97440
683-6269, FTS 430-6269

121 Development of photogrammetric techniques for quantifying forest residues

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Seattle

LOCATION: Siuslaw National Forest and State Department of Forestry lands in coastal Oregon

OBJECTIVE: 1) To develop a stereo photo series to assess fuel loadings for second-growth Douglas-fir, hemlock, hardwood, and spruce/hemlock fuel types. 2) To assess the use of aerial photographs for quantifying fuel loading.

DESCRIPTION: Thirty-six units were inventoried and photographed for development of a photo series for coastal Oregon forested lands. Aerial photogrammetric techniques were developed for use in assessing ground fuel loadings on four harvested units.

STATUS: The photo series is in editorial review with publication expected by January 1989. The initial photogrammetric assessment has been completed; additional work begins on the Willamette National Forest in the summer of 1988.

CONTACT: Roger Ottmar
Pacific Northwest Research Station
4043 Roosevelt Way NE
Seattle, WA 98105
(206) 442-7815

122 Reedsport rehabilitation project

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Smith River, east of Reedsport (Douglas County)

OBJECTIVE: To examine post-burn sprouting following pre-burn spraying with Roundup® and Garlon®.

DESCRIPTION: Following pre-burn application of Roundup® and Garlon®, post-burn sprouting was surveyed in this unreplicated study.

STATUS: Last measured in 1983. Dormant; recent progress report completed.

CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

123 Scarification vs. ripping: effects on Douglas-fir 2-1 survival and growth

RESPONSIBLE ORGANIZATION: Starker Forests, Inc.

LOCATION: Three clearcut sites (Benton County)

OBJECTIVE: To determine whether subsoil ripping after scarification affects survival and growth of 2-1 transplants.

DESCRIPTION: Three tractor-logged 1987 clearcuts were scarified during the summer of 1987. At each location part of the area was also ripped with a large winged subsoiler; 50 Douglas-fir 2-1's were planted in each of these adjacent treatments.

STATUS: Pre-first year growth measurements taken winter 1988. Some soil measurements may be taken.

CONTACT: Marc Vomocil, Mark Gourley
P.O. Box 809
Corvallis, OR 97339
929-2477

124 Skid trail tillage study

RESPONSIBLE ORGANIZATION: International Paper Company
LOCATION: Near Vaughn (Lane County)
OBJECTIVE: To determine the effect of tillage of compacted skid trails on soil bulk density and Douglas-fir growth.
DESCRIPTION: Douglas-fir growth in ripped, disked, and untreated skid trails was compared with growth in undisturbed areas.
STATUS: Established winter of 1982-83. Abandoned after initial measurements; plots recently relocated for potential remeasurement.
CONTACT: Greg Johnson
P.O. Box 308
Veneta, OR 97487
935-2215

125 Terrace planting

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science
LOCATION: Near Burnt Woods (Benton County)
OBJECTIVE: To determine growth and survival of Douglas-fir on clearcut units scarified by terracing.
DESCRIPTION: Units were clearcut, burned, and trenched with a bulldozer. Douglas-fir trees were machine planted and hand planted, planted in between cuts (no disturbance) or on the near or outer edge of units (cut and fill sides of blade patch).
STATUS: Plots established in 1962. Ninth-year progress report published. Dormant but useful for demonstration.
CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

Tree Improvement

See Also: Project 49

126 Genetic variation of wood density components in coastal Douglas-fir, and their relationship to growth rhythm

RESPONSIBLE ORGANIZATION: Pacific Northwest Tree Improvement Research Cooperative, Oregon State University

LOCATION: Coyote Creek, Clay Creek, and Oxbow progeny test sites in the Noti Breeding Unit of the Douglas-fir Progressive Tree Improvement Program—International Paper Company and Bureau of Land Management (Eugene District) lands (Douglas and Lane Counties)

OBJECTIVE: 1) To determine the degree to which individual intra-ring components of wood density are under genetic control, are genetically intercorrelated, and influence overall core density. 2) To assess the genetic relationships between intra-ring density components and growth phenology.

DESCRIPTION: Wood core samples will be collected at one test site from 800 15-year-old trees from 60 families currently under test in a tree improvement program in the central Oregon Coast Range. Intra-ring wood density components, such as mean earlywood and latewood density, will be assessed with an X-ray densitometer. These results will be combined with bud and cambial phenology data already available for the same trees. Data will be used to determine the role of growth phenology in wood density and to determine whether individual wood density components are useful for improving average wood density in breeding programs.

STATUS: Core samples collected June-July 1988. The project is scheduled for completion in 1991.

CONTACT: Tom Adams
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

127 Early test in Douglas-fir

RESPONSIBLE ORGANIZATION: Pacific Northwest Tree Improvement Research Cooperative, Oregon State University

LOCATION: International Paper's nursery at Kellogg, Oregon, and Weyerhaeuser's nursery at Mima, Washington. Field tests: Noti Breeding Unit of the Douglas-fir Progressive Tree Improvement Program, on International Paper Company and Bureau of Land Management (Eugene District) lands (Douglas and Lane Counties)

OBJECTIVE: To assess the reliability of predicting family performance for such traits as volume growth, stem form, branching habit, and wood density in 10- to 15-year-old Douglas-fir on the basis of measurements of 1- and 2-year-old seedlings in nurseries.

DESCRIPTION: Fifteen-year-old progenies of 72 parent trees from the central Oregon Coast Range are growing in eight field sites. Seeds from the same families were recently sown in nursery beds at two locations and are being measured for a variety of traits. Correlations between family seedling traits and field measurements (growth, form, and wood density) will be determined. The strength of the correlations will help determine the potential use of early testing for culling families with poor genetic potential, thus avoiding expensive field tests.

STATUS: Data collection completed in the fall of 1988. Analyses and report writing should be completed by the summer of 1990.

CONTACT: Tom Adams
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

128 Measurement strategies for tests of young Douglas-fir progeny

RESPONSIBLE ORGANIZATION: Pacific Northwest Tree Improvement Research Cooperative, Oregon State University

LOCATION: Coyote Creek, Clay Creek, and Oxbow progeny test sites—International Paper Company and Bureau of Land Management (Eugene District) lands (Douglas and Lane Counties)

OBJECTIVE: To determine 1) the best traits for assessing growth, stem quality, and wood quality in young Douglas-fir, 2) the most efficient methods of measuring these traits at the appropriate precision levels, and 3) the extent that growth, stem quality, and wood quality traits in Douglas-fir are genetically related and controlled.

DESCRIPTION: Ninety families included in three progeny test sites in the Noti Breeding Unit of the Douglas-fir Progressive Tree Improvement Program were measured for a number of bole, branch, and growth traits in November 1984. At the time of measurement, the progeny were 12 and 13 years old. The data will be used to estimate efficiencies of genetic gain and costs associated with alternative techniques for measuring growth and quality traits. Potential gains from multi-trait selection will also be determined.

STATUS: Most of the analyses have been completed and some preliminary reports made. Additional analyses and final reports are in progress. The project should be completed in 1989.

CONTACT: Tom Adams
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

129 Effects of seed characters and competitive environment on 2-year performance of open-pollinated Douglas-fir families in the nursery. I. Family composition study

RESPONSIBLE ORGANIZATION: Pacific Northwest Tree Improvement Research Cooperative, Oregon State University

LOCATION: International Paper's nursery at Kellogg, Oregon, and Weyerhaeuser's nursery at Mima, Washington. Study material: 36 families currently under test in the Noti Breeding Unit of the Douglas-fir Progressive Tree Improvement Program (Douglas and Lane Counties)

OBJECTIVE: To determine whether families differ significantly in their ability to survive and produce plantable seedlings under normal nursery conditions.

DESCRIPTION: Seeds from 36 families were sown directly into nursery beds at two nurseries. Although family identity was maintained, families were intermixed and spaced to approximate the spacing of operationally sown seed. Emergence, survival through 2 years, and proportion of plantable seedlings after lifting will be recorded. Data will be used to assess the potential for significant shifts in family representation between sowing and the time seedlings are outplanted.

STATUS: Data collected in the winter of 1988-89. A final report should be completed in June 1989.

CONTACT: Tom Adams
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

130 Effects of seed characters and competitive environment on 2-year performance of open-pollinated Douglas-fir families in the nursery. II. Competitive environment study

RESPONSIBLE ORGANIZATION: Pacific Northwest Tree Improvement Research Cooperative, Oregon State University.

LOCATION: Seed sown in raised beds at Oregon State University's Forest Research Laboratory. Study material: 40 families currently under test in the Noti Breeding Unit of the Douglas-fir Progressive Tree Improvement Program (Douglas and Lane Counties)

OBJECTIVE: To determine the degree to which growth differences among families in a nursery are influenced by competitive environment, seed weight, and date of emergence.

DESCRIPTION: Forty families were sown in each of three competitive environments—pure family blocks at 4-cm spacing, and mixed family blocks at 4-cm and 16-cm spacing. In addition, replications were divided equally

between sowings of germinated and ungerminated seed. Seedlings were harvested after 2 years and measured for height, diameter, dry weight, and crown characteristics. The relationship between seedling architecture and nursery performance within each treatment will be examined.

STATUS: The data has been collected and is currently being analyzed. A final report should be completed in January 1989.

CONTACT: Tom Adams
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

131 Genetic variation in phenology of bud and cambial activity in Douglas-fir

RESPONSIBLE ORGANIZATION: Pacific Northwest Tree Improvement Research Cooperative, Oregon State University.

LOCATION: Coyote Creek, Smith Creek, and Oxbow progeny test sites in the Noti Breeding Unit of the Douglas-fir Progressive Tree Improvement Program—International Paper Company and Bureau of Land Management (Eugene District) lands (Douglas and Lane Counties)

OBJECTIVE: 1) To determine the degree to which bud and cambial phenology of 15-year-old Douglas-fir are genetically controlled and correlated, 2) to examine the genetic relationships between phenology and growth, and 3) to determine how closely the phenology of field-planted families can be predicted from measurements on seedlings in a nursery.

DESCRIPTION: Sixty families from three progeny test sites in the central Oregon Coast Range tree improvement program were scored for bud break and bud set on the terminal shoot. Lateral bud break and bud set were also scored at one site to determine how closely phenology on the more easily measured lateral branches was correlated with terminal shoot phenology. Bud break and bud set of 1- and 2-year-old seedlings from the same families in four nursery plantings will be correlated with the same traits in the field. Weekly measurements of dbh were made at one test site throughout one growing season to provide information on vascular cambium phenology.

STATUS: The data have been collected and are currently being analyzed. A final report should be completed in January 1989.

CONTACT: Tom Adams
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

132 Cooperative tree improvement program

RESPONSIBLE ORGANIZATION: Oregon State Department of Forestry
LOCATION: State land in Clatsop, Columbia, Washington, Tillamook, Benton, and Coos Counties
OBJECTIVE: 1) To obtain information on genetic qualities of selected Douglas-fir and western hemlock "parent" trees by evaluating offspring in designed field tests; 2) to serve as a source of future genetic selections; and 3) to function as a gene resource for conservation plantings.
DESCRIPTION: The State Department of Forestry has established 16 progeny test sites, each approximately 15 acres in size. Test sites contain individually pedigreed (identified) trees from approximately 350 parent trees in each of four seed zones. Trees are planted at exact spacings from 8.5 ft to 15 ft apart: each test site is at a consistent spacing. State Forestry test sites represent a portion of the total progeny testing effort in the Oregon Coast Range.
STATUS: Oldest tests in Columbia and Washington counties are 22 years old and were measured for height and diameter at 5, 10, and 15 years. Forking and straightness data were collected on some test sites.
CONTACT: Mike Bordelon
Oregon State Department of Forestry
2600 State Street
Salem, Oregon 97310
378-2186

133 Lower Columbia western hemlock breeding program

RESPONSIBLE ORGANIZATION: Cavenham Forest Industries
LOCATION: Various sites in Clatsop County
OBJECTIVE: To evaluate "parent-tree" selections for inclusion in a breeding program.
DESCRIPTION: Four progeny tests exist, testing 250 wind-pollinated hemlock families in a randomized complete block design. Three tests are 13 years old and one test is 2 years old.
STATUS: Ongoing. Analyzed and measured in 1985.
CONTACT: Robin Mangold
1500 SW 1st Ave., Suite 500
Portland, OR 97201
221-7127

Vegetation Management

See Also: Projects 25, 28, 65, 66, 69, 190, and 204

134 Manual and chemical options for releasing Douglas-fir from competing brush in Oregon's Coast Range

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis, Siuslaw National Forest

LOCATION: Farmer Roundtop, Howell Ridge, Bailey, and Popo Maple (Lane, Lincoln, and Tillamook Counties)

OBJECTIVE: 1) To compare the effectiveness of seven release options for improving the survival and growth of Douglas-fir plantations. 2) To compare chemical and manual release methods. 3) To determine whether two or three successive manual release treatments are more effective than a single treatment. 4) To assess the effectiveness of a combination of manual and fosamine treatments.

DESCRIPTION: Each study location (block) contains seven side-by-side release treatments, each 5 to 15 acres in size. Within each treatment, an evaluation grid of 50 sample points was staked, and the nearest trees and associated brush were marked for initial and periodic evaluation. The release treatments being compared include: one, two, and three manual cuttings; glyphosate and fosamine alone, applied aerially; manual cutting plus fosamine; and a control receiving no release treatment. Periodic tree and vegetation measurements have been made for 6 years.

STATUS: Trees and vegetation were measured, perhaps for the final time, in 1987. Data analyses and a summary publication are targeted for FY 1989. Research progress reports containing results through the fourth year are available.

CONTACT: William I. Stein
3200 SW Jefferson Way
Corvallis, OR 97331
757-4363

135 Hand vs. chemical release comparison

RESPONSIBLE ORGANIZATION: Oregon Department of Forestry—Astoria District

LOCATION: Clatsop County—six sites

OBJECTIVE: To compare control of brush competition by manual cutting and by helicopter application of chemicals.

DESCRIPTION: Four methods of brush control were compared on six plots: 1) hand release (manual cutting) with chemical treatment of stumps; 2) aerial (helicopter) chemical release during early foliage period; 3) hand release

only; 4) aerial chemical release during dormant period; 5) hand release only; 6) aerial chemical release during early foliage period.

STATUS: The study will be measured one more year.

CONTACT: David Kaspar, Steve Skinner
Rt. 1, Box 950
Astoria, OR 97103
325-5451

136 The effects of six competition-release treatments on growth and survival of Douglas-fir, and recovery of six shrub/hardwood species in the Oregon and Washington Coast Ranges

RESPONSIBLE ORGANIZATION: CRAFTS (Oregon State University); Oregon cooperators: Oregon Department of Forestry, Champion, International Paper, and USDI Bureau of Land Management. Washington cooperators: Weyerhaeuser and ITT Rainier

LOCATION: Oregon sites are near Tillamook, Mapleton, Reedsport, and Coos Bay (Tillamook, Lane, Douglas, and Coos Counties), Washington sites are near Raymond and Forks

OBJECTIVE: To test the effectiveness of six treatments for reducing competing vegetation and increasing the survival and growth of Douglas-fir seedlings.

DESCRIPTION: Six 2- to 3-year-old Douglas-fir plantations, each considered in need of competition release from associated salmonberry/thimbleberry-type vegetation, were selected for study. On each site (replication), five treatments were applied: 1) untreated control, 2) aerial spray of glyphosate, 3) manual cutting in a 4-ft radius around conifers, 4) aerial spray of triclopyr, and 5) complete removal of all competing vegetation using annual applications of hexazinone (and other herbicides when needed).

STATUS: Conifer and shrub/hardwood growth measurements were collected 1 year before treatment, annually for 3 years after treatment, and the 5th year after treatment. Future measurements will be collected periodically every 5 years. The data through the 5th year is being summarized in several manuscripts that will be submitted for publication.

CONTACT: Steven Radosevich, Tim Harrington, Bob Wagner
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

137 Vegetative community development following herbicide application and hand slashing

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science, USFS Cooperative Aid, FIR

LOCATION: Near Gold Beach, Agnes, and Waters Creek near Galice (Curry

and Josephine Counties)

OBJECTIVE: To document growth of trees and brush competitors in response to herbicides and hand clearing.

DESCRIPTION: Tree growth, vegetative response, and herbicide residues were measured for 5 years after application of herbicides and hand clearing of brush.

STATUS: Dormant; five manuscripts in preparation.

CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

138 Effect of manual cutting on regrowth of salmonberry

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Waldport and Hebo Ranger Districts (Lincoln and Tillamook Counties)

OBJECTIVE: To determine the effect of timing of cutting on regrowth of salmonberry.

DESCRIPTION: Salmonberry has been cut according to several regimes: cutting (with chainsaw) at about one month intervals; continuous cutting; and removal of the basal stem/root crown. Regrowth of salmonberry is monitored periodically after cutting. Rhizome samples are collected for carbohydrate analysis and for determining resprouting potential in a controlled environment.

STATUS: Treatments will be completed in January 1989. Salmonberry regrowth will be monitored through the 1989 growing season.

CONTACT: John Zasada
3200 SW Jefferson Way
Corvallis, OR 97331
757-4377

139 Effects of a grass-legume seeding mixture on the establishment of conifer regeneration in Oregon Coastal clearcuts in the Yamhill resource area

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Salem District

LOCATION: Three sites in Lincoln County

OBJECTIVE: To determine the effect of grass-legume seeding of clearcuts on: 1) suppression of competitive brush species; 2) survival and growth of conifer seedlings; 3) soil moisture depletion; 4) animal damage to planted seedlings; 5) fill-in of naturally seeded conifer; and 6) utilization of forage by big-game animals.

DESCRIPTION: Units selected were on the west slope of the Coast Range where severe competition was expected from red alder, salmonberry, and thimbleberry. Uniform 2-acre areas of clearcut were each split into one control plot and one plot seeded with a grass-legume mixture and fertilized.

STATUS: Now have data after three seasons. Final measurements planned after five seasons.

CONTACT: Walt Kastner
6615 Officer's Row
Tillamook, OR 97141
842-7546

140 Grass control trial

RESPONSIBLE ORGANIZATION: Lone Rock Timber Company, Oregon State University Department of Forest Science

LOCATION: Near Reedsport and Roseburg (Douglas County)

OBJECTIVE: To screen and compare efficacy of glyphosate, atrazine, and sulfometron for controlling grass around newly planted Douglas-fir seedlings.

DESCRIPTION: Glyphosate, atrazine, and sulfometron were applied at various rates to newly planted Douglas-fir seedlings during the spring. There were two sites, with two replications per site, and six treatments including a control.

STATUS: Data collected in July 1988; progress reports in preparation.

CONTACT: Dan Newton
Lone Rock Timber Company
P.O. Box 1127
Roseburg, OR 97470
673-0141

141 Effects of herbaceous weed control on moisture stress and growth in young Douglas-fir

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Starker Forest Property near Blodgett (Benton County)

OBJECTIVE: 1) To determine the relationship between soil moisture availability (as influenced by chemical weed control) and tree growth. 2) To evaluate various chemical weed control measures.

DESCRIPTION: This factorial study involves 16 0.01-ha plots. Half of the trees within each plot were planted before weed control treatment and half after treatment. Plots were subdivided each year as weed control treatments were added. Eight of the 16 plots were irrigated the final year.

STATUS: Dormant. Plots established in 1968-71; last measurement at age 11 years (1982). Ph.D. thesis by Dave Preest, 1975.

CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

142 Effects of low levels of grass and forb competition on conifers in high and low rainfall areas

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Coast Range near Philomath (Benton County), and Eastern Oregon near LaGrande

OBJECTIVE: 1) To determine effects of grass competition (0 to 40% cover) on growth of Douglas-fir and ponderosa pine. 2) To compare effects of grass competition at both high rainfall (coast) and low rainfall (E. Oregon) sites.

DESCRIPTION: Forty plots (8 x 8 ft) were established in areas with heavy herbaceous cover. Grass was controlled with glyphosate to obtain treatment levels of 40, 20, 10, 5, and 0 (control) percentages of grass cover. Glyphosate levels were regulated by masonite discs covering the ground.

STATUS: Completed; manuscript prepared.

CONTACT: Mike Newton, Diane White
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

143 Alternatives to treatment with fire and herbicides: a synthesis of reforestation techniques

RESPONSIBLE ORGANIZATION: Adaptive COPE

LOCATION: Will cover information from the entire Coast Range

OBJECTIVE: To synthesize current information on reforestation and vegetation management techniques that can be used where fire and herbicides are restricted; to develop plans for further study based on this synthesis.

DESCRIPTION: Many managers have recently experimented with alternative vegetation management treatments; these techniques will be brought together in this synthesis, an in-depth literature review as well as a review of unpublished information. Where possible, it will include comparisons of effectiveness and cost.

STATUS: Literature review is in progress. Manuscript will be submitted for publication in 1990. New study plan also to be developed in 1990.

CONTACT: Cathie Bacon
Oregon State University Marine Science Center
Newport, OR 97365
867-4011

144 The influences of environment, phenology, and application variables on the responses of major conifer and brush species to glyphosate

RESPONSIBLE ORGANIZATION: CRAFTS (Oregon State University), Weyerhaeuser

LOCATION: Oregon Coast Range near North Bend (Coos County), and foothills of the Oregon Cascade Range near Springfield

OBJECTIVE: To determine the relationships between shrub/hardwood and conifer injury from glyphosate and indicators of plant phenology, growth, and physiological activity.

DESCRIPTION: Laboratory and field experiments were conducted to evaluate variations in the effect of glyphosate on Douglas-fir, western hemlock, vine maple, red alder, and salmonberry caused by differences in environmental conditions, spray deposit patterns, and phenology.

STATUS: Completed in 1982; final report was distributed to CRAFTS cooperators.

CONTACT: Susan G. Conard
4955 Canyon Crest Drive
Riverside, CA 92507
(714) 351-6560

145 Arsenal® (imazapyr) trials

RESPONSIBLE ORGANIZATION: Lone Rock Timber, Oregon State University Department of Forest Science, Wilbur Ellis

LOCATION: Near Cottage Grove, Canyonville, Sutherlin, and Roseburg (Douglas and Lane Counties)

OBJECTIVE: To determine the optimum season and dose for injecting Arsenal® herbicide into selected hardwoods.

DESCRIPTION: Arsenal® herbicide treatments were injected into oak, maple, madrone and alder during December and June. Trial treatments were administered 3 in, 6 in, and 9 in between hack centers, in dosages of 0.2 lbs/gal a.i., 0.5 lbs/gal a.i., 1.0 lbs/gal a.i., or 2.0 lbs/gal a.i.

STATUS: Will record efficacy data summer 1988. Results should be available by September 1988.

CONTACT: Dan Newton
Lone Rock Timber
P.O. Box 1127
Roseburg, OR 97470
673-0141

146 Early testing of vegetation management technology

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science
LOCATION: Coast Range of Oregon
OBJECTIVE: To investigate effects of experimental herbicides on forest vegetation.
DESCRIPTION: Approximately 500 experimental plots have been established in areas subject to woody brush problems. This study involves numerous different projects and various treatment agents and experimental designs. The most common target species are bigleaf maple, alder, salmonberry, vine maple, thimbleberry, and elderberry (woody components). Bracken fern, sword fern, and herbaceous cover are also important.
STATUS: Active.
CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

147 Brush control with Oust® and 2,4-D

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science
LOCATION: State forestry land near Hoskins, Starker Forests land near Burnt Woods, McDonald Forest, and Sun Studs near Lakeview (Benton and Lincoln Counties)
OBJECTIVE: To determine efficacy and selectivity of Oust® and 2,4-D for brush control on 2- to 5-year-old cutover land.
DESCRIPTION: Each site had four plots, each about 10 acres in size. Each plot was treated with an aerial application of Oust®, 2,4-D, both, or left as a control.
STATUS: Publication in preparation.
CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

148 Imazapyr/glyphosate ratio and time of year: effects on conifers and vegetation control

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science
LOCATION: State land near Hoskins in "Wildwood unit" (Benton County)
OBJECTIVE: To evaluate the interactive or synergistic effect of imazapyr and glyphosate mixed in various low concentrations and applied to mixtures of

alder, salmonberry, vine maple, and conifers at difference times of the year.

DESCRIPTION: 132 plots were divided into two series, differentiated by species composition. The first series of 66 roadside plots (12 x 16 ft) was established in alder, salmonberry, and volunteer conifers. Herbicides were applied with a hand-held nitrogen-powered pressurized sprayer. On the second series, characterized by a vine maple component, herbicides were applied to 0.01-acre plots and broadcast with a waving wand technique.

STATUS: Active, awaiting remeasurement. Two-year duration to project.

CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

149 Canopy architecture and herbicide interception

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Starker Forests land and Farmer Tree Farm, near Philomath and Blodgett (Benton County)

OBJECTIVE: To determine 1) the penetration of bracken fern canopies by sprays containing glyphosate, 2) the efficacy of glyphosate for controlling bracken fern.

DESCRIPTION: Two study sites with 0.01-acre plots of bracken fern were treated with aerial application of different combinations of glyphosate and surfactant. Drop interception was measured by means of a string gauge analyzed on a spectrophotometer. Canopy architecture (the leaf orientation and distribution within a canopy) was measured by a laser mounted on a stand and run through the canopy. The ratio of foliage area to stem area was also calculated.

STATUS: Data collection complete, Ph.D. dissertation being written by Brian Richardson.

CONTACT: Mike Newton, Brian Richardson
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

150 Treatment screening trial for control of bigleaf maple sprout clumps

RESPONSIBLE ORGANIZATION: CRAFTS (Oregon State University); Oregon cooperators: Willamette Industries, International Paper, Weyerhaeuser, and Lone Rock Timber; Washington cooperators: Washington Department of Natural Resources, Boise Cascade

LOCATION: Near Vaughn and Alsea, in the Oregon Coast Range (Lane and Benton Counties), near Springfield and Roseburg, and near Carnation and Centralia, WA

OBJECTIVE: To compare the efficacy of conventional, new, and alternative treatments for controlling bigleaf maple sprout clumps.

DESCRIPTION: Six herbicide products and manual cutting, four methods of application, and three application timings were tested for their efficacy in controlling bigleaf maple sprout clumps. Treatments were applied in 1985 to a total of 269 sprout clumps located on six sites in Oregon and Washington. Pre-treatment and post-treatment measurements of cover and crown volume were used to assess bigleaf maple recovery following treatment.

STATUS: First- and second-year evaluations of treatment efficacy have been determined. A research status report has been sent to CRAFTS cooperators. Final evaluations will be completed in 1988.

CONTACT: Steven Radosevich, Bob Wagner
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

151 Bigleaf maple stump treatment screening trial

RESPONSIBLE ORGANIZATION: Weyerhaeuser Company

LOCATION: Private and Weyerhaeuser land (Lane and Coos Counties)

OBJECTIVE: To evaluate the efficacy of various herbicide treatments applied to the cut surface of single stems of bigleaf maple.

DESCRIPTION: Eight different herbicide treatments were tested on freshly cut bigleaf maple stumps in August 1984 and March 1985. All chemicals were applied within an hour of cutting. Each chemical was tested on 5 to 20 stumps, depending on site and availability. Evaluations were made in fall 1985 and 1986.

STATUS: Data analyzed and 2-year results have been reported.

CONTACT: Ron Heninger
P.O. Box 275
Springfield, OR 97477
746-2511

152 Bracken fern control plots

RESPONSIBLE ORGANIZATION: Starker Forests, Inc.

LOCATION: Benton County

OBJECTIVE: To determine the effects of bracken fern on survival and growth of Douglas-fir 2-1's.

DESCRIPTION: Plots at two locations each contained 100 seedlings. At each location, 50 seedlings were treated for bracken fern; the other 50 were left as controls.

STATUS: Bracken fern treated fall 1986. First measurements made fall 1987.

CONTACT: Mark Gourley
P.O. Box 809
Corvallis, OR 97339
929-2477

153 Scotch broom screening trial

RESPONSIBLE ORGANIZATION: Weyerhaeuser Company
LOCATION: Drain (Douglas County)
OBJECTIVE: To test several chemicals and treatment timings for controlling Scotch broom.
DESCRIPTION: This study, installed spring 1985, tests several chemicals and treatment timings aimed at preventing germination or establishment of Scotch Broom. The 13 treatments are replicated among seven blocks. Treatments were applied to plots 25 by 25 ft in 1985, 1986, and 1987. Measurement plots of 20 by 22 ft were evaluated in 1985, 1986, 1987, and 1988. Treatments: 1) Atrazine at 8 lbs/acre—applied year 1, 1+2, or 1,2,3; 2) Pronone® 5G at 2.2 lbs/acre—applied year 1, 1+2, 1+2+3, 2, or 3; 3) Atrazine plus Dalapon at 4 and 8 lbs/acre—applied year 1, 1+2, or 1+2+3.
STATUS: Data collected and ready for analysis.
CONTACT: Ron Heninger
P.O. Box 275
Springfield, OR 97477
746-2511

154 Baseline measurements of herbicide concentrations in air in Southwest Oregon

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis, Oregon State University
LOCATION: Chetco River, Southwestern Oregon (Curry County)
OBJECTIVE: To establish baseline data concerning herbicides in the air.
DESCRIPTION: The concentrations in the air of acids, salts, and esters contained in commonly used forestry-related herbicides are being measured and analyzed to establish baseline levels.
STATUS: Ongoing. Established December 1986. Completion date unknown.
CONTACT: Ken Benston
3200 SW Jefferson Way
Corvallis, OR 97331
757-4333

155 Glyphosate residue distribution

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science
LOCATION: South Fork of Berry Creek in McDonald Forest (Benton County)
OBJECTIVE: To follow the degradation of glyphosate in foliage, soil, water, and sediments for one year and to document the regrowth of the vegetation.
DESCRIPTION: A 20-acre site, established on a 35-year-old clearcut dominated by bigleaf maple, red alder, and scattered conifers, was treated by aerial application of glyphosate. Before and after spraying, glyphosate concentrations were measured in foliar samples, litter-covered and bare soil,

and streams. In addition, small mammal trapping was used both to determine animal utilization of riparian zones adjacent to the impacted area and to measure residue glyphosate concentrations in the animals.

STATUS: Recent data are currently being analyzed. This project is the second phase of a previous study, "Fate of glyphosate in Oregon forest ecosystems"; it repeats parts of that study on new plots.

CONTACT: Mike Newton, Diane White
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

156 The effect of planting time and vegetation control method on Douglas-fir rootstock establishment

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Eugene District

LOCATION: Tyrrell Seed Orchard, Lorane (Lane County)

OBJECTIVE: 1) To determine the best time of year to plant Douglas-fir rootstock for maximum seeding performance. 2) To determine the best non-chemical method of eliminating vegetative competition around the seedlings.

DESCRIPTION: Three study blocks were established in different areas within the orchard. Five lots of rootstock seedlings were planted at three different times of the year (October, February, and March). Five different vegetation control methods (three mulching, one control, and one hand hoeing/rototilling) were then used. Survival, growth, and vegetation control success will be measured after the second growing season. Cost data will also be collected and the most cost-effective method of establishing rootstock will be determined.

STATUS: The study blocks have been planted and the vegetative control methods were started in late 1986 and early 1987.

CONTACT: Glenn R. Miller
P.O. Box 10226
Eugene, OR 97401
683-6445

157 Morphological indicators of the competitive effects on conifers of overtopping plant canopies

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Near Florence, Hebo, and Waldport (Lane, Tillamook, and Lincoln Counties)

OBJECTIVE: To develop techniques for assessing the competitive effects of overtopping plant canopies, including 1) a fisheye photograph analysis system, and 2) morphological indicators of conifer response to competition.

DESCRIPTION: On three clearcut sites, Douglas-fir representing a range of

overtopping levels were selected from within an existing manual release study. Both visual and computerized estimates of percent sky (light availability) were compared with measurements of Douglas-fir bud size and growth of height and stem diameter.

STATUS: The data were summarized in an M.S. thesis by Sam Chan and in two publications.

CONTACT: Steven Radosevich, Sam Chan
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

158 Development of monitoring techniques and evaluation of responses of crop trees to operational release treatments

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Chetco, Gold Beach, and Powers Ranger Districts, Siskiyou National Forest (Coos and Curry County)

OBJECTIVE: To develop techniques for measuring long-term response of crop trees to operational release treatments, and to measure such response on the Siskiyou National Forest.

DESCRIPTION: One control (untreated) plot and one treatment plot were established in units being operationally released. Plots were installed on the Chetco, Gold Beach, and Powers Ranger Districts between 1980 and 1983. Measurements are taken every 2 years.

STATUS: Data being actively collected. One preliminary paper has been published, and data have recently been provided to a team developing a young-tree growth model for southwest Oregon and Northern California.

CONTACT: Peyton W. Owston
3200 SW Jefferson Way
Corvallis, OR 97331
757-4343

159 Growth of juvenile stands of conifers to stand closure under competitive stress

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Near Alsea and Philomath (Benton County)

OBJECTIVE: To determine inter- and intra-specific competition over a range of densities of Douglas-fir and grand fir both by themselves and intermingled with various hardwoods.

DESCRIPTION: Large Nelders (250 ft across) were planted with various mixtures of red alder, Sitka alder, scotch broom, and paper birch. The results corroborate and extend data obtained from previous small Nelder projects.

Stand development should now progress from establishment to "free-to-grow" phase.

STATUS: Active. Large Nelders have 40-year life expectancy. An article demonstrating the ability of large Nelders to nest within the small Nelders used in previous work will be published soon.

CONTACT: Mike Newton, Liz Cole
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

160 Interference between Douglas-fir and red alder: growth, physiology, and resource use

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science, Siuslaw and Willamette National Forests, Washington Department of Natural Resources

LOCATION: Near Lincoln City (Lincoln County), and Blue River (Lane County); also near Belfair, WA

OBJECTIVE: To examine the process of interference between red alder and Douglas-fir trees, and to determine the effect of resource availability on tree growth and biomass allocation.

DESCRIPTION: Douglas-fir and red alder seedlings were planted in a replacement series design during 1985-1986. A randomized complete block design was used at each of three sites. Several planting regimes were followed: 1) various-sized seedlings of the two species were planted at several densities; 2) red alder planting was delayed; and 3) red alder removal was delayed. Red alder response to increasing density is being studied by means of a circular Nelder design. Competing vegetation cover, tree growth, and availability of soil water and light have been monitored monthly during the growing season. Within both the replacement series and the Nelder studies, nutrient contents of the soil and woody debris have been quantified initially and will be sampled again in the fifth year of the study.

STATUS: Initial nutrient levels and first- and second-year growth and resource data have been collected at each of the three study sites.

CONTACT: Steven Radosevich, Tim Harrington
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

161 Interference between red alder and Douglas-fir

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Cascade Head Experimental Forest (Tillamook County)

OBJECTIVE: To describe the physical and physiological processes of interference between red alder and Douglas-fir.

DESCRIPTION: This project, which is part of a larger study with sites in Oregon and Washington, included mixed species replacement series and alder density series. The alder plots are split with P fertilization. Measurements include: plant dimensions; soil and plant water relations; soil and plant nutrient status; light; and nitrogen fixation.

STATUS: Planted in 1986. Annual measurements taken.

CONTACT: David Hibbs, Steven Radosevich
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

162 Competitive influence and N-fixation input of red alder, Sitka alder, and scotch broom on young Douglas-fir and grand fir in the Oregon Coast Range

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Near Toledo, Alsea, and Philomath (Lincoln and Benton Counties)

OBJECTIVE: To determine whether Sitka alder and/or scotch broom can provide N-fixation benefits equal to those of red alder, while avoiding brush competition problems.

DESCRIPTION: Large Nelders (250 ft diameter) were established at two sites, and were planted with 2-0 Douglas-fir seedlings in 1978 and 1980. Scotch broom and Sitka and red alder were planted; the alders were destroyed by elk browsing. Scotch broom was unaffected.

STATUS: Ongoing, data collection current.

CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

163 A growth model for determining potential reductions in Douglas-fir yield caused by bigleaf maple sprout clumps

RESPONSIBLE ORGANIZATION: CRAFTS (Oregon State University); Oregon cooperators: USDI Bureau of Land Management, Champion, Oregon Department of Forestry, Lone Rock Timber, and Weyerhaeuser; Washington cooperators: Washington Department of Natural Resources, Simpson, and Weyerhaeuser

LOCATION: Twenty-five study sites located throughout the Oregon and Washington Coast and Cascade Ranges

OBJECTIVE: Phase I: To develop a model that will predict crown width and

height growth of 1- to 10-year-old bigleaf maple sprout clumps. Phase II: To determine the individual effect of a bigleaf maple sprout clump on the wood volume of the surrounding 20- to 60-year-old Douglas-fir stand. Such information will provide the basis for an economic analysis of treatments to control bigleaf maple sprout clumps.

DESCRIPTION: Phase I: CRAFTS cooperators measured 346 bigleaf maple sprout clumps (aged 1 to 10 years) for height, crown width, "parent" stump diameter(s)/height/number, and age. CRAFTS staff are developing mathematical equations to describe bigleaf maple crown width and height growth trajectories; these equations will be spliced into models developed in Phase II. Phase II: In 20- to 60-year-old Douglas-fir stands on a total of five sites, a total of 20 isolated bigleaf maple clumps were measured for their height, crown width, stem dbh, and age. Stand characteristics were estimated from a series of variable-radius plots that started at sprout clump center and extended out into the Douglas-fir stand. Douglas-fir height vs. dbh relationships were developed for each site to permit estimation of total stand volume.

STATUS: Phase I and II data sets have been completed. CRAFTS staff will finish model development in 1989.

CONTACT: Steven Radosevich, Tim Harrington, Bob Wagner
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

164 Interspecific competition indices for vegetation management decisions in young Douglas-fir stands on the Siuslaw National Forest

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science, Siuslaw National Forest, USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Phase I sites: Hebo, Waldport, Alsea and Mapleton Ranger Districts, Siuslaw National Forest (Tillamook, Lincoln, Benton, and Lane Counties); Phase II sites: near Rose Lodge and Tidewater (Lincoln County)

OBJECTIVE: Phase I: To develop vegetation indices for predicting effects of interspecific competition on Douglas-fir saplings, and to develop models predicting individual tree size from the competition indices, site factors, and tree characteristics. Phase II: To test and refine the predictive models developed in Phase I, and to quantify the relationships between the interspecific competition indices and the availability of light and soil water in the Douglas-fir seedling environment.

DESCRIPTION: Phase I: On the basis of an individual tree-centered approach, data on tree size and associated vegetation were collected at nine sites that are part of a Pacific Northwest Research Station site preparation study. Regression equations were developed that related absolute tree size to indices of the competing vegetation, site factors, and tree characteristics.

Phase II: Existing salmonberry brushfields on four sites were cut and planted with Douglas-fir seedlings. Shrub cover has been periodically removed to leave 0, 25, 50, 75, and 100 percent of each 0.1-acre plot in bare-ground condition. On two additional plots with 100 percent shrub removal, 50 or 100 percent of herbs have also been removed. Soil water and light availability have been monitored during the growing season.

STATUS: Phase I is complete and a final report has been submitted to the Siuslaw National Forest. First- and second-year tree growth and site resource data have been collected on Phase II.

CONTACT: Steven Radosevich, Bob Wagner
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

165 Growth and development of young Douglas-fir in relation to intra- and inter-specific competition

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Near Toledo, Alsea, and Philomath (Lincoln and Benton Counties)

OBJECTIVE: To determine the relationship between Douglas-fir seedling growth and the availability of light and moisture, as influenced by type and density of competitor.

DESCRIPTION: Twelve 360-m^2 Nelder plots of 2-0 bareroot Douglas-fir seedlings were established, with spacings ranging from 300 to 15,000 cm^2 per plant, in 48 spokes. Sites represented a cool-moist, a warm-moist, and a hot-dry environment. Two of the four plots on each site were irrigated. Nelders were split into six "pie" sections; two sections were planted with Douglas-fir, two with a Douglas-fir/red alder wildling mix, and two with Douglas-fir and broadcast-seeded grass. Measurements included soil moisture, plant moisture stress, light alteration in the seedling canopy, height, diameter and volume growth, and dry matter accumulation.

STATUS: Ph.D. thesis by Shepard Zedaker, 1981. Nine-year data to be published soon.

CONTACT: Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

166 Fifth-year growth responses of Douglas-fir to crowding and other competition

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Near Toledo, Alsea, and Philomath (Lincoln and Benton Counties)

OBJECTIVE: To determine the fifth-year growth response of Douglas-fir to competition from red alder and grass.

DESCRIPTION: This project is essentially a continuation of Zedaker's project (above), except that half of each plot had been destructively sampled so that there is no longer replication within each plot. Measurements included foliage and soil nutrients, pre-dawn moisture stress, foliage moisture diffusion, and light levels within the canopy. Douglas-fir sample trees were measured for total height, height of each node, and diameter at 15 cm above ground.

STATUS: M.S. thesis by Liz Cole, 1984. Nine-year data to be published soon.

CONTACT: Mike Newton, Liz Cole
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

167 Red alder/Douglas-fir planting density/ replacement series

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Cascade Head (Tillamook County)

OBJECTIVE: To study effects of density on growth, carbon partitioning, and mortality. To study effects of P fertilization on growth processes.

DESCRIPTION: Douglas-fir and red alder were planted in replacement series in ratios of 0:100, 25:75, 50:50, 75:25, and 100:0, replicated three times. Half of this density series was fertilized with phosphorus.

STATUS: Planted in 1984, measured through 1985, needs examination.

CONTACT: David Hibbs
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

168 Competitive interaction among western hemlock, red alder, and riparian salmonberry

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Sam's Creek near Logsden, and confluence of Deer Creek and Big Elk Creek near Harlan (Lincoln and Benton Counties)

OBJECTIVE: To determine competitive interactions between important riparian zone species following stand conversion.

DESCRIPTION: Trees were planted in a Nelder design in clearcuts being converted from hardwood/shrub to conifers. The ten treatments included five ratios of hemlock to alder, with and without sprout origin salmonberry. Measurements include: height, diameter, leaf area, foliage samples, soil

water potential, pre-dawn xylem water potential, and soil samples (pH, total N, and available N).

STATUS: Four-year study; second year completed.

CONTACT: Mike Newton, Liz Cole
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

169 Ecology and management of shrubs and hardwoods: survival and growth of native shrubs

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Resources Management, USDA Forest Service Pacific Northwest Research Station—Corvallis, COPE

LOCATION: Cape Creek, Randall Saddle, Hilltop Cascade Head (Lane and Lincoln Counties)

OBJECTIVE: 1) To determine survival and growth of salmonberry, bigleaf maple, salal, elderberry, and vine maple in clearcuts, dense conifer stands, and thinned conifer stands.

DESCRIPTION: Five caged (protected seed) and five uncaged spots of each hardwood species were planted in clearcuts, dense conifer stands, and thinned conifer stands.

STATUS: Installed fall 1987. Tallied through August 1988.

CONTACT: John Tappeiner
Department of Forest Resources Management
Oregon State University
Corvallis, OR 97331
754-4215

John Zasada
3200 SW Jefferson Way
Corvallis, OR 97331
757-4377

170 Population growth and demographics of salmonberry and thimbleberry

RESPONSIBLE ORGANIZATION: Oregon State University, Starker Forests, Times-Mirror Corporation

LOCATION: Near Philomath and Toledo (Benton and Lincoln Counties)

OBJECTIVE: To develop predictive models of population dynamics for pure and mixed stands of thimbleberry and salmonberry.

DESCRIPTION: Demographic and competition studies of thimbleberry and salmonberry from several sources have been initiated on both an inland and a coastal site. Density gradients and replacement series experiments are being used to compare shoot and clump growth from sexual and vegetative propagules, while classical growth analysis techniques will help identify the growth strategies of each species. Soil water availability has been measured during the growing season.

STATUS: Seed-origin survival of the two species has been assessed. First- and second-year growth data have been collected for each species, and a population dynamics simulation model is being developed.

CONTACT: Steven Radosevich, Bruce Maxwell
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

171 Establishment and early growth of alder seedlings

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: McDonald Forest (Benton County)

OBJECTIVE: To investigate the factors affecting seedling establishment and early growth of red alder.

DESCRIPTION: Of nine plots in clearcut and forested areas, six were exposed to different levels of soil disturbance, with the humus layer and some surface soil removed. All nine plots were then broadcast seeded with red alder. Survival and growth of red alder, environmental conditions, and successional development of plots will be monitored.

STATUS: Thesis completed September 1987.

CONTACT: Sybille Haeussler, John Tappeiner
Department of Forest Resources Management
Oregon State University
Corvallis, OR 97331
754-4215

172 Leaf area and biomass of whiteleaf manzanita

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Resources Management

LOCATION: Forest Service land (Josephine County)

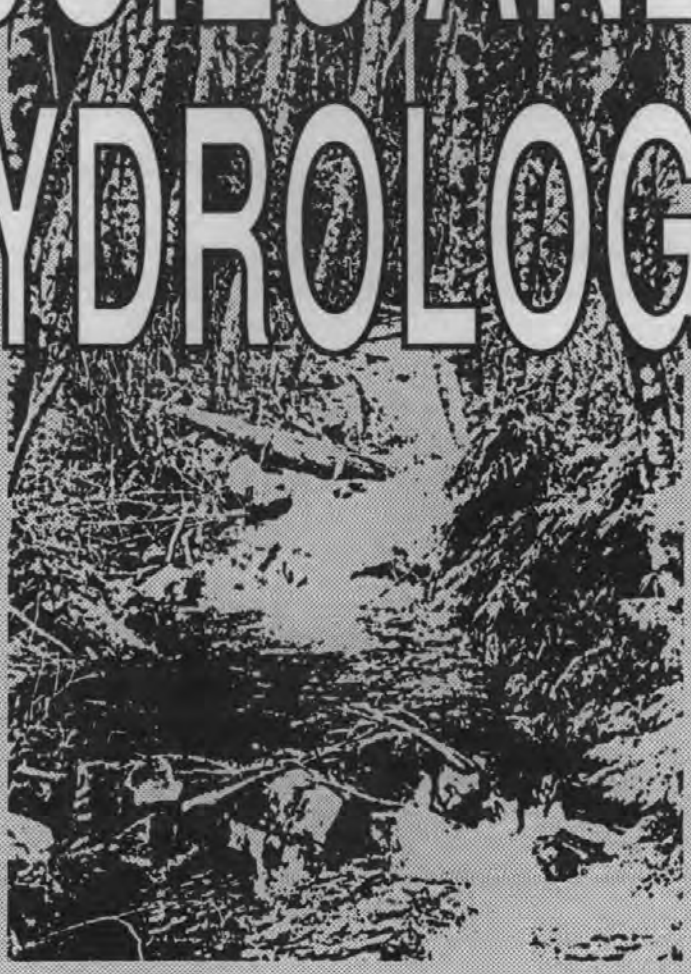
OBJECTIVE: To examine the development of structure, aboveground biomass, and leaf area in brushfields of whiteleaf manzanita (*Arctostaphylos viscida*) and to explore the relationship between stand densities and community biomass.

DESCRIPTION: Nine sites were studied. There were two stands of 2-year-old shrubs and one site with 16-year-old shrubs. Six plots were established on each site. Two plots each of low, medium, and high density were then randomly selected on each site.

STATUS: Study to continue through 1995 or so.

CONTACT: John C. Tappeiner
Department of Forest Resources Management
Oregon State University
Corvallis, OR 97331
754-4215

SOILS AND HYDROLOGY



Accelerated Erosion—Effect of Forest Roads

173 Flood emergency road maintenance plan

RESPONSIBLE ORGANIZATION: USDA Forest Service—Siuslaw National Forest

LOCATION: Siuslaw National Forest (Tillamook, Lincoln, Benton, Lane, and Douglas Counties)

OBJECTIVE: To prevent road-associated landslides during high intensity storms.

DESCRIPTION: The report outlines: 1) criteria for implementing emergency activities; 2) measures used to prevent slides from roads (drainage, maintenance, etc.); and 3) organizational responsibilities.

STATUS: On file: Siuslaw National Forest.

CONTACT: George Bush, Mike Rebar
P.O. Box 1148
Corvallis, OR 97339
757-4466 or 757-4498

174 Sidecast pullback—a staff paper

RESPONSIBLE ORGANIZATION: Siuslaw National Forest

LOCATION: Mapleton Ranger District, Siuslaw National Forest (Lane and Douglas Counties)

OBJECTIVE: To document the extent of unstable sidecast on district roads, and to assess its effect on road failures and downstream resources.

DESCRIPTION: Sidecast on Mapleton Ranger District roads is documented.

STATUS: On file: Siuslaw National Forest.

CONTACT: George Bush
P.O. Box 1148
Corvallis, OR 97339
757-4466

175 Sidecast risk analysis

RESPONSIBLE ORGANIZATION: Siuslaw National Forest
LOCATION: Mapleton Ranger District, Siuslaw National Forest (Lane and Douglas Counties)
OBJECTIVE: To develop a methodology for analyzing road sidecast and the risk it poses to downslope resources.
DESCRIPTION: This report, written by the soil scientists and materials engineer, is used to prioritize sidecast pullback projects. It describes sidecast materials and outlines the assessment of their potential for failure and sliding.
STATUS: On file: Siuslaw National Forest.
CONTACT: Robert Young, George Bush
P.O. Box 1148
Corvallis, OR 97339
757-4466 or 757-4478

Hydrology/Watershed Management

176 Simulation of storm runoff in the Oregon Coast Range

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management, Oregon State University Department of Forest Engineering

LOCATION: Alsea Watershed Study area and other watersheds in the Oregon Coast Range (Lincoln and Tillamook Counties)

OBJECTIVE: To evaluate an existing method and/or develop an alternative method for simulating individual storm hydrographs in the Oregon Coast Range.

DESCRIPTION: Following a literature review of existing streamflow models of small forested watersheds throughout the United States, simulation of storm hydrographs in the Oregon Coast Range was explored by means of the Soil Conservation Service's curve number methodology and by developing and testing an antecedent precipitation index (API) method. Linear regression was used to correlate API and discharge values for five Coast Range watersheds. Model coefficients for these watersheds were used to predict discharge relations for a sixth coastal watershed. Storm hydrograph shape was accurately simulated.

STATUS: The final report is to be published in the summer of 1988 as a Bureau of Land Management Technical Note, and a computerized version of the API methodology will be made available shortly thereafter.

CONTACT: Robert Beschta
Department of Forest Engineering
Oregon State University
Corvallis, OR 97331
754-4292

177 Calibration of PRMS model for East Fork Lobster Creek

RESPONSIBLE ORGANIZATION: US Geological Survey, USDI Bureau of Land Management

LOCATION: East Fork Lobster Creek, Five Rivers, and the Alsea River (Lane County)

OBJECTIVE: To calibrate a mathematical computer model, the Precipitation-Runoff Modeling System (PRMS), that will simulate streamflow to within 20%, based on inputs of precipitation and evaporation.

DESCRIPTION: Five years of precipitation and streamflow data for East Fork Lobster Creek will be used to calibrate the PRMS model, with approximately half the data set for calibration and the other half for verification. Afterwards, a sensitivity analysis will be performed to evaluate effects of land-use change and predictability. Basin characteristics (e.g., roads and forest cover) and

other parameters (e.g., interception and transpiration) will be varied to define their effect on the model and to measure its accuracy.

STATUS: Five years of hydrologic data have been collected and model calibration and verification are to be completed in the summer of 1988, when evaluation of model results will determine the need for project continuation.

CONTACT: Tony Laenen
847 NE 19th Ave.
Suite 300
Portland, OR 97232
231-2025

Jim Fogg
USDI Bureau of
Land Management
1717 Fabry Rd. SE
Salem, OR 97306
399-5626

178 Contextual system's description of an Oregon Coastal watershed

RESPONSIBLE ORGANIZATION: Oregon State University Department of Fisheries and Wildlife

LOCATION: Yaquina Watershed (Lincoln County)

OBJECTIVE: To develop an understanding of the organization and development of mesoscale systems (several hundred square miles of size), by means of contextualistic watershed classification.

DESCRIPTION: The Yaquina watershed was classified contextualistically, by classifying its substrate (geology, soils, geomorphology), climate, biota (forest community—emphasis on trees), water (hydrology, geomorphology), and culture (Forest Service, local community leaders). It was found that common forest practices were not always appropriate for the bio-physical environment, for erosion control, and for landscape development. However, forest practices were acceptable within the larger cultural and local cultural environments. Therefore, adaptation of more concordant management practices will be difficult.

STATUS: Ph.D. thesis was defended June 1988.

CONTACT: Brigitte Goetze
Department of Fisheries and Wildlife
Oregon State University
Corvallis, OR 97331
754-3503

Logging—Surface Erosion and Landslides

179 Logging and forest roads related to increased debris slides in Southwest Oregon

RESPONSIBLE ORGANIZATION: Siskiyou National Forest, Pacific Southwest Experimental Station—Redding

LOCATION: Siskiyou National Forest (Josephine County)

OBJECTIVE: To estimate quantitative effects of forest management activities on frequency and volume of mass movements, and to collect information on conditions at landslide sites as an aid to appraising future risks of landslides.

DESCRIPTION: Photointerpretation was used to evaluate site variables and volume of existing mass movements on 24 randomly selected tri compartments over a 20-year interval. Afterwards, pi data were verified and additional data were collected for a subset of 125 identified slides.

STATUS: Complete.

CONTACT: Mike Amaranthus
P.O. Box 1131
Grants Pass, OR 97526
476-3830

180 Movement of large landslides in the Oregon Coast Range

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Landslides in the Upper Condon and Wilhelm Creek drainages, North Fork Siuslaw River, Mapleton Ranger District (Lane and Douglas Counties)

OBJECTIVE: 1) To determine the magnitude and timing of landslide movement in relation to rainfall. 2) To evaluate the effects of clearcutting on the movement of the Condon landslide.

DESCRIPTION: Two periodically moving landslide masses, of about 1 ha each, have been monitored with various instruments. One area was clearcut and burned in 1987. Pre- and post-treatment movement, precipitation records, and comparisons with the "control" landslide will be used to analyze the effects of logging on landslide movement.

STATUS: Ongoing.

CONTACT: Fred Swanson, George Lienkaemper
3200 Jefferson Way
Corvallis, OR 97331
757-4398

181 Forest management on landslide-prone sites: evaluation of stability, effectiveness of vegetation leave areas, and effects of landslides on riparian areas

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Engineering

LOCATION: West side of the Oregon Coast Range from Astoria to Florence (Clatsop, Tillamook, Yamhill, Polk, Lincoln, Benton, Lane, Douglas, Coos, and Curry Counties)

OBJECTIVE: 1) To evaluate the role vegetation leave areas play in preventing landslide activity on steep slopes. 2) To determine the extent of blowdown within streamside buffers, as well as any associated increases in sediment. 3) To examine variations in precipitation intensity throughout the Coast Range.

DESCRIPTION: 1) Landslide frequency and size are being monitored on steep slopes (headwalls) in the central Coast Range. Topographic features, rainstorm intensity, and the influence of vegetation on slope stability are also being examined. 2) Blowdown in about 50 streamside buffer strips along the western edge of the Coast Range is being documented. The study will also identify sources of increased stream sedimentation caused by the blowdown (rootwads in stream, landslides, bank cutting). 3) Nine recording rain gauges are being set up in the Central Coast Range to determine spatial and elevational differences in rainfall. This information will lead to a more complete picture of rainfall intensity and therefore to a better understanding of landslide activity, particularly when combined with other sources of rainfall data (radar imagery, a volunteer precipitation network, and weather stations).

STATUS: 1) Headwalls to be monitored have been identified and existing data are being evaluated. 2) Field measurements for the streamside buffers are to be completed September 1988. 3) Rain gauges will be placed in the field by October.

CONTACT: Henry A. Froehlich
Department of Forest Engineering
Oregon State University
Corvallis, OR 97331
754-4005

182 Administrative report—Mapleton leave area study

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis

LOCATION: Mapleton Ranger District, Siuslaw National Forest (Lane and Douglas Counties)

OBJECTIVE: To satisfy the National Wildlife Federation in agreement reached as part of the Mapleton lawsuit. The paper describes the effectiveness of vegetation leave areas in the Mapleton District.

DESCRIPTION: This study assesses the performance of in-unit and riparian leave areas. In general, Siuslaw Forest managers were implementing leave areas as required. Furthermore, even when a leave area was later modified—intentionally or unintentionally—it appeared to maintain its effectiveness. Slides were investigated in forests, clearcuts, and headwall leave areas, but so far the results of the headwall leave area assessments are inconclusive. Whenever roads increased the drainage area by more than 100%, there was an increased incidence of sliding. Seventy percent of landslides came from headwalls, while another 15% came from streamsides. This report contains further discussion of landslides in streamside leave areas, the relation between headwall leave areas and fish habitat, and evaluation of the headwall rating system.

STATUS: On file: Siuslaw National Forest.

CONTACT: George Bush, Chris Roach
P.O. Box 1148
Corvallis, OR 97339
757-4466 or 757-4465

183 Sediment model for forest planning—Siuslaw National Forest

RESPONSIBLE ORGANIZATION: USDA Forest Service—Siuslaw National Forest

LOCATION: Siuslaw National Forest (Tillamook, Lincoln, Benton, Lane, and Douglas Counties)

OBJECTIVE: To allow prediction of sediment from landslides and surface soil erosion associated with logging activities and to estimate the mitigative effects of certain erosion prevention measures.

DESCRIPTION: This model, developed for use in forest land management planning, can be used to predict landslide rates and sedimentation from landslides and other erosional processes for both the natural forest and areas where logging is planned. The natural sediment rates are extrapolated from 20 years of sedimentation data from several roadless basins that have not been clearcut. It is assumed that the natural erosion patterns throughout the Siuslaw National Forest are similar to those within the undisturbed basins. Harvest-associated landslides and dry ravel surface erosion are estimated by assuming aerial clearcut harvest, broadcast burning for site preparation, and construction of access roads. Sediment from landslides and dry ravel processes are reported for 13 landtype associations, each consisting of many similar contiguous landtypes; these are described and mapped in the Siuslaw National Forest Soil Resource Inventory.

STATUS: On file: Siuslaw National Forest.

CONTACT: George Bush
P.O. Box 1148
Corvallis, OR 97339
757-4466

184 Landslide inventories for Mapleton Ranger District (1975, 1978, 1980, 1981, and 1986) and Waldport Ranger District (1980)

RESPONSIBLE ORGANIZATION: USDA Forest Service—Siuslaw National Forest

LOCATION: Mapleton and Waldport Ranger Districts, Siuslaw National Forest (Lincoln, Lane, and Douglas Counties)

OBJECTIVE: To document landslide frequency in clearcut units and in association with roads.

DESCRIPTION: The inventories range from compilations of raw data with little interpretation to published documents with interpretations.

STATUS: On file: Siuslaw National Forest.

CONTACT: George Bush
P.O. Box 1148
Corvallis, OR 97339
757-4466

185 Effectiveness of headwall leave areas in mitigating clearcut-related slides

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Corvallis, Siuslaw National Forest, Oregon State University Department of Forest Engineering

LOCATION: Over 300 sites throughout the Mapleton Ranger District, Siuslaw National Forest (Lane and Douglas Counties)

OBJECTIVE: To determine the effectiveness of headwall leave areas in mitigating small-scale slides and debris flows in clearcuts.

DESCRIPTION: Over 300 headwalls (steep headward tips of streamchannels) in forest, clearcut, and headwall leave areas have been examined for stability and recent slide history (10 to 20 years). These sites will be reexamined after the next big slide-triggering storm to determine the effectiveness of leave areas in mitigating clearcut-related sliding.

STATUS: When the next big slide-triggering storm takes place, these headwalls will be systematically resampled.

CONTACT: Fred Swanson
3200 SW Jefferson Way
Corvallis, OR 97331
757-4398

Henry Froehlich, Chip Andrus
Department of Forest Engineering
Oregon State University
Corvallis, OR 97331
754-4005

186 Disturbed forest land survey

RESPONSIBLE ORGANIZATION: Soil Conservation Service (Clatsop County)
LOCATION: Clatsop County
OBJECTIVE: To assess the amount of soil loss on various timber harvesting sites in Clatsop County, with a view to eventually controlling stream sediment.
DESCRIPTION: Erosion bridges have been set up on 10 sites in Clatsop County, and the sites have been monitored for 2 to 3 years. Several grass-seeded sites are also being monitored.
STATUS: Ongoing.
CONTACT: Jerry M. Proutt
249 W. Main Street
Hillsboro, OR 97123
640-1332

187 Monitoring of sediment from forest roads

RESPONSIBLE ORGANIZATION: National Council for Air and Stream Improvement (NCASI) Engineering Experiment Station
LOCATION: Oregon State University's McDonald Forest (Benton County)
OBJECTIVE: To test efficacy of a sediment trap for monitoring sediment from a forest road.
DESCRIPTION: NCASI is involved in a cooperative research project to monitor sediment coming from forest roads under various erosion control regimes. A sediment trap was installed on a culvert in Road 680 in McDonald Forest to monitor the sediment coming from that road. The installation is being used to test the monitoring approach and the efficacy of the trap.
STATUS: Project is complete. See: Ice, George. 1986. "A study of the effectiveness of sediment traps for the collection of sediment from small forest plot studies." NCASI Tec. Bull. #483.
CONTACT: George Ice
NCASI
P.O. Box 458
Corvallis, OR 97339
752-8801

188 Monitoring erosion on harvest units in Clatsop County—a field study

RESPONSIBLE ORGANIZATION: Soil Conservation Service—Astoria Field Office
LOCATION: Clatsop County
OBJECTIVE: To determine the effects of vegetative cover on soil movement, brush composition, and animal damage to plantation seedlings.
DESCRIPTION: Twenty-one sites were established throughout Clatsop County. The sites are on recently harvested units which were primarily cable-logged, broadcast burned, planted, and seeded for large game (elk) habitat. At each site, 0.1-acre circular plots were established, containing two single or double

3F erosion bridge locations. Remeasurements are completed twice annually, and the seedlings are observed for survival and animal damage. The brush succession is also noted.

STATUS: The sites were established in 1984, 1985, and 1986, with data collected since 1985. Some preliminary summaries have been completed. A detailed report should be available for review by 1989 or 1990.

CONTACT: Jerry M. Proutt
249 W. Main Street
Hillsboro, OR 97123
640-1332

189 Failure mechanisms in shallow forest soils

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Engineering

LOCATION: Oregon Coast Range—No specific field sites selected yet

OBJECTIVE: To identify the mechanisms and degree by which soil strength is influenced by the full continuum of organic components in shallow forest soil.

DESCRIPTION: The properties of small roots from second-growth Douglas-fir have been studied in the laboratory, where the magnitude of shear stress transfer between the roots and surrounding inorganic soil were also examined. Current work involves the development of an analytical model of the forces generated in roots extending through a shear zone, as a function of movement on the shear zone. The model will be based on a combination of laterally and axially loaded pile theory. Future studies will examine the difference between the shear strength of the organic rich horizon of a shallow forest soil profile and the relatively inorganic soil below the organic layer. Strength tests will be performed on reconstituted samples in triaxial shear following back-pressure saturation. Stage testing will be used.

STATUS: Active.

CONTACT: Marvin R. Pyles
Department of Forest Engineering
Oregon State University
Corvallis, OR 97331
754-4571

190 Vegetation management and surface soil erosion in the Oregon Coast Range

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Engineering, USDA Forest Service

LOCATION: Alsea, Mapleton, Waldport, and Hebo Ranger Districts, Siuslaw National Forest (Tillamook, Lincoln, Benton, Lane, and Douglas Counties)

OBJECTIVE: To evaluate and compare the relative amounts of surface soil erosion following manual and chemical treatments for site preparation and conifer release.

DESCRIPTION: Plots on four fresh clearcuts were broadcast burned, aerially sprayed (glyphosate), manually cut, slashed and burned, or left without site

preparation. Plots on four young Douglas-fir plantations were aerially sprayed (glyphosate), manually cut once, manually cut twice, manually cut three times, or left without release treatment. Metal troughs were installed on each plot shortly after the treatments to monitor surface soil erosion at 3-month intervals for 3 years.

STATUS: A preliminary data summary and analysis has been prepared. A more detailed evaluation is underway and a final report will be completed by summer 1989.

CONTACT: Paul W. Adams
Department of Forest Engineering
Oregon State University
Corvallis, OR 97331
754-4952

191 Land evaluation of woodland soils in Lincoln County

RESPONSIBLE ORGANIZATION: Lincoln Soil and Water Conservation District

LOCATION: Lincoln County

OBJECTIVE: To provide a rating of the soils in Lincoln County and to place them in numerical classes that indicate relative quality for forest use.

DESCRIPTION: Each woodland soil in Lincoln County is rated for its use in growing Douglas-fir and western hemlock. The rating factors include seedling mortality, plant competition, wind-throw hazard, equipment limitation, fire hazard, cut-fill limitations, sheet-rill erosion, and soil compaction. The computer program Stand Projection System is being used.

STATUS: The data have been assembled for review by the Land Evaluation Committee. Final report is expected by December 1988.

CONTACT: Don Kessi
3922 Mary's Peak Rd.
Blodgett, OR 97326
265-2631

192 Lincoln County area soil survey report

RESPONSIBLE ORGANIZATION: Soil Conservation Service

LOCATION: Lincoln County, excluding Alsea drainage basin (previously published)

OBJECTIVE: To produce an inventory of soil types and interpretations of their potential for various uses.

DESCRIPTION: Soil scientists have identified and classified the soils according to the International System of Soil Taxonomy. Soil types have been separated into mapping units and plotted on aerial photo base maps, and tree growth rates and soil types have been determined on over 200 sample plots as an aid for estimating the potential for tree growth on each soil mapping unit. Soil scientists and conservationists have clipped pastures on seven caged sample plots for 2 years to assess potential pasture and hay yields. Drainage and erosion control requirements have been estimated for each

mapping unit. In an attempt to determine the influence of temperature on productivity, soil temperatures have been checked monthly at more than 20 sites in pastured and timbered locations.

STATUS: Field work should be completed by December 1988 and the report readied for publication during the next spring.

CONTACT: Soil Conservation Service
344 SW 7th, Suite A
Newport, OR 97365
265-2631

193 Three dimensional Level I Stability Analysis (3-D LESA)

RESPONSIBLE ORGANIZATION: Intermountain Research Station—Moscow Laboratory, USDI Bureau of Land Management—Eugene District

LOCATION: Bureau of Land Management-administered land, Eugene District (Lane County)

OBJECTIVE: To improve the predictive capabilities of the infinite slope equation for Tyee Sandstone.

DESCRIPTION: Parameters such as topographic basin shape, precipitation, and root strength are being incorporated into a predictive equation for slope stability.

STATUS: Work has been ongoing for a number of years. Additional field data will be obtained summer of 1988.

CONTACT: Carol Hammond
1221 S. Main St.
Moscow, ID 83843
(208) 882-3557

Prescribed Burning and Wildfires

194 Dallas watershed erosion monitoring field study

RESPONSIBLE ORGANIZATION: Soil Conservation Service, Coordinated Resource Management Project (CRMP) Group

LOCATION: Rockhouse Creek Burn, a 5000-acre portion of the Rickreall Creek watershed supplying the City of Dallas municipal reservoir (Polk County)

OBJECTIVE: To determine the effects of sediment control measures applied after the October 1987 wildfire.

DESCRIPTION: Seven monitoring sites were established throughout the north portion of the watershed. Each monitoring site consists of a 0.1-acre circular plot containing two double 3F erosion bridge locations. Baseline profile data were obtained in November 1987 and January, April, and May 1988. The plots will be remeasured twice annually for a minimum of 2 years. Seedling survival and animal damage will be monitored.

STATUS: Current remeasurements were completed on four sites as of April 1988.

CONTACT: Jerry M. Proutt
249 W. Main Street
Hillsboro, OR 97123
640-1332

195 Erosion rate/burn intensity study

RESPONSIBLE ORGANIZATION: USDI Bureau of Land Management—Eugene District

LOCATION: Coast and Cascade Ranges in the Eugene District (Lane County)

OBJECTIVE: 1) To quantify erosion differences between soils that are burned at the "hot" end of slashburning prescriptions and those burned at the "cool" end. 2) To estimate a reasonable worst-case amount of erosion that results from the standard burn prescription.

DESCRIPTION: Fifty erosion boxes were placed in harvested units (after harvest) on slopes greater than 60%. Fuel loading was determined before and after burning. Colored beads were placed at specified intervals upslope of each erosion box. Material in the erosion boxes was collected 24 hours before and after burning and for 12 months following the burn. Data will be used to determine erosion rates vs. time and revegetation.

STATUS: The data were collected during 1984, 1985, and 1986. Some preliminary data analysis has been conducted.

CONTACT: Jim McLaughlin
Nevada State Bureau of Land Management Office
P.O. Box 1200
Reno, NV 89520
(702) 784-5455

Stream Temperature

196 Stream temperature and channel characteristics

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Engineering

LOCATION: Elk River Basin (Curry County)

OBJECTIVE: To evaluate summertime stream temperature and channel characteristics of the Elk River.

DESCRIPTION: Historical flow and temperature data were analyzed. During the summers of 1984 and 1985, basin-wide water temperatures were measured, along with channel characteristics and the relative amounts of shading.

STATUS: Study completed. Oregon State University M.S. thesis by M.D. McSwain, 1987: Summer stream temperature and channel characteristics of a southwestern Oregon Coastal Stream.

CONTACT: R.L. Beschta
Department of Forest Engineering
Oregon State University
Corvallis, OR 97331
754-4292

WILDLIFE

Community Diversity and Abundance

197 Mycophagy rates of small mammals on *Hysterangium* species in a mature Douglas-fir stand

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Siuslaw National Forest land, Mary's Peak (Benton County)

OBJECTIVE: To quantify monthly mycophagy on *Hysterangium* mats in a 60-year-old Douglas-fir stand.

DESCRIPTION: Thirty pairs of *Hysterangium* mats were located in a mature Douglas-fir stand in March 1988. An exclosure was placed over one mat of each pair to reduce or eliminate mycophagy by small mammals. Sporocarp production (numbers and biomass) were recorded monthly through July from each mat. Small mammals in the area were trapped in winter 1987-88 and will be trapped again fall 1988. Data collection included: presence of small mammal species; species of spores in small-mammal fecal samples; and sporocarp production from all mats.

STATUS: Active.

CONTACT: Bill McComb, Kermit Cromack
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

198 Spotted owl prey ecology: Oregon Coast Range

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Olympia, USDI Bureau of Land Management

LOCATION: Private and Bureau of Land Management lands in western Douglas County

OBJECTIVE: To determine the abundance and habitat preferences of flying squirrels, woodrats, and red tree voles in the types of forest stands found in the home ranges of spotted owls.

DESCRIPTION: Prey populations are being studied at 15 sites in the Coast Range. At each site a 10 by 10 trapping grid has been established. Live trapping using mark-and-release techniques is conducted twice a year in the spring and fall.

STATUS: This study was initiated in 1985 and sampling is scheduled to continue through 1990.

CONTACT: A.B. Carey
Pacific Northwest Research Station
Forestry Sciences Laboratory
3625 93rd Avenue SW
Olympia, WA 98502
(206) 753-9494

199 Patterns of wildlife abundance and diversity in managed upland forest landscapes

RESPONSIBLE ORGANIZATION: Adaptive COPE, Oregon State University

LOCATION: Drift Creek watershed (Lincoln County)

OBJECTIVE: 1) To examine abundance of wildlife in three stand types (managed open-canopy plantation, managed closed-canopy plantation, natural mature Douglas-fir); 2) To quantify wildlife abundance, microhabitats, and microclimates along a gradient from stand edges to stand interiors; 3) To describe the patterning of stands and edges across the watershed and to project patterns of suitable wildlife habitat for the watershed.

DESCRIPTION: Managed plantations of two ages—young (0 to 8 years) and older (20 to 30 years)—will be located adjacent to natural mature Douglas-fir forest in the Drift Creek watershed. There will be three replicates of each plantation type. Three transects will be established in each site extending from the center of the plantation, across the stand edge, and 400 m into the natural forest. Birds, small mammals, amphibians, and reptiles will be sampled along the transects during fall and spring. Vegetation and microclimate variables will also be measured along the transects. Patterns of association between wildlife, habitat, and microclimate will be analyzed as a function of stand type and distance from edge. Aerial photo interpretation will be used to describe the patterning of stands and edges across the watershed, and projections of wildlife habitat suitability over the basin will be developed.

STATUS: Study sites were located and transects established in summer 1988. Wildlife, vegetation, and microclimate will be sampled during 1988 and 1989. Photo interpretation and data analysis will be done and the study completed in 1990.

CONTACT: Andy Hansen
Adaptive COPE
Oregon State University Marine Science Center
Newport, OR 97365
867-4011

200 Vertebrate community studies: Oregon Coast Range

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Olympia, USDI Bureau of Land Management

LOCATION: Bureau of Land Management and private lands in the central Coast Range (Benton, Lincoln, Lane, Douglas, and Coos Counties)

OBJECTIVE: To determine the patterns of abundance of birds, mammals, amphibians, and reptiles across young, mature, and old-growth Douglas-fir forests in the Coast Range.

DESCRIPTION: Forty-five study stands were selected in 1984. Vertebrate abundance was sampled from 1984 to 1986 by means of point count censuses for birds, area searches for amphibians, pitfall trapping for amphibians and reptiles, and snap and pitfall trapping for small animals.

STATUS: Field work was completed in 1986. Data analysis and manuscript writing is currently under way. This research was included in a symposium on old-growth Douglas-fir forests in March 1988.

CONTACT: A.B. Carey
Pacific Northwest Research Station
Forestry Sciences Laboratory
3625 93rd Avenue SW
Olympia, WA 98502
(206) 753-9494

Control of Pest Species

201 Black bear density and habitat use in relation to conifer damage in the central Oregon Coast Range

RESPONSIBLE ORGANIZATION: Oregon State University Department of Fisheries and Wildlife

LOCATION: Near Philomath (Benton County)

OBJECTIVE: 1) To determine black bear habitat use and home range size during the spring season (mid-April through early July); 2) to examine spring food habits of black bear; 3) to compare relative bear densities in areas of high and low bear-related timber damage; 4) to determine whether characteristics of specific Douglas-fir stands contribute to the incidence of bear damage.

DESCRIPTION: Thirteen bears have been captured and radio-collared. Their spring movements are being followed, and their scats collected for forage analysis. Relative abundance of bears in areas of high and low timber damage is being assessed via scent stations. Transects through pockets of bear-damaged Douglas-fir trees are being used to describe the characteristics of those stands.

STATUS: Thirteen bears have recently been collared. Additional bears (up to 20 total) may be collared in fall 1988.

CONTACT: Charles Meslow
Oregon Cooperative Wildlife Research Unit
104 Nash Hall
Oregon State University
Corvallis, OR 97331
754-4531

Habitat Management—Commercial Forest

202 Management of the nesting habitat of selected bird species (bald eagle, golden eagle, great blue heron, and osprey)

RESPONSIBLE ORGANIZATION: Weyerhaeuser Company and others
LOCATION: Weyerhaeuser Company lands (Coos, Lane, and Linn Counties)
OBJECTIVE: To determine appropriate forestry management strategies for the maintenance of productive populations of selected bird species.
DESCRIPTION: Management plans are developed and monitored for all known nesting eagles, herons, and osprey within and adjacent to Weyerhaeuser Company property.
STATUS: The project was initiated in 1977 and is ongoing with annual monitoring of bird use and productivity in relation to planned forest management activities.
CONTACT: Bob Anderson
Weyerhaeuser Company
Tacoma, WA 98477
(206) 924-6328

203 Geographic information analysis: an ecological approach for the management of wildlife on forested landscape

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Management Environmental Remote Sensing Applications Laboratory (ERSAL)
LOCATION: Portions of the Siuslaw National Forest including the Drift Creek watershed (Lincoln County)
OBJECTIVE: To characterize spatial patterns in the forested landscape using satellite data, a geographic information system, and landscape ecology techniques for wildlife habitat modelling.
DESCRIPTION: A test site will be established in the Drift Creek area. A wildlife species-richness model will be developed from a Landsat classification of forest successional stages and from data on the occurrence or potential occurrence of vertebrate species.

STATUS: This project will be starting in 1988/1989. New high-altitude U-2 infrared aerial photography was obtained in July 1988 over a part of the Siuslaw National Forest including the Drift Creek watershed. The project will continue for 3 years.

CONTACT: William J. Ripple
ERSAL
College of Forestry
Oregon State University
Corvallis, OR 97331
754-3056

Habitat Management—Riparian Zone

204 Response of vegetation and terrestrial vertebrates to herbicidal and mechanical devegetation adjacent to Coast Range riparian zones

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science, USDA NAPIAP (North American Pesticide Impact Assessment Program)

LOCATION: Private industry lands (Benton and Lincoln Counties)

OBJECTIVE: To identify changes in habitat and animal communities following herbicidal and mechanical devegetation in red alder stands adjacent to riparian zones.

DESCRIPTION: Four sites will be selected for study, each scheduled for conversion from alder to Douglas-fir. On each site, three 20-acre treatment blocks will be assigned: control; harvest, spray with glyphosate, burn, and plant; harvest, burn and plant. Terrestrial vertebrates and habitat will be sampled for 1 year before treatment and 1 to 2 years after treatment.

STATUS: Two sites have been selected, with pretreatment sampling to begin summer 1988. Two additional sites will be selected in spring 1989.

CONTACT: Bill McComb, Mike Newton
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

205 Wildlife habitat and wildlife diversity in riparian zones: a gradient approach

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science

LOCATION: Forest Service, Bureau of Land Management, and private lands throughout the Coast Range

OBJECTIVE: To identify responses of wildlife to management practices within and adjacent to riparian zones, and to explain patterns on the basis of resource availability.

DESCRIPTION: A problem analysis and a pilot study will be conducted to prioritize research problems for this project. Information needs will be identified through interviews with biologists and managers from the Forest Service, Bureau of Land Management, Bureau of Indian Affairs, Oregon Department of Forestry, Oregon Department of Fish and Wildlife, and private industry. The pilot study will identify wildlife patterns upslope, within riparian zones, and along transriparian gradients in six mature unmanaged watersheds in the central Coast Range. Three sites are scheduled for harvest.

STATUS: Spring sampling of birds and small mammals is complete. The problem analysis will be completed in the fall of 1988. Habitat and amphibians will be measured in summer 1988, and additional bird and small mammal sampling will be conducted in the fall and winter of 1988.

CONTACT: Bill McComb
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

Status of Indicator or Endangered Species

See also: Project 198

206 Effects of forage improvement on Roosevelt elk in the Oregon Coast Range

RESPONSIBLE ORGANIZATION: Oregon State University Department of Fisheries and Wildlife, Oregon Department of Fish and Wildlife, Siuslaw National Forest, Rocky Mountain Elk Foundation

LOCATION: Alsea and Waldport Ranger Districts, Siuslaw National Forest (Benton and Lincoln Counties)

OBJECTIVE: To compare improved and untreated areas for: 1) elk movements and home range size; 2) elk productivity—calf birth weight and survival, cow body condition, pregnancy rates, breeding dates, and calf-to-cow ratios; 3) forage availability; and 4) diets of elk.

DESCRIPTION: Seeded and fertilized areas in the Alsea Ranger District are being compared to untreated areas in the Waldport Ranger District. Elk calves will be captured, weighed, and radio-collared to determine movements, home range size, and birth weights. Cow elk will be harvested in special hunts, and the kidneys, reproductive tracts, udders, and incisors examined for productivity and age data. Summer herd counts will be used to determine calf-to-cow ratios. Plots will be clipped to measure forage availability, and elk diets will be determined by microhistological analysis of fecal samples.

STATUS: Thirty-six elk calves were captured in the spring of 1987 and 1988. Forty-two cow elk were collected in the special hunts in 1988; additional hunts are planned for 1989. Forage sampling and fecal collections will be completed in June 1989.

CONTACT: Rosemary Stussy
Department of Fisheries and Wildlife
Oregon State University
Corvallis, OR 97331
754-4531 or 487-7494

207 Development of inventory techniques for surveying marbled murrelet (*Brachyrampnus marmoratus*) in coniferous forests of the Oregon Coast Range

RESPONSIBLE ORGANIZATION: Oregon Department of Fisheries and Wildlife, National Council for Air and Stream Improvement, Oregon State University, Oregon Cooperative Wildlife Research Unit, USDA Forest Service, US Fish and Wildlife Service, USDI Bureau of Land Management

LOCATION: Oregon Coast Range Mountains within 50 km of ocean

OBJECTIVE: To develop a forest inventory technique for locating, documenting, and describing use of specific inland habitat areas by marbled murrelets; to

locate nest or roost sites within predetermined areas; to describe habitat characteristics of forest stands and nest sites utilized by murrelets.

DESCRIPTION: A factorial sampling design was used for this study, so that eight regimes, repeated four times in each of six study sites, resulted in 32 visits to each survey site. The eight regimes involved three factors—time of day (dawn or dusk), survey location (on road or in stand), and playing or not playing tape recordings of murrelet vocalizations. Dawn surveys were the most effective for surveying for murrelets. Survey stations with greater than 50% visible sky allowed for the most sightings. These auks did not respond to tape recordings of their vocalizations.

STATUS: Started 15 May 1988; completed 30 September 1988. Final report due 31 December 1988.

CONTACT: Kim Nelson
Oregon Cooperative Wildlife Research Unit
104 Nash Hall
Oregon State University
Corvallis, OR 97331
754-4531

208 Use of general road transects to locate inland murrelet aggregations in coniferous forests of the Oregon Coast Range

RESPONSIBLE ORGANIZATION: Oregon Department of Fish and Wildlife, USDA Forest Service, USDI Bureau of Land Management, US Department of Fish and Wildlife, National Council for Air and Stream Improvement, Oregon State University, Oregon Cooperative Wildlife Research Unit

LOCATION: Mountains within 50 km of the ocean, primarily on Siuslaw National Forest and Salem Bureau of Land Management land, in the central Oregon Coast Range (Benton, Lincoln, and Tillamook Counties)

OBJECTIVE: To utilize road transects to locate new inland murrelet aggregations; to describe use of inland areas and habitat characteristics.

DESCRIPTION: Thirty road transects were established in a variety of habitat types. Each transect included some old-growth (>200 years) or mature (80-200 years) forests, as well as younger forests and clearcuts. Ten to twelve sampling stations, placed at 0.5-km intervals, were surveyed for 10 minutes each. Surveys began 45 minutes before and continued 90 minutes after official sunrise. Twenty new inland areas were discovered; most occurred in older-aged forests (>100 years). Actual stand associations could not be established in all cases.

STATUS: Started 15 May 1988; completed 30 September 1988. Final report due 31 December 1988.

CONTACT: Kim Nelson
Oregon Cooperative Wildlife Research Unit
104 Nash Hall
Oregon State University
Corvallis, OR 97331
754-4531

209 Spotted owl population biology—Oregon Coast Range

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Olympia, USDI Bureau of Land Management

LOCATION: Private and Bureau of Land Management lands (Douglas County)

OBJECTIVE: To determine survivorship, fecundity, site tenacity, ecological density, and population trends of spotted owls.

DESCRIPTION: This intensive banding and reobservation study is an attempt to locate and color-band all spotted owls within a study area of approximately 150 mi^2. The population will then be monitored for at least 5 years. The study is a companion study to a prey base study and a radio telemetry project on habitat use.

STATUS: Study was initiated in 1987 and will continue through 1991. Field work each year will be conducted between 1 March and 30 September.

CONTACT: Eric Forsman,
Pacific Northwest Research Station
Forestry Sciences Laboratory
3625 93rd Avenue SW
Olympia, WA 98502
(206) 753-9494

210 Spotted owl habitat use—Oregon Coast Range

RESPONSIBLE ORGANIZATION: USDA Forest Service Pacific Northwest Research Station—Olympia, USDI Bureau of Land Management

LOCATION: Private and Bureau of Land Management lands near Roseburg (Douglas County)

OBJECTIVE: To determine habitat use and home range size of spotted owls in the Coast Range.

DESCRIPTION: Twenty-five pairs of spotted owls are currently equipped with radio transmitters. Each bird is located two to three times per week by radio triangulation methods. Aerial photos and forest type maps are used to compare use vs. availability of habitat within the home range of each pair of birds.

STATUS: This study was initiated in 1986 and field sampling is scheduled to continue through 1990. Analysis of owl habitat preferences is currently under way.

CONTACT: A.B. Carey
Pacific Northwest Research Station
Forestry Sciences Laboratory
3625 93rd Avenue SW
Olympia, WA 98502
(206) 753-9494

211 Spotted owl home range and habitat use in west central Oregon

RESPONSIBLE ORGANIZATION: Oregon Cooperative Wildlife Research Unit, USDI Bureau of Land Management

LOCATION: Crow (Lane County)

OBJECTIVE: To document the home range size, habitat selection, and survival/reproductive parameters of selected pairs of spotted owls.

DESCRIPTION: Radio telemetry is used to acquire data on up to four pairs of spotted owls.

STATUS: Project is in fourth year and is continuing.

CONTACT: Charles Meslow
104 Nash Hall
Oregon State University
Corvallis, OR 97331
754-4531

212 Winter acclimatization in dark-eyed juncos

RESPONSIBLE ORGANIZATION: Oregon State University Department of Zoology

LOCATION: McDonald Forest (Benton County)

OBJECTIVE: To determine the extent of winter acclimatization in juncos and to document physiological mechanisms underlying acclimatization.

DESCRIPTION: Juncos will be trapped from forest edge habitat (seven sites currently) and transported to the laboratory. Seasonal variations in cold resistance, metabolic parameters, and vascular oxygen transport have already been identified. Seasonal variation in carbohydrate and lipid metabolism, and hormonal influence on acclimatization, are now under investigation. Following experiments, adult and juvenile birds will be banded with U.S. Fish and Wildlife Service bands, released, and patterns of migration, survivorship, and nest fidelity will be monitored.

STATUS: The project began during the summer of 1985 and should continue until approximately June 1990.

CONTACT: David Swanson
Department of Zoology
Oregon State University
Corvallis, OR 97331
754-3705

213 Physical and microclimatic characteristics of white-breasted nuthatch roost sites

RESPONSIBLE ORGANIZATION: Oregon State University Department of Forest Science, North American Bluebird Society

LOCATION: Hardwood stands on east slopes of Coast Range and the Willamette Valley (Benton County)

OBJECTIVE: To identify characteristics important to energy conservation by roosting white-breasted nuthatches during winter and summer.

DESCRIPTION: Sixteen white-breasted nuthatches will be captured and radio-marked in summer and winter to locate roost sites. The microclimate and physical characteristics of the roost sites will be compared to those of randomly selected cavities that were not used.

STATUS: Data have been collected on four birds during the winter 1987-88. Summer field work began in 1988.

CONTACT: Bill McComb
Department of Forest Science
Oregon State University
Corvallis, OR 97331
754-2244

Project Number Index

Indexed by responsible organization, location by county, or contact.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